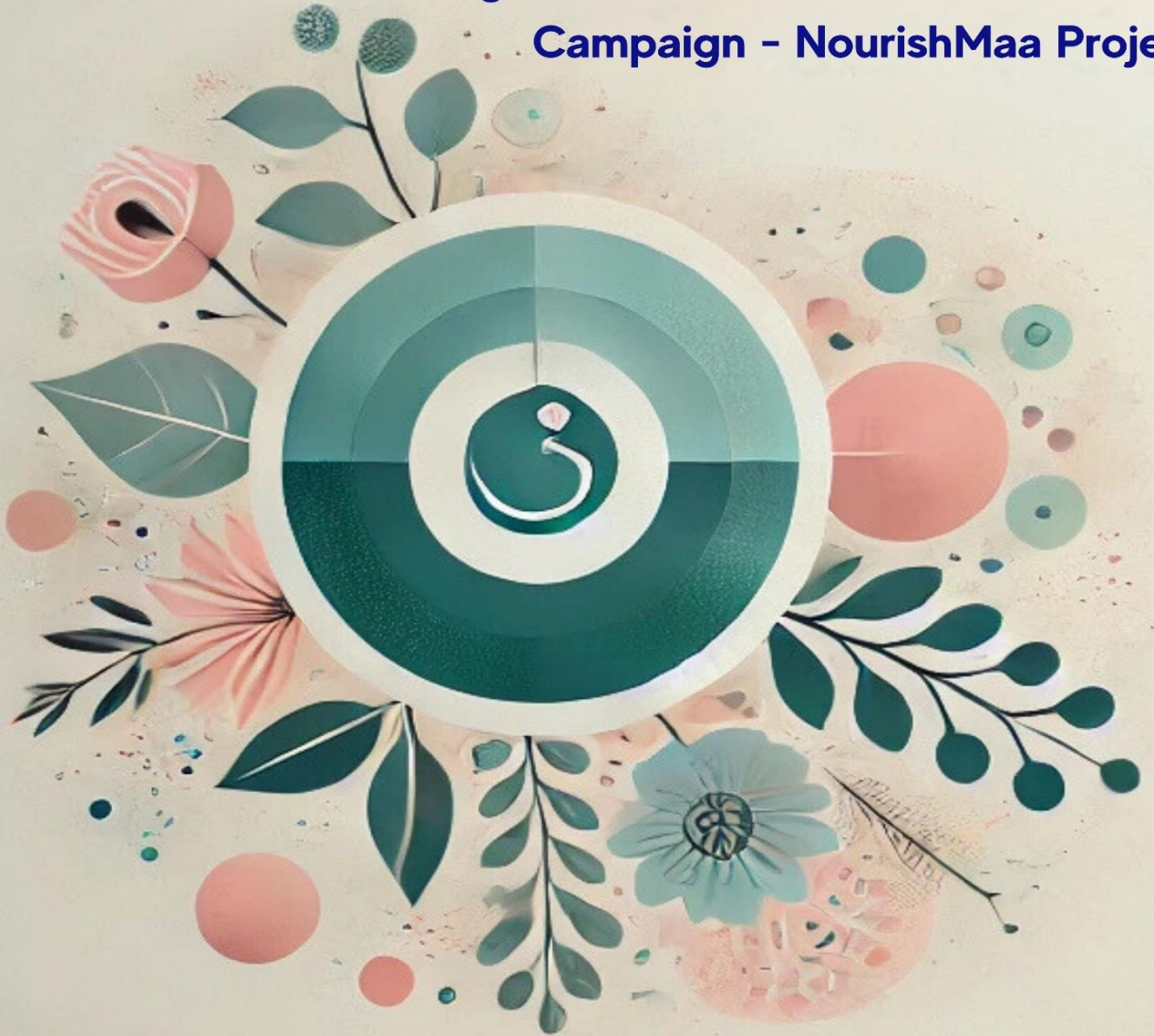


**End-line Survey for Measuring Knowledge, Attitude,
Motivation, and Practices of Health Care Providers (HCPs)
and Frontline Health Workers (FHWs) on Maternal
Nutrition through the Pakistan Maternal Nutrition
Campaign - NourishMaa Project**



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Acronyms

ANC	Antenatal care
BHU	Basic Health Unit
MoNHSR&C	Ministry of National Health Services Regulations and Coordination
DHQ	District Head Quarters
FGDs	Focus Group Discussions
FLW	Frontline Workers
IRMNCH	Integrated Reproductive, Maternal, Neonatal & Child Health
HCPs	Healthcare Providers
IDI	In-depth interview
KOLs	Key Opinion Leaders
LHWs	Lady Health Workers
MN	Maternal Nutrition
MNCH	Maternal, Neonatal and Child Health
NI	Nutrition International
PNC	Postnatal care
RHCs	Rural Health Centres

1. Executive Summary

The NourishMaa Campaign was launched in response to Pakistan's triple burden of malnutrition, which predominantly affects women and children. This campaign aimed to improve maternal nutrition by enhancing the capacity of healthcare providers (HCPs) and frontline health workers (FLWs) through education, training, and behavior change communication (BCC). The campaign was implemented across several districts in Sindh, Punjab, and Khyber Pakhtunkhwa, and targeted both urban and rural populations. This endline evaluation assesses the campaign's impact by comparing baseline and post-campaign data through quantitative surveys and qualitative insights from focus group discussions (FGDs) and in-depth interviews (IDIs) with key stakeholders.

Context and Background

Pakistan continues to face a malnutrition crisis, with nearly 50% of pregnant women anemic and 12-14% of women of reproductive age underweight. Recognizing this challenge, the NourishMaa campaign sought to enhance the knowledge, motivation, and practices of HCPs and FLWs, while raising community awareness on the importance of maternal nutrition. The campaign aligned with the Pakistan Maternal Nutrition Strategy (2022-2027) and aimed to address gaps in maternal nutrition knowledge, practices, and service delivery.

Methodology

A mixed-methods approach was adopted, combining quantitative surveys of 783 HCPs and 662 FLWs, and qualitative data from FGDs and IDIs with key stakeholders. This methodology allowed for comprehensive analysis, triangulating quantitative findings with qualitative insights to provide a robust understanding of the campaign's impact.

Key Findings

1. Increased Awareness and Knowledge

The campaign led to significant improvements in the knowledge and awareness of both HCPs and FLWs:

FLWs' knowledge improvement: The percentage of FLWs who knew about the recommended Iron and Folic Acid Supplementation (IFAS) during pregnancy and after delivery increased from 34.7% at baseline to 98.5% post-campaign. Additionally, knowledge of the five essential food groups improved from 24.4% to 39.9%.

HCPs' knowledge on maternal nutrition: HCPs demonstrated high knowledge levels, but certain areas such as food diversity and appropriate weight gain during pregnancy showed room for improvement. At endline, 91.8% of HCPs recognized maternal nutrition as important to their practice, up from 84.1% at baseline.

2. Improved Practices in Maternal Nutrition

The campaign had a positive impact on the maternal nutrition practices of healthcare providers and FLWs:

FLWs' behavior change: Almost all FLWs (99.9%) reported advising pregnant women to take nutritional supplements, with 98.5% specifically promoting daily IFAS intake during pregnancy.

HCPs' counseling practices: The frequency of HCPs providing nutrition counseling improved, with 97.8% advising pregnant women on proper nutrition. There was also a significant increase in the systematic use of anthropometric screening for pregnant women at ANC/PNC clinics, reported by 88.5% of HCPs.

3. Increased Motivation and Engagement

The campaign was successful in motivating healthcare providers and frontline workers:

FLWs' motivation: 94.9% of FLWs reported feeling motivated to work on maternal nutrition, and 95.6% indicated that they enjoyed providing nutrition-related education to their clients.

Challenges with motivation: Despite high motivation, 79.6% of FLWs mentioned that workload and job stress affected their motivation, and 76.7% reported being overburdened with additional responsibilities.

4. Barriers to Policy Adoption and Implementation

While the campaign enhanced knowledge and practices, challenges remained in the full adoption of maternal nutrition policies:

Adoption of national policies: Although 87.6% of HCPs were aware of national maternal nutrition guidelines, 48.7% reported challenges in adopting these policies due to resource constraints and institutional barriers. Both HCPs and FLWs expressed the need for clearer policy directives and support from health management.

5. Sustainability and Community Engagement

The sustainability of behavior change remains a concern, particularly regarding long-term adherence to nutritional practices:

Sustaining behavior change: Although there was widespread uptake of nutrition-related behaviors during the campaign, concerns were raised about the sustainability of these changes without continued support and engagement. For example, while 98.5% of FLWs encouraged IFAS usage, only 41.5% ensured postpartum women adhered to calcium supplementation for the recommended three months.

Community involvement: The qualitative data highlighted the importance of community engagement, with FLWs expressing the need for greater involvement from community influencers and local leaders to sustain maternal nutrition practices.

Key Outcomes

Healthier behaviors: There was a marked improvement in the uptake of healthier nutritional behaviors among pregnant women, driven by the campaign's emphasis on supplements, dietary diversity, and counseling.

Health outcomes: While the evaluation did not directly measure health outcomes like reduced rates of low birth weight or preterm births, the improved practices in nutrition counseling, supplement distribution, and anthropometric screening suggest a positive trajectory for maternal and fetal health.

Challenges

Workload and resources: The high workload of FLWs, combined with a lack of institutional resources, was a recurring challenge. FLWs reported feeling overburdened, and HCPs noted difficulties in consistently implementing maternal nutrition guidelines in their facilities due to resource constraints.

Sustainability of behavioral changes: The long-term sustainability of behavior changes remains uncertain, particularly without continued training and engagement from community leaders.

Recommendations

1. **Strengthen Policy Adoption:** Provide healthcare providers with the necessary tools and resources to adopt national maternal nutrition guidelines, ensuring that policies are fully integrated into daily clinical practices. Establish clear channels of support for HCPs and FLWs to overcome resource and operational barriers.
2. **Ensure Continuous Training and Capacity Building:** Continue providing regular, structured training programs for both HCPs and FLWs, focusing on key areas such as food diversity, weight gain during pregnancy, and postpartum nutrition. These sessions should incorporate practical, scenario-based learning to further enhance real-world application.
3. **Address Workload and Resource Gaps:** Reduce the workload of FLWs by streamlining tasks and providing additional personnel where needed. Introduce digital tools to automate routine tasks and improve efficiency in patient monitoring and data collection.
4. **Increase Community Engagement:** Sustain and expand community outreach efforts by involving local influencers, religious leaders, and community groups in promoting maternal nutrition. Establish maternal nutrition support groups at the community level to maintain behavior change post-campaign.
5. **Monitor and Evaluate Long-Term Impact:** Implement long-term monitoring systems to assess the sustainability of behavior changes, and track health outcomes such as rates of low birth weight, anemia, and preterm births. Periodic evaluations should be conducted to adjust strategies based on emerging challenges and successes.

The NourishMaa campaign has successfully improved the knowledge, attitudes, and practices of healthcare providers and frontline health workers regarding maternal nutrition. However, continued efforts are required to sustain behavior changes, address policy implementation barriers, and provide ongoing support to healthcare workers. By focusing on these areas, the campaign's positive impact on maternal and child health can be deepened and sustained over time.

2. Introduction to the Nutrition International

Nutrition International (NI), formerly known as the Micronutrient Initiative (MI), is a renowned international development organization based in Ottawa, Canada, dedicated to improving global nutrition through interventions focusing on women and children in developing countries. NI aims to generate innovative and sustainable solutions to improve nutrition among women, newborns, and children. The organization relies on robust evidence-based research and evaluation to demonstrate the significant return on investment from scaling up highly cost-effective nutrition interventions. NI aspires to be a global center of excellence in providing technical and programmatic support in the field of nutrition.

In collaboration with key stakeholders, including governments, the private sector, and civil society groups, NI seeks to address the nutrition challenges affecting one-third of the world's population. NI is actively engaged in tailoring health and nutrition strategies and scaling up existing programs in various regions across the globe, including Africa, Asia, the Caribbean, and Latin America. Its international Board of Directors oversees interventions that currently reach approximately 500 million people in over 70 countries.

One of NI's key strategic goals is to enhance the global impact of micronutrient interventions by generating cutting-edge knowledge and using it to develop sound policies and programs, while also consolidating political will to achieve its vision. NI aims to position itself as a global center of excellence in generating scientific research in micronutrient programs, providing quality assurance for research and programs, and disseminating and translating new knowledge to influence and improve national and global policies and programs. NI also offers guidance and support for program evaluations, and coordinates the analysis and utilization of evaluation results to inform ongoing and future activities.

This end-line survey focuses on assessing the knowledge, attitudes, motivation, and practices of HCPs and FHWs who have been instrumental in implementing maternal nutrition interventions. Additionally, it examines the influence of KOLs on the attitudes and practices of HCPs. The survey's findings provide insights into the effectiveness of the NourishMaa campaign in enhancing maternal nutrition practices among key health actors across selected districts in Sindh, Khyber Pakhtunkhwa (KPK), and Punjab provinces.

2.1 Project Background

Rationale

Pakistan is experiencing a triple burden of malnutrition, significantly affecting women and children. According to the National Nutrition Survey 2018, 40% of children under five are stunted, 18% are wasted, and 12-14% of adolescent girls and women of reproductive age (WRA) are underweight. Additionally, micronutrient deficiencies are widespread, with half of children under five being anemic and deficient in Vitamin A, similar rates observed among WRA and adolescent girls. Deficiencies in iron, zinc, and calcium are also alarmingly high across all population groups. Among pregnant women, 50% are anemic, while 38% of WRA are overweight or obese.

Despite the availability of cost-effective, evidence-based interventions, attendance at antenatal care (ANC) and postnatal care (PNC) services remains low, with only 31.7% of women attending four ANC visits, and 32% receiving PNC after delivery, according to the Pakistan Demographic and Health Survey (PDHS) 2017-18. Nearly 70% of women report challenges in accessing healthcare, including restrictions on mobility and obtaining permission for accessing services. Within Pakistan's conservative socio-cultural setting, healthcare providers are critical confidants for women, who are often allowed to visit them only with chaperones (husbands or female in-laws).

Gender equality and improved nutrition are interlinked, as a woman's empowerment status affects her nutritional status. Nutrition International (NI) recognizes that addressing gender-related barriers can improve nutritional outcomes in health programming. In Pakistan, specific gender roles significantly limit

women's ability to access healthcare services. According to NI's recent Sex & Gender-Based Analysis in Pakistan, young and unmarried women have limited decision-making power at the household level, and they rely financially on male family members for healthcare access. Restrictions on mobility and the need for approval from male heads of the household further hinder healthcare-seeking behavior among women and girls.

Healthcare Providers (HCPs) in both public and private health sectors play a key role in reaching, engaging, and influencing women and their "gatekeepers" (husbands, mothers-in-law) about essential health and nutrition practices. ANC and PNC visits are the primary platforms for delivering maternal health and nutrition interventions. However, only 15% of women reported receiving information and counselling on nutrition during ANC visits. Frontline health workers, including Lady Health Workers (LHWs) and Community Midwives (CMWs), provide basic maternal health services at community and household levels, particularly in rural and remote areas.

The limited engagement of HCPs and health workers in providing nutritional information represents a missed opportunity to advance women's health and well-being, and to maximize the uptake and impact of maternal nutrition interventions. Improving maternal nutrition requires a comprehensive approach and supportive environment, including adequate financing, clear policies, appropriate health worker capacity, functioning supply chains, and access to necessary commodities. Enhancing the knowledge, attitudes, practices, and motivation of HCPs is essential for creating this enabling environment. The Pakistan Maternal Nutrition Strategy (MNS) 2022-2027 was launched with the goal of protecting and promoting healthy diets, practices, and services that support optimal nutrition, health, and well-being of all women in Pakistan, particularly during the preconception, pregnancy, and postpartum stages. Therefore, now is the opportune moment to invest in advancing maternal nutrition efforts in Pakistan.

Background

Pakistan has made significant progress in strengthening key infrastructure for health and social services and increasing public health expenditure over the past decade. Positive changes are evident in national health indicators, particularly in child survival and reproductive healthcare. However, malnutrition remains a persistent challenge for the government. Maternal nutrition indicators continue to show poor performance, characterized by the triple burden of malnutrition, including undernutrition, overweight and obesity, and micronutrient deficiencies.

According to the National Nutrition Survey 2018, 14.4% of women of reproductive age are underweight, reflecting an improvement from 18% in 2011. The prevalence of underweight women is more pronounced in rural areas compared to urban centers. Maternal malnutrition in Pakistan is largely driven by inadequate household food and nutrition security, insufficient health services and care practices, and gender inequality. Within Pakistan's socio-cultural context, restricted normative practices related to maternal health and limitations on women's mobility further compound this issue.

2.2 Purpose of the Assignment:

The overall objective of this evaluation was to assess the knowledge, attitudes, practices, and motivation of healthcare providers (HCPs) and frontline health workers (FLHWs) regarding maternal nutrition as influenced by the campaign. The endline survey comprehensively evaluated the project's impact, focusing on areas such as training effectiveness, health outcomes, community engagement, and policy influence. Specifically, it assessed knowledge levels, motivation, and attitudes towards maternal nutrition, as well as the nutritional practices adopted by HCPs and FLHWs.

The survey also reviewed the effectiveness of training programs, measuring improvements in maternal and infant health outcomes, and the reach and impact of behavior change communication (BCC) materials. Additionally, it explored the role of key opinion leaders (KOLs) in guiding HCPs and FLHWs to promote

best practices, evaluating their influence on advocacy efforts, policy changes, and stakeholder collaboration.

3. Materials and Methods

Study Area

The project area comprises districts in the Punjab, Sindh, and Khyber Pakhtunkhwa (KPK) provinces, focusing on diverse geographic and socio-economic contexts:

Sindh:

- ❖ Gulshan-e-Iqbal Town, District Central, Karachi
- ❖ District Korangi, Karachi
- ❖ Tehsil Larkana, District Larkana
- ❖ Qambar Shahdadkot

Punjab:

- ❖ Tehsil Rawalpindi, District Rawalpindi
- ❖ Tehsil Ahmedpur East, District Bahawalpur

KP:

- ❖ Mardan
- ❖ Battagram

Target Groups in the Project

To achieve meaningful coverage through project activities, the initiative focused on a set of priority target groups composed of healthcare providers (HCPs) and key opinion leaders (KOLs). These groups were selected for their relevance in influencing and changing practices:

1. Public Maternal, Neonatal, and Child Health (MNCH) Providers:

- ❖ Specialists (gynecologists, physicians, pediatricians) reached through government departments based in primary, secondary, and tertiary healthcare facilities.
- ❖ Primary Level: Basic Health Units (BHUs) and Rural Health Centers (RHCs)
- ❖ Secondary Level: Tehsil Headquarter Hospitals (THQs) and District Headquarter Hospitals (DHQs)
- ❖ Tertiary Level: Teaching hospitals

Public sector doctors served as trainers, influencers, and role models for frontline health workers and acted as Agents of Change in the campaign.

2. Private Registered Health Service Providers:

Individually operated medical clinics (General Practitioners) and high-end consultants and specialists.

3. Frontline Health Workers:

Lady Health Workers (LHWs), LHVs and Community Midwives (CMWs) in the targeted geographies were sensitized on maternal nutrition issues.

4. Key Opinion Leaders (KOLs) and Decision Makers:

National and provincial parliamentarians, government officials from health ministry's/ departments, senior technical experts, and office bearers of professional medical associations.

5. Secondary Target Groups:

Other opinion leaders and influencers, including celebrities, religious and faith leaders, and media journalists, were also sensitized on the importance of maternal nutrition interventions. They served as Campaign Ambassadors through public outreach and media activities, contributing to the acceleration of national health and nutrition goals and strategies, such as stunting reduction.

3.1 Methodological Design

The survey employed a "before and after" mixed-methods design to compare stakeholders' situations before and after the implementation of the NourishMaa campaign. The endline survey focused on several key parameters to evaluate the campaign's impact:

1. **Knowledge, Attitudes, Practices (KAP):** Evaluated changes in the knowledge, attitudes, and practices of healthcare providers (HCPs), frontline health workers (FLHWs), and key opinion leaders (KOLs) regarding maternal nutrition.
2. **Training Effectiveness:** Assessed the effectiveness of the training provided to HCPs and FLHWs on maternal nutrition, including improvements in their skills, motivation, and confidence in delivering nutrition interventions.
3. **Health Outcomes:** Measured improvements in maternal and infant health outcomes resulting from the campaign, including changes in nutritional status and ANC/PNC service uptake.
4. **Behavior Change Communication (BCC) Materials:** Reviewed the reach and impact of BCC materials (including social media), including their effectiveness in disseminating maternal nutrition information and promoting behavior change among target groups.
5. **Policy Influence:** Examined the campaign's impact on advocacy efforts, policy changes, and collaboration among stakeholders to improve maternal nutrition.

The endline survey for the NourishMaa campaign assessed three key aspects related to maternal nutrition among healthcare providers (HCPs), frontline health workers (FLHWs), and the community:

3.1.1 Knowledge

The survey evaluated the improvement in knowledge among HCPs and FLHWs regarding maternal nutrition, including their understanding of key nutritional practices and guidelines. This component aimed to determine how well-informed these groups became about maternal nutrition due to the NourishMaa project, which is crucial for improving the health outcomes of both mothers and their children.

3.1.2 Attitudes and Motivation

The survey also explored changes in attitudes and motivation among HCPs and FLHWs towards maternal nutrition, assessing their willingness and drive to prioritize and promote maternal nutrition in their daily practices. Understanding these attitudes was essential for identifying potential barriers or facilitators to effective nutritional counseling and for gauging how receptive healthcare workers were to implementing changes.

3.1.3 Practices

The survey examined how the NourishMaa campaign influenced the actual nutritional practices adopted by HCPs and FLHWs, as well as the dietary behaviors and practices of pregnant and lactating women. By assessing these practices, the survey aimed to build an understanding of the practical application of knowledge and attitudes, offering a comprehensive view of how maternal nutrition interventions are being implemented and prioritized in real-world settings, and how did NourishMaa contribute in improving this.

These three parameters provide a detailed understanding of the campaign's impact on maternal nutrition, highlighting both the strengths and areas for further improvement in the targeted regions.

3.2 Survey Design

A robust mixed-methods approach was employed for the endline survey on maternal nutrition, incorporating both quantitative and qualitative data collection to comprehensively assess current maternal nutrition practices and evaluate the impact of the NourishMaa campaign.

The endline survey results were analyzed in comparison to the baseline data established at the start of the NourishMaa project. However, it is important to note that four additional districts were included, and new activities were introduced midway through the project's implementation. Despite these changes, the same quantitative and qualitative tools from the baseline assessment were used for the endline evaluation to ensure consistency in measuring the outcomes.

This mixed-methods approach allowed for a thorough evaluation of how the campaign influenced key stakeholders' knowledge, attitudes, motivation, and practices concerning maternal nutrition, while providing deeper insights into the factors contributing to these changes.

3.3 Tools & Sample size

Study Area

The project area comprises of two districts each in Punjab and Sindh provinces. Additionally, 4 districts were added into the project areas.

Sindh: District Karachi East and Karachi Korangi
District Larkana and Qamabar Shahdadkot

Punjab: District Rawalpindi
Tehsil Ahmedpur East, District Bahawalpur

Khyber Pakhtunkhwa: District Mardan and District Battagram

3.3.1 Target Respondents

The target population was public and private health care providers, frontline health workers like; Lady Health Workers (LHWs) LHVs, and Community Mid-Wives (CMWs). The respondents were selected using systematic random sampling through the sampling frame of the health care providers and frontline health functionaries.

3.3.2 Tools

A semi-structured questionnaire was administered for this group. The field teams visited the selected HCP, LHWs and CMWs for collecting the information regarding their knowledge, attitude and practices related to the maternal nutrition campaign. Motivation scales were adopted to measure the level of motivation among frontline health workers.

3.3.3 Sample size

The minimum sample size after applying finite population correction factor was 783 Healthcare Providers (HCPs) and 662 Frontline Health Workers (FHWs). The sample size has been computed in Stata 17 software and adjusted for finite population correction factor based on the data of HCPs and FLWs in PDHS. Total service providers are 6950.

Table 1: Sample size estimation of the target Health Care Providers

Category	Health care providers (HCPs) ³				Frontline health functionaries (FHWs) ⁴				
Province	Sindh		Punjab		Sindh		Punjab		Total
Districts	Karachi East	Larkana	Rawalpindi	Bahawalpur	Karachi	Larkana	Rawalpindi	Bahawalpur	
Adjusted sample size (one round of baseline or end-line)	453	453	453	453	453	453	453	453	3627
Registered number of HCPs/ FLWs/ tehsil	902	153	405	228	692	195	150	197	2922
Adjusted n (one round of baseline or end-line) for finite population correction factor	302	115	214	152	274	137	113	138	1444

Respondent selection by systematic random sampling (SysRS): Systematic sampling is the ordered sampling at fixed intervals from a list, starting from a randomly chosen point. Typically, systematic sampling is not used at the first stage of sampling (selection of PSUs) because it renders the estimation of sampling error difficult. Systematic sampling is recommended at the SSU, TSU.

The finite population correction factor was applied using the formula = $\text{Adjusted } n_{\text{fpc}} = \frac{nN}{n+(N-1)}$: where n is the sample size, without considering the finite population correction factor and N is the population of the respondent category.

Public MNCH-specific health providers, including specialists (gynecologists, physicians, pediatricians) will be reached through government departments and are based in primary, secondary, and tertiary healthcare facilities. The private sector HCPs including General Practitioners (GPs), Lady Health Workers (LHWs) and Community Midwives (CMWs)

To complement the quantitative data, a qualitative method was employed through in-depth interviews (IDIs) and focus group discussions (FGDs). IDIs were conducted with key stakeholders, including health officials, key opinion leaders, and representatives from health departments, to gain deeper insights into perspectives on maternal nutrition practices, program implementation, and the influence of the NourishMaa campaign. FGDs with health care providers (HCPs) and frontline health workers (FHWs) provided detailed feedback on their experiences with training and counseling related to maternal nutrition, as well as their views on the campaign's effectiveness.

This methodological triangulation was done after analyzing the quantitative and qualitative data. After analyzing both quantitative and qualitative data, triangulation of data was done by comparing, contrasting, and integrating the findings from the two types of data. This process usually helps to strengthen the validity and comprehensiveness of the research outcomes. It enhanced the reliability and validity of the findings by integrating quantitative survey data with qualitative insights from IDIs and FGDs. The mixed-methods approach offered a more comprehensive understanding of the NourishMaa campaign's impact, highlighting both statistical trends and contextual narratives around maternal nutrition practices in the target areas. For example, if the end line results showed marked improvement in nutrition-specific practices of health workers, the results from the IDIs and the FGDs explored why those improvements have had occurred.

The district-wise gender, nature of job, and occupation of the target population is given in Table 2 below. It details that most (69%) of the respondents were females as compared to the males (31%). Most of them were working in the public sector organizations (70%), while the rest were employed by the private sector. Occupation wise, they were either Woman Medical Officers (WMO) or male Medical Officers (MO) followed by the General Physicians and Gynecologists (Table 2).

Table 2. District-wise distribution of the Respondents based on their Gender, nature of job and current occupation.

Variable	District		District		District		District		Total	
	Bahawalpur		Karachi East		Larkana		Rawalpindi			
Gender	Number	%	Number	%	Number	%	Number	%	Number	%
Male	52	34.2	78	25.8	38	33.0	77	36.0	245	31.3
Female	100	65.8	224	74.2	77	67.0	137	64.0	538	68.7
Total	152	100	302	100	115	100	214	100	783	100
Nature of Job	Number	%	Number	%	Number	%	Number	%	Number	%
Private	112	73.7	197	65.2	96	83.5	147	68.7	552	70.5
Public	40	26.3	105	34.8	19	16.5	67	31.3	231	29.5
Total	152	100	302	100	115	100	214	100	783	100
Occupation										
WMO	65	42.8	174	57.6	58	50.4	75	35	372	47.5
MO	34	22.4	79	26.2	32	27.8	66	30.8	211	26.9
GP	18	11.8	14	4.6	19	16.5	16	7.5	67	8.6
Gyn	20	13.2	9.0	3.0	1.0	0.9	23	10.7	53	6.8
Nutritionist	0	0.0	17	5.6	0	0.0	8	3.7	25	3.2
Pediatrics	8	5.3	1	0.3	3	2.6	3	1.4	15	1.9
LHV	2	1.3	4	1.3	0	0.0	2	0.9	8	1.0
LHW	0	0.0	0	0.0	0	0.0	5	2.3	5	0.6
PG Trainee	0	0.0	0	0.0	0	0.0	3	1.4	3	0.4
Senior Registrar	1	0.7	0	0.0	0	0.0	1	0.5	2	0.3
Orthopedics	1	0.7	0	0.0	0	0.0	1	0.5	2	0.3
Nurse	0	0.0	1	0.3	0	0.0	1	0.5	2	0.3
Dermatologist	1	0.7	0	0.0	1	0.9	0	0.0	2	0.3
Dentist	0	0.0	1	0.3	0	0.0	1	0.5	2	0.3
Associate Professor	0	0.0	0	0.0	0	0.0	2	0.9	2	0.3
Senior Medical Officer	0	0.0	0	0.0	0	0.0	1	0.5	1	0.1
Radiology	0	0.0	0	0.0	1	0.9	0	0.0	1	0.1
Neurologist	1	0.7	0	0.0	0	0.0	0	0.0	1	0.1
Neurosurgeon	0	0.0	0	0.0	0	0.0	1	0.5	1	0.1
Neonatology	0	0.0	0	0.0	0	0.0	1	0.5	1	0.1
Infection Control Officer	0	0.0	0	0.0	0	0.0	1	0.5	1	0.1
Hospital management	0	0.0	0	0.0	0	0.0	1	0.5	1	0.1
ENT	0	0.0	1	0.3	0	0.0	0	0.0	1	0.1
Blood bank Officer	0	0.0	0	0.0	0	0.0	1	0.5	1	0.1
Assistant Professor	1	0.7	0	0.0	0	0.0	0	0.0	1	0.1
Total	152	100.0	302	100.0	115	100.0	214	100.0	783	100.0

4. Quantitative Results:

4.1 Methods and Materials

To ensure the effectiveness of our comparison between baseline and endline results for the NourishMaa campaign, we selected a sample size of 1,445, consistent with the baseline study. This sample was drawn from the same districts—Rawalpindi, Bahawalpur, Karachi East, and Larkana—allowing for direct comparability. By maintaining the same sample size and districts, we enhance the reliability and accuracy of the comparison between the baseline and endline results. Using the same sample ensures that the population characteristics remain consistent, minimizing the introduction of variables that could affect the results. Additionally, by comparing data from the same individuals or communities over time, we can more accurately track changes and measure the impact of the NourishMaa interventions. This method strengthens the internal validity of the study, as it controls for geographic and demographic variations, allowing us to attribute changes in the results to the campaign's efforts, rather than external factors. Revisiting the same districts also provides insights into the effectiveness of the NourishMaa programs in those specific areas, ensuring targeted improvements. Overall, this approach ensures that our endline results will provide meaningful and actionable insights when compared to the baseline data.

The study adopted a repeated two-time-point cross-sectional survey design, comparing the baseline and endline data to evaluate the impact of the NourishMaa campaign.

Study Area

The project area included four districts across two provinces in Pakistan:

Sindh: Gulshan-e-Iqbal Town, District Central, Karachi; Tehsil Larkana, District Larkana.

Punjab: Tehsil Rawalpindi, District Rawalpindi; Tehsil Ahmedpur East, District Bahawalpur.

4.1.1 Target Respondents

The target population comprised public and private HCPs and FHWs, LHWs and CMWs. Respondents were selected using systematic random sampling from lists of healthcare providers and frontline functionaries.

4.1.2 Tools

A semi-structured questionnaire was administered to collect information from the selected HCPs, and FHWs, regarding their knowledge, attitudes, and practices related to the maternal nutrition campaign. Motivation scales were adopted to measure the level of motivation among frontline health workers.

4.1.3 Sample Size

The minimum sample size was determined to be 783 HCPs and 662 FLWs, calculated using finite population correction and computed using Stata 17 software¹. The total number of service providers in the sample frame was 6,950, as per the Pakistan Demographic and Health Survey (PDHS) which is a two stage sample design². There were four old districts where baseline was already done. Four new districts were

¹ The finite population correction factor was applied using the formula = Adjusted $n_{fpc} = \frac{nN}{n+(N-1)}$: where n is the sample size, without considering the finite population correction factor and N is the population of the respondent category.

² Respondent selection by systematic random sampling (SysRS): Systematic sampling is the ordered sampling at fixed intervals from a list, starting from a randomly chosen point. Typically, systematic sampling is not used at the first stage of sampling (selection

included during the end line to independently evaluate the effect of innovative interventions of Nourishma campaign.

Table 2: Sample size for public and private health care providers and frontline health functionaries for the baseline and end-line surveys

Quant Sample Size						
SNO	Province	Districts	HCPs	FHWs	Quant Total Sample Size	HCPs
1	Punjab	Rawalpindi	214	113	327	205
2		Bahawalpur	152	138	290	154
3	Sindh	Karachi East	302	274	576	304
5		Larkana	115	137	252	117
Total			783	662	1445	780

of PSUs) because it renders the estimation of sampling error difficult. Systematic sampling is recommended at the SSU, TSU, and household selection stages of sampling. Systematic sampling may be linear or circular, as illustrated in the following examples.

5. Study Results

5.1 Quantitative Results- Healthcare providers (HCPs)

Certain questions given below were asked to measure the composite knowledge of HCPs. The results show an overall high knowledge against individual questions scores also. However, comparatively low knowledge was found with respect to food groups and appropriate weight gain during the pregnancy. Following is the individualized frequency of correct answers against each of the questions used for the assessment of overall knowledge levels.

Almost all of the respondents had sufficient knowledge about maternal nutrition required to carrying out day to day official work (Figure 1).

Do you think, HCP have sufficient knowledge and information about maternal nutrition for carrying out your work efficiently?

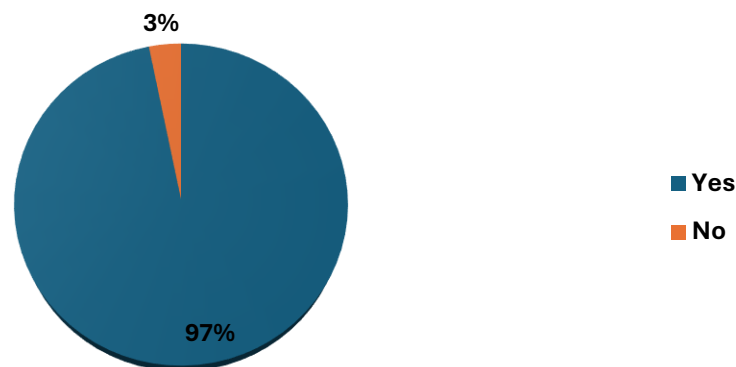


Figure 1: Frequency of Knowledge Score (n=783)

The assessment of healthcare providers' (HCPs) knowledge on maternal nutrition revealed high overall knowledge, but comparatively lower awareness regarding specific topics like food groups and appropriate weight gain during pregnancy.

Knowledge of HCPs on Maternal Nutrition Components and Benefits of Micronutrients

HCPs were assessed on various components of maternal nutrition, including diet and micronutrients. The responses to specific questions were as follows:

Diet Frequency/Quantity: 56.2% of HCPs mentioned this component.

Diet Diversity: Identified by 43.0%.

Micronutrient Supplementation: 55.8% mentioned this aspect.

Adequate Recommended Weight Gain: Only 33.5% indicated knowledge of the recommended weight gain during pregnancy.

Nutriton Components

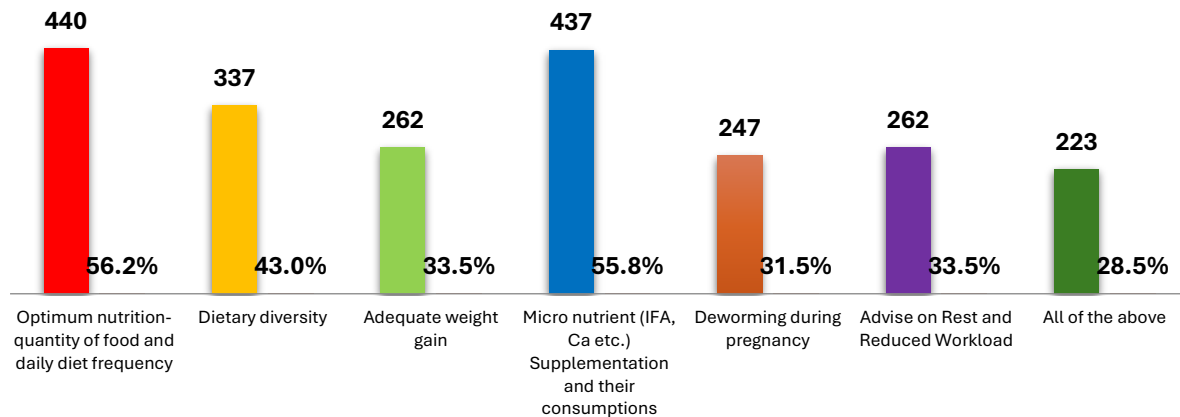


Figure 2: Awareness of Different Maternal Nutrition Components (n=783)

The participants were asked about the key components of maternal nutrition counseling across different stages: preconception, pregnancy, and postnatal care. The results are as follows:

Dietary Intake Improvement: 79.7% of healthcare providers (HCPs) believed that improving dietary intake significantly contributes to maternal health.

Dietary Supplements: 82.1% of HCPs considered dietary supplements an important component of maternal nutrition.

Breastfeeding: 72.8% identified breastfeeding as a key area of maternal nutrition counseling.

Hygiene: 61.3% emphasized the importance of hygiene as a crucial element of maternal nutrition counseling.

These findings suggest that while most HCPs recognize the importance of dietary intake and supplements, there are relatively fewer who focus on breastfeeding and hygiene, indicating potential areas for further emphasis in future training and interventions.

These findings reflect the varying levels of knowledge among HCPs regarding different components of maternal nutrition. While knowledge in general nutrition aspects was relatively high, there are gaps concerning dietary diversity and appropriate weight gain recommendations during pregnancy.

Key Components of Maternal Nutrition Counseling

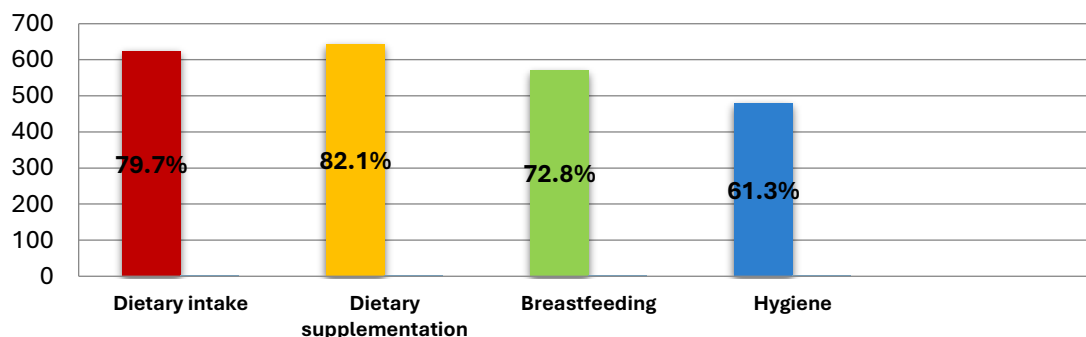


Figure 3: Key Components of maternal counseling (n=783)

Maternal malnutrition (causes, effects and strategies to deal)

The healthcare providers (HCPs) were asked to identify the primary causes of maternal malnutrition based on their knowledge and experience. Their responses highlighted the following major causes:

- ❖ Inadequate Diet: 64.9% of HCPs pointed to an insufficient diet as a key cause of maternal malnutrition.
- ❖ Undernutrition: 74.5% cited undernutrition as a significant factor.
- ❖ Micronutrient Malnutrition: 61.2% mentioned deficiencies in essential micronutrients.

These findings underscore the need for targeted interventions that address not only overall dietary intake but also specific nutritional deficiencies that contribute to maternal malnutrition.

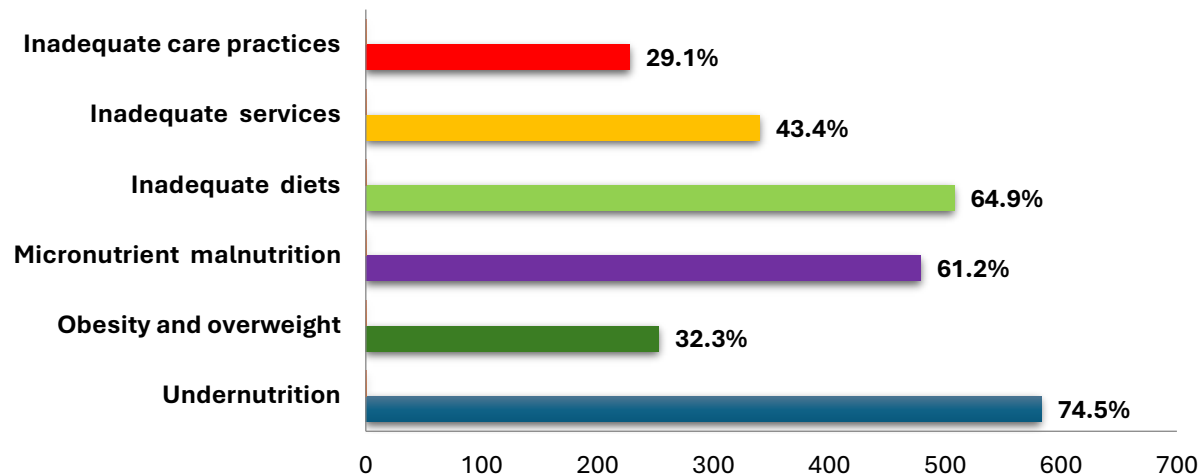


Figure 4: Key causes of maternal malnutrition (n=783)

Healthcare providers (HCPs) identified several effects of maternal malnutrition based on their knowledge and experience:

- ❖ Maternal Underweight: Reported by 79.7% of HCPs as a major consequence of malnutrition.
- ❖ Micronutrient Deficiencies: Noted by 62.8% of HCPs as a significant impact.
- ❖ Maternal Obesity: Mentioned by 47.1% as an effect, indicating that malnutrition can also lead to over nutrition issues.
- ❖ Short Stature: Reported by 37.5% as an outcome of poor maternal nutrition.

These responses highlight maternal underweight as the most prominent effect of malnutrition, indicating a critical need for interventions that promote adequate weight gain during pregnancy.

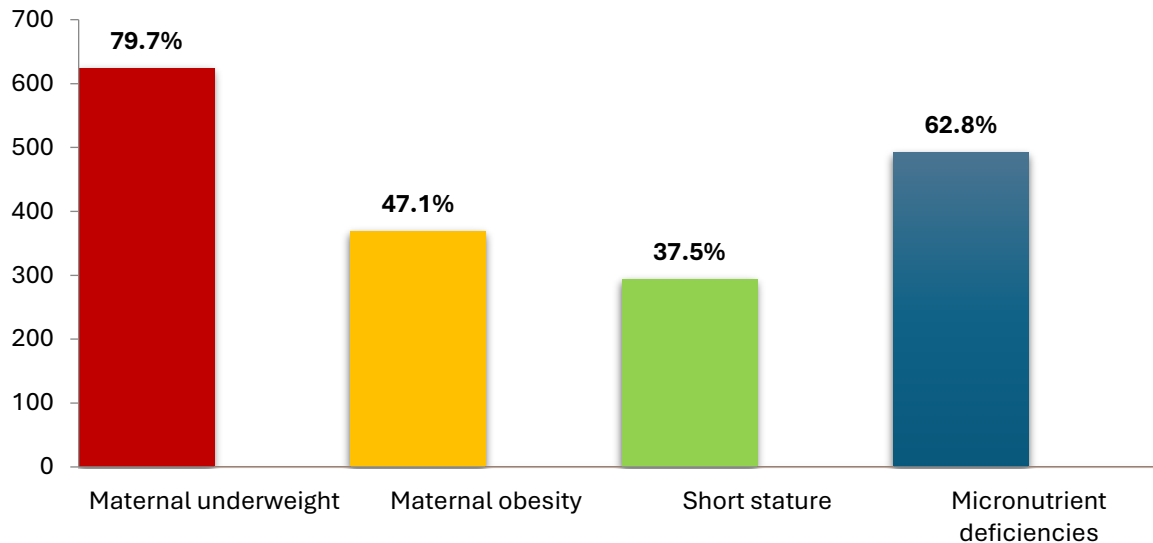


Figure 5: Key effects of maternal malnutrition (n=783)

The results indicate that healthcare professionals frequently encounter various maternal nutrition-related problems during pregnancy, which can lead to serious health complications. Key findings include:

Anemia: A staggering 96.2% of pregnant women were reported to be suffering from anemia, highlighting a critical area of concern for maternal health.

Pre-eclampsia: Reported in 27.5% of cases, this condition can pose significant risks to both the mother and the fetus.

Hemorrhage: Affected 29.6% of pregnant women, underscoring the dangers associated with maternal nutrition and health.

Wasting: Noted in 24% of pregnant women, indicating severe malnutrition.

Stunting in children: Reported in 22%, this reflects long-term nutritional deficiencies affecting growth and development.

These issues collectively contribute to compromised childbirth outcomes, reinforcing the importance of addressing maternal nutrition comprehensively to improve health outcomes for both mothers and their infants.

Most common nutrition related problem in women

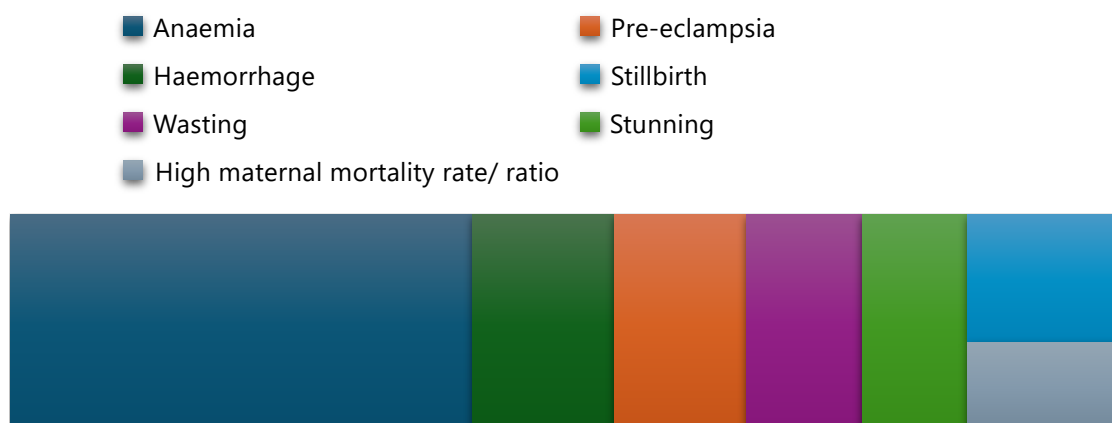


Figure 6: Most common maternal malnutrition problems (n=783)

The survey results reveal that healthcare professionals (HCPs) recognize the critical role of nutrition education in addressing maternal malnutrition. Key insights include:

- ❖ **Nutrition Education:** An overwhelming 90.9% of HCPs identified nutrition education to responding mothers, during their counselling sessions with them, as a vital strategy to combat maternal malnutrition. This underscores the importance of empowering women and healthcare providers with knowledge regarding nutritional practices.
- ❖ **Food Fortification:** 46.2% of HCPs advocated for food fortification as an additional strategy to tackle maternal malnutrition, highlighting its potential to enhance the nutritional quality of food consumed by pregnant women.
- ❖ **Micronutrient Supplementation:** 68.1% of HCPs recognized micronutrient supplementation as crucial for improving maternal nutrition, indicating awareness of the specific dietary needs during pregnancy.
- ❖ **Energy and Protein Supplementation:** 49.9% of HCPs mentioned the need for energy and protein supplementation, which is essential for supporting the increased nutritional demands of pregnant women.

These findings emphasize the need for a multi-faceted approach to address maternal malnutrition, combining education, food fortification, and targeted supplementation to improve maternal and infant health outcomes.

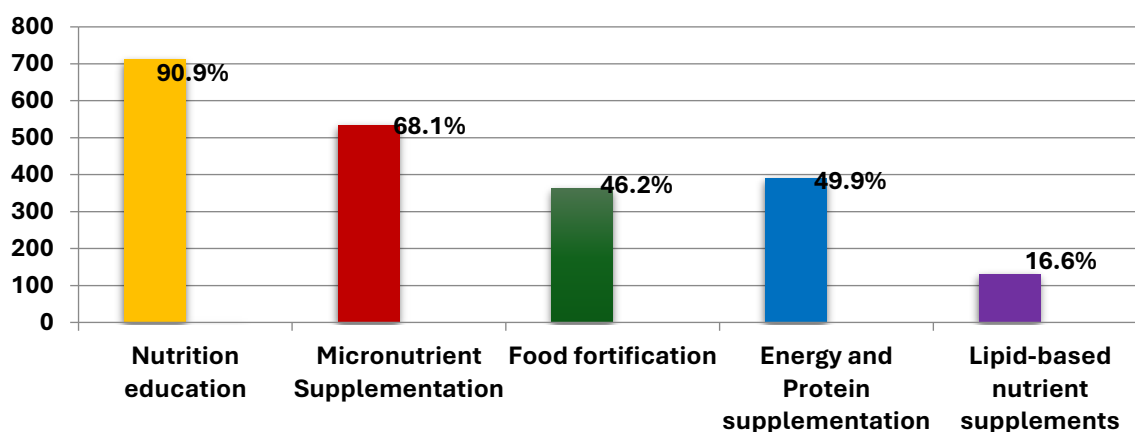


Figure 7: Strategies to control maternal malnutrition (n=783)

HCP's Sources for updating the knowledge among maternal nutrition

The survey results on how healthcare professionals (HCPs) update their knowledge regarding maternal nutrition reveal several important sources:

- ❖ **Regular Trainings:** A significant majority, 82.9%, of HCPs rely on regular training sessions (face-to-face) as their primary source for updating their knowledge on maternal nutrition. This indicates the effectiveness and importance of structured educational programs in enhancing their skills and understanding. These face-to-face trainings could be official refresher trainings, which were usually resource constrained. However, any accelerated and focused training, such as NourishMaa, specifically boosted their pursuit to refreshed knowledge.
- ❖ **NourishMaa Facebook Page:** 43.6% (341 out of 783 of the participants) of HCPs utilize the NourishMaa Facebook page as a source of information, reflecting the growing role of social media platforms in disseminating knowledge and engaging healthcare providers in ongoing education.
- ❖ **Internet:** 34.7% of HCPs turn to the internet for updated information, highlighting the importance of online resources for continuous learning.

- ❖ Research Articles: 29% of HCPs access research articles to stay informed about the latest findings and interventions in maternal nutrition.

These findings underscore the significance of both traditional and modern methods for knowledge dissemination among healthcare providers, indicating a preference for formal training while also acknowledging the value of digital platforms and academic literature.

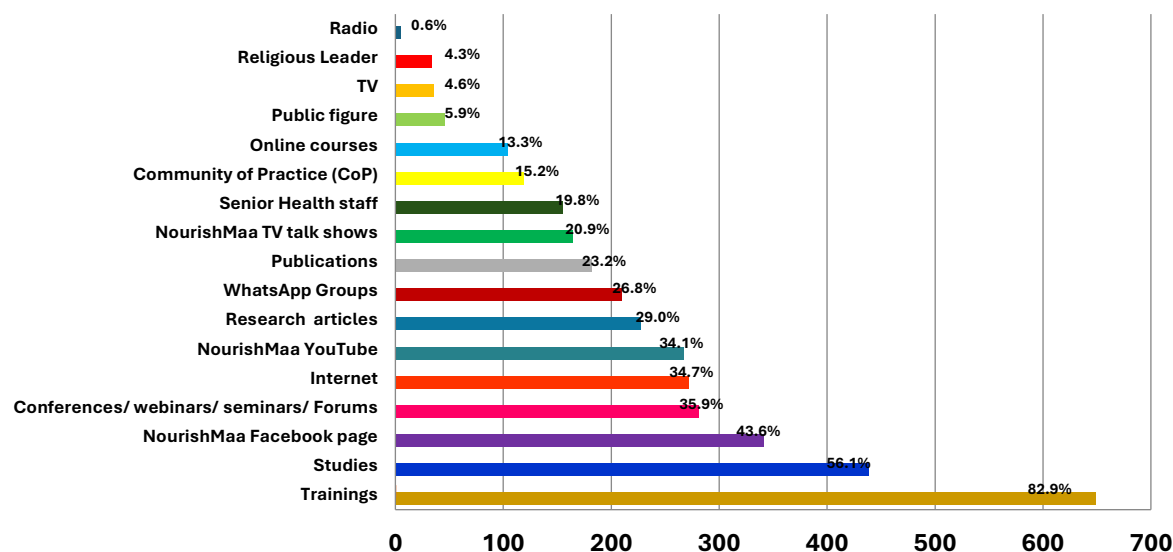


Figure 8: Methods for knowledge dissemination among healthcare providers

The survey results indicate the frequency with which healthcare professionals (HCPs) update their knowledge, attitudes, and practices related to maternal nutrition:

- ❖ Majority Updated: 64.9% of HCPs reported having updated themselves recently on maternal nutrition, indicating a strong commitment to staying informed.
- ❖ Frequent Updates: 19.9% of HCPs updated their knowledge frequently, demonstrating proactive engagement with the latest maternal nutrition guidelines and practices.
- ❖ Not Updated for a Long Time: 4.3% of HCPs mentioned that they had not updated themselves about maternal nutrition for a long time, suggesting a gap that may need addressing through targeted interventions.

These insights highlight the overall efforts of HCPs in keeping up-to-date, while also pointing to opportunities for improving continuous education among a small segment of providers (Figure 9).

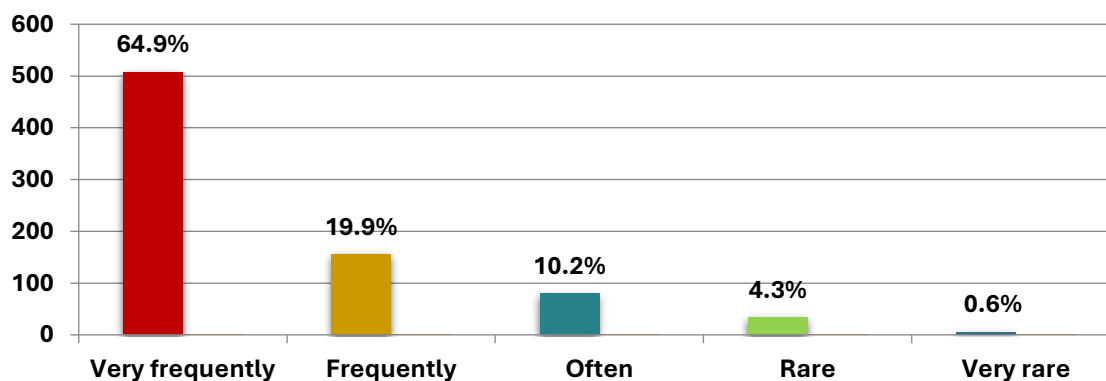


Figure 9: Frequency to update knowledge, attitude and practices on maternal nutrition (n=783)

The results below provide a detailed view of how frequently healthcare professionals (HCPs) updated their knowledge on maternal nutrition:

- ❖ More than Four Times a Year: 17% of HCPs updated their information on maternal nutrition at least four times annually, indicating consistent engagement.
- ❖ Thrice a Year: 11.9% of HCPs updated their knowledge three times a year.
- ❖ Twice a Year: 19% of HCPs updated themselves twice yearly.
- ❖ Once a Year: The majority (52.5%) updated their knowledge annually.

This distribution suggests that while most HCPs update their knowledge at least annually, there is variation in how frequently they engage in continuous learning, with a smaller proportion doing so more frequently throughout the year (Figure 10).

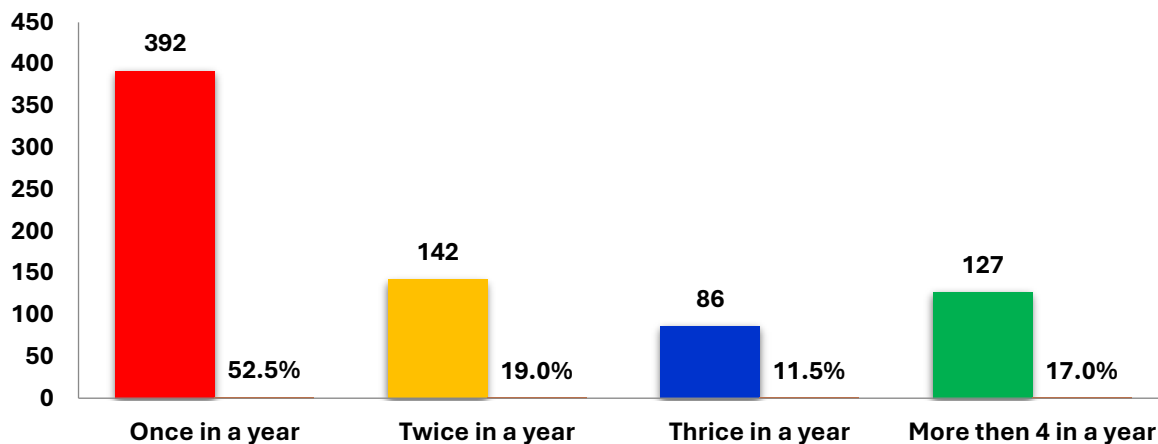


Figure 10: Frequency to update information on maternal nutrition (n=783)

The findings further indicate that a significant majority (82.1%) of healthcare professionals (HCPs) believe that maternal nutrition-related training is crucial for their capacity building and the provision of quality care to pregnant women (PW) and lactating women (LW). This strong consensus underscores the importance of ongoing training and capacity-building initiatives (NourishMaa) for HCPs, ensuring they are well-equipped to deliver effective maternal nutrition interventions and improve health outcomes for mothers and their children (Figure 11).

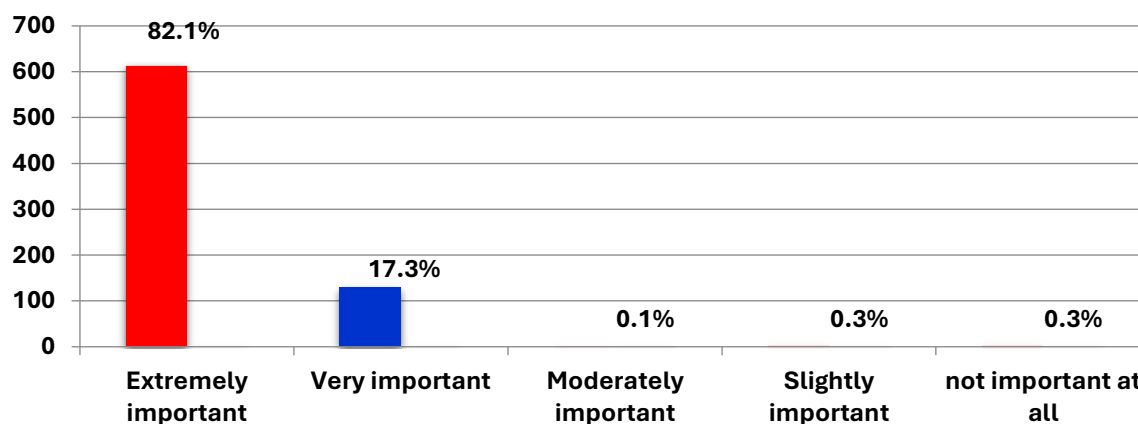


Figure 11: Importance of training on maternal nutrition (n=783)

Healthcare Providers Practices Related to Maternal Nutrition

In assessing healthcare providers' practices regarding maternal nutrition, questions were posed about the methods used to evaluate maternal health. The findings revealed that Body Mass Index (BMI) was the most frequently used anthropometric method, utilized by 76% of respondents. Additionally, Mid-Upper Arm Circumference (MUAC) was also commonly employed, with 75.9% of HCPs using it as a complementary method. These improved practices, as compared to the baseline practices (described elsewhere in the text of this report) highlight the reliance on standardized measurements for assessing maternal nutrition status, which is crucial for identifying nutritional deficiencies and ensuring appropriate interventions (Figure 12).

For anthropometric measurements which methods were used?

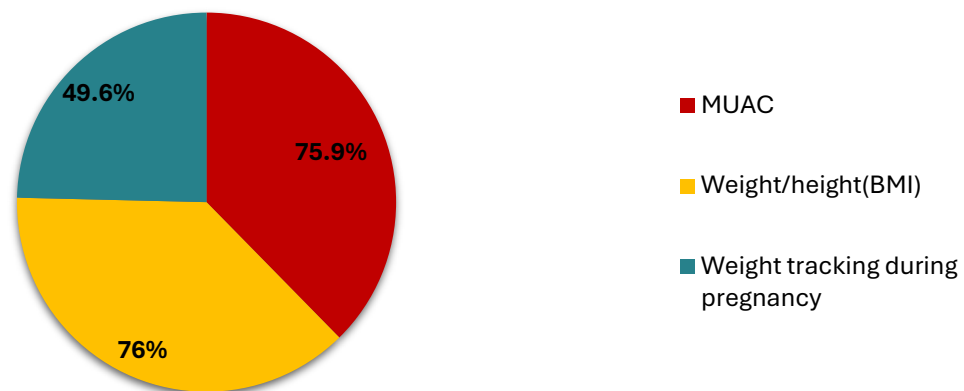


Figure 12: Percentage of Anthropometric measurements method's usage

The practice score was assessed using various statements. The responses showed that the vast majority of participants (99.7%) consistently or frequently consider the education or counseling of mothers on nutrition and breastfeeding as part of their facility's ANC service provision. According to the survey results, a large majority of participants (97.8%) indicated that they consistently or frequently discuss the importance of a diverse diet with pregnant women. However, around half of the respondents (48.7%) reported challenges in adopting maternal nutrition policy guidelines within their facilities due to multiple reasons explained in the qualitative part of this report. Additionally, 95% of participants stated that they consistently discuss women's nutrition issues with family members, such as husbands and mothers-in-law. Similarly, 88.5% of participants consistently or systematically conduct anthropometric screening at their ANC/PNC clinics, indicating that the majority are performing practices related to maternal nutrition to the best of their knowledge and capacity. Responses to most practice-related questions were similar, with 94% of healthcare providers reporting that they always or often discuss the importance of taking iron and calcium supplements during pregnancy, along with necessary precautionary measures. Furthermore, most healthcare providers reported weighing pregnant women at each visit, encouraging micronutrient consumption, and discussing nutrition issues with family members who accompany pregnant women to the health facilities.

The following table (Table 3) presents the details.

Table 3: Statements on Practice Scale (ages)

Statement on Practice Scale	Yes (%)	NO (%)
Do you, advice/provide education/counselling to PNC women on her nutrition/diet?	97.8	2.2
Does your facility provide dedicated Maternal Nutrition and infant & Young Child Nutrition Counselling services?	96.3	3.7
Have of heard or aware of National Policy/Strategy on Maternal Nutrition?	87.6	12.4
Are you willing to adopt MN policy guidelines in your facility?	91.2	8.8
Will you face any challenges in adopting MN policy guidelines in your facility?	48.7	51.3
Do you systematically conduct anthropometric screening at the ANC/PNC clinics?	88.5	11.5
Do you discuss about women nutrition issues to the family members- husbands, mothers-in-law?	95	5
Is nutritional counselling a part of your or hospitals delivery of Maternal health services?	96.2	3.8
Is education or counselling of mother on nutrition and breastfeeding part of your facilities ANC service provision?	99.7	0.3

General Questions Related to Practice

The practices of healthcare providers were further assessed using multiple-response questions. The results indicated that the majority of respondents provided information to pregnant women regarding eating nutritious food (81.0%), the importance of iron and folic acid tablets (49.2%), and advice on breastfeeding (69.1%). Further details are presented in Figure 13 below.

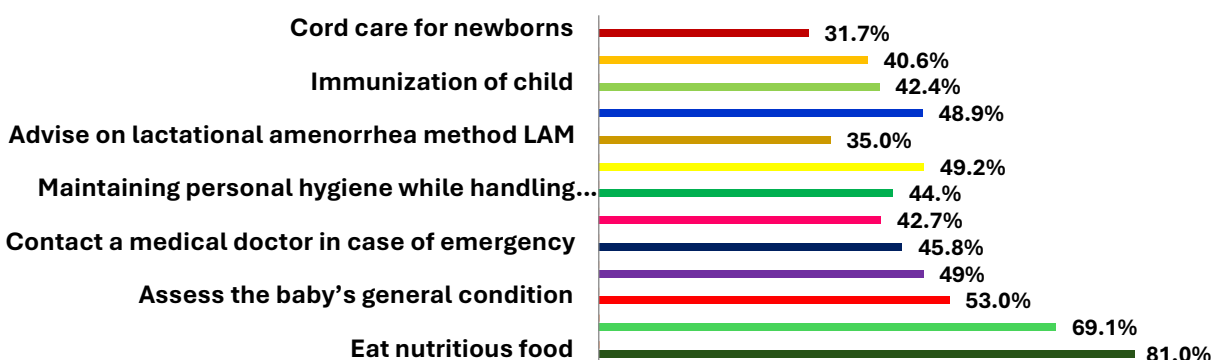


Figure 13: Key information provision to pregnant women for Antenatal (n=793)

When asked about their preferred advice for pregnant women who are not receiving adequate nutrition, most healthcare providers indicated that they would recommend consulting a nutritionist (46.0%) and provide counseling (81.2%). Other responses included discussing possible dietary options (63.3%) and providing iron and folic acid supplements (43.3%) (Figure 14).

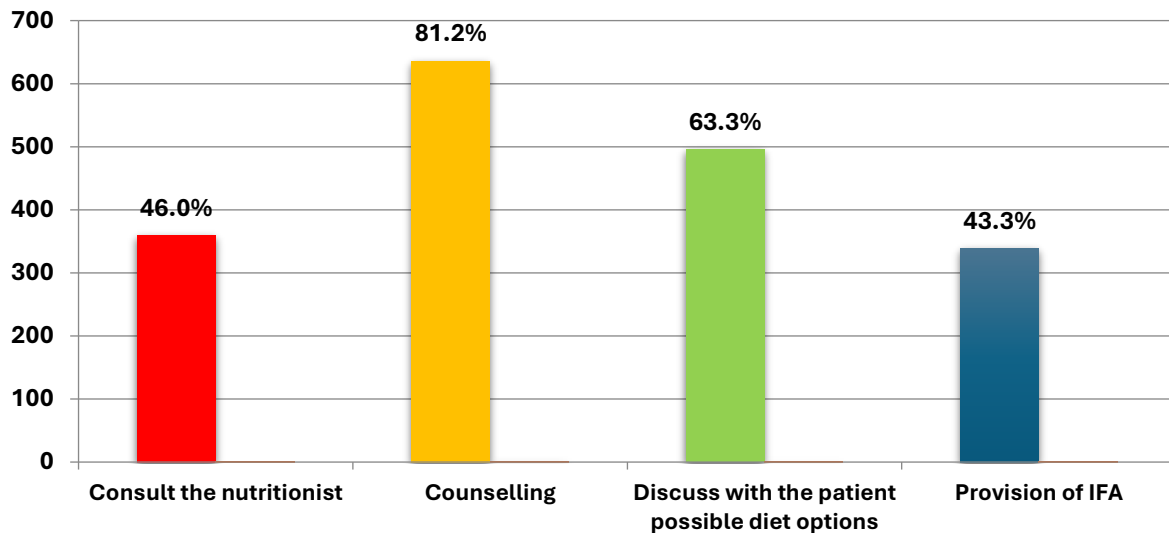


Figure 14: Remedies for PWs not receiving adequate nutrition (n=783)

Figure 15:

It was reported by 48.8% HCPs that in last 15 days on average 1 to 5 women visited them with nutrition related issue. Another (24.9%) reported that 6 to 11 women with nutrition issue visited them during same period. Remaining, less than 50% patients dealt with over 12 patients during this period.

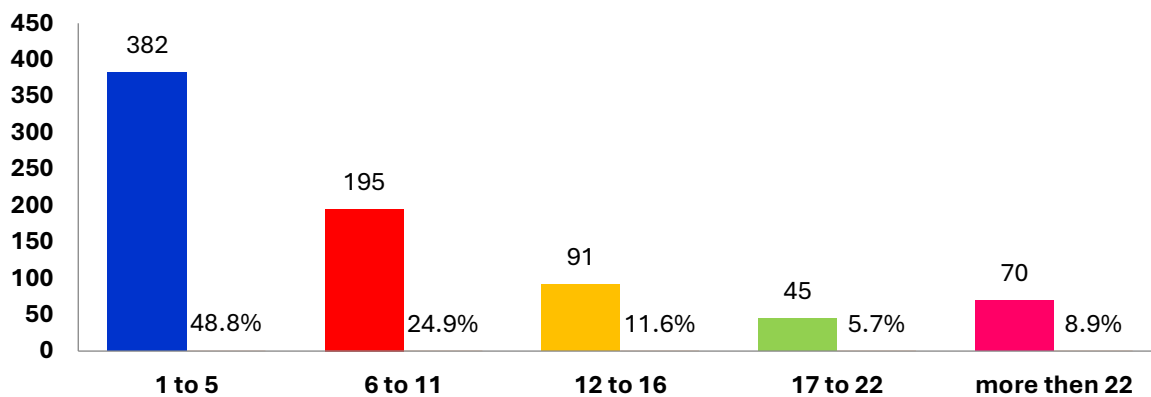


Figure 15: Women's visit in last 15 days with some maternal nutrition issue (n=783)

The data indicates that healthcare providers frequently perform various examinations as part of postnatal check-ups for mothers. Specifically, 77.4% of HCPs conduct abdominal examinations, 68.1% perform breast examinations, and 61.6% assess urine output. Additionally, 67.2% of the respondents reported checking for fever, while 69.5% monitor vaginal bleeding. These practices reflect the comprehensive approach adopted by HCPs to ensure maternal well-being during the postnatal period, covering key areas that influence maternal health outcomes (Figure 16).

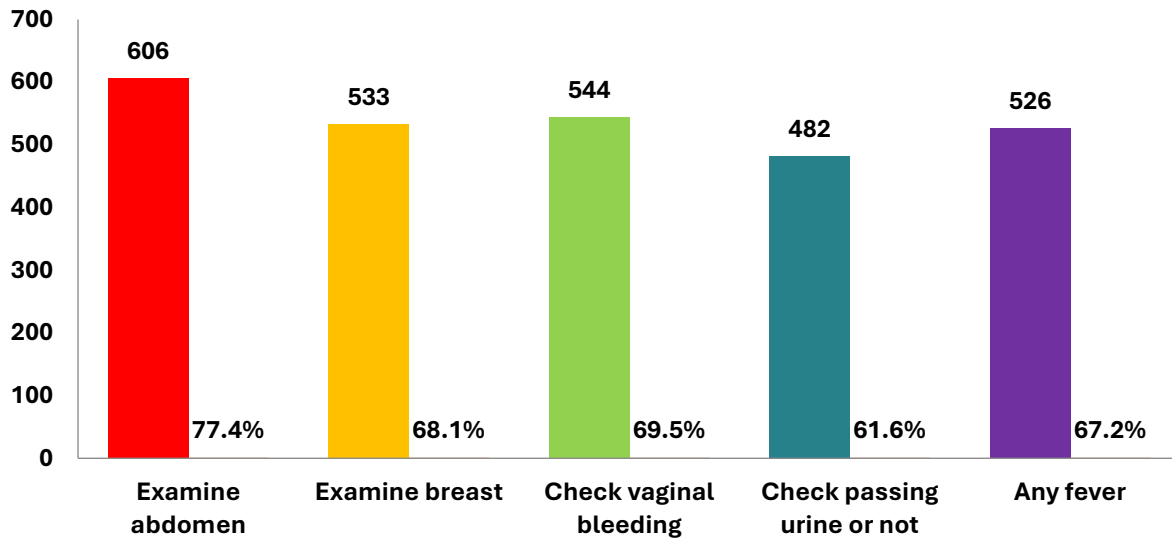


Figure 16: Practices during postnatal check-ups (n=783)

The majority of healthcare providers exhibit a positive attitude toward maternal nutrition. Most respondents believe that maternal nutrition knowledge among women should be prioritized, emphasizing the importance of providing both appropriate food and supplementation for successful pregnancy outcomes. The healthcare providers expressed high sensitivity to maternal nutrition issues and demonstrated a strong desire to actively work towards improving maternal nutrition, highlighting their commitment to enhancing the nutritional well-being of mothers. These findings illustrate the willingness of HCPs to address maternal malnutrition as a critical area of concern (Table 4).

Table 4: Results of specific attitude related questions on maternal nutrition knowledge

Questions	Results
HCPs who think the issue of maternal nutrition is important	91.8 %
HCPs who think nutrition is an important / integral part of Maternal and child health services?	93.4 %
HCPs who feel Due to interactions with NourishMaa, it has sensitized you for the importance of maternal nutrition actions in your clinical practice?	91.8 %
HCPs who feel Counselling/education on nutritional aspects is also part of every Doctors responsibility?	88.5 %
HCPs have critical role in improving the nutritional status of Pregnant women?	86.7 %
HCPs who feel, It is important to assess the nutritional status of all mothers admitted to the ward?	89.7 %
HCPs who think, Counselling/education on nutritional aspects is also part of every Doctors/FLWs responsibility?	90.0 %
HCPs who feel, Underweight and overweight women experience more complications during pregnancy and delivery than normal women?	90.8 %
HCPs who think All pregnant women and lactating mothers should be knowledgeable about the need for an adequate and nutritious diet?	91.7 %
HCPs who think All women should be encouraged to take Iron and Folic Acid Supplements (IFAS) during pregnancy irrespective of their hemoglobin levels?	87.5 %
HCPs who think All women should be counselled on adequate and healthy weight gain during pregnancy	88.9 %
HCPs who think, All women at risk including adolescents, HIV-positive women, and women in emergency situations should receive special nutrition support?	92.1%
HCPs who agree that Pre-pregnancy nutrition influences a woman's ability to conceive, determines fetal growth and development as well as the health of the mother?	92.3 %
HCPs who feel Good maternal nutrition is important for a successful pregnancy, child delivery and lactation	84.4 %
HCP who thinks that educating mothers on the importance of healthy eating during pregnancy is one of the responsibilities of a nurse?	86.7%

5.2 Quantitative Results -Frontline Health workers (FLWs)

The survey's results reveal that the vast majority of participants (97.3%) possess a high level of knowledge regarding maternal nutrition, while a small proportion (2.7%) have low levels of knowledge on the subject. This indicates that the NourishMaa campaign and related efforts have been largely effective in raising awareness and educating healthcare providers on maternal nutrition, although there is still a small group that requires additional support to improve their knowledge. The detailed frequency distribution of knowledge levels further illustrates the overall effectiveness of knowledge dissemination among participants (Figure 17).

Sufficient knowledge and information about maternal nutrition

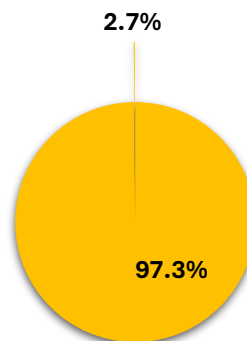


Figure 17: Percent Knowledge Score

The detailed analysis of frontline health workers' (FLWs) knowledge regarding maternal nutrition reveals several areas where improvement is needed. Specifically, knowledge on food groups, meal frequency, iron-folic acid (IFA) duration and recommended dosage, anemia causes, and total weight gain during pregnancy were found to be insufficient. Particularly concerning is the lack of consistent understanding about total weight gain during pregnancy, with responses varying widely. These knowledge gaps present an opportunity to restructure Information, Education, and Communication (IEC) materials and adjust the NourishMaa campaign to focus on these critical areas, ensuring FLWs are better equipped to promote maternal nutrition effectively. The table below provides further details about the specific knowledge levels of FLWs on each item assessed during the study (Table 5).

Table 5: knowledge of individual items asked during the study

Individual Items (Questions)	N	%
FLWs who correctly mentioned 5 food groups recommended for PW	264	39.9%
FLWs who correctly mentioned 3 meals + 2 snacks a day as ideal frequency of meals for PW in 2 nd trimester	365	55.1%
FLWs who mentioned that a pregnant woman needs to take adequate diet beginning months before conception occurs and continuing through the period of lactation.	631	95.3%
FLWs who mentioned Folate and vitamin B-12 as nutrients required for the synthesis of red blood cells during pregnancy	655	98.9%
FLWs who mentioned 12-15 kg weight gain for a healthy woman during pregnancy	66	10.0%
FLWs who reported the desirable period for a successful pregnancy longer than 37 weeks	614	91.5%
FLWs who mentioned whole-grain cereals, vegetables, and fruits to avoid constipation, the pregnant woman should increase intake of:	563	83.9%
FLWs who mentioned “physiological anemia of pregnancy” a result of increase in the mother’s blood volume	157	23.7%
FLWs who mentioned the pregnant women need Iron and Folic Acid Supplements (IFAS) throughout during pregnancy and after delivery	652	98.5%
FLWs who reported that one IFA tablet a pregnant woman must consume throughout her entire pregnancy?	655	98.9%
FLWs who reported, one IFA tablet daily a post-partum woman must consume post-delivery for 3 months?	275	41.5%
FLWs who reported that one calcium tablets a pregnant woman must consume throughout her entire pregnancy?	344	52.0%
FLWs who reported, one calcium tablet daily a post-partum woman must consume post-delivery for 3 months?	293	44.3%
FLWs who reported, IFA and Calcium cannot be taken together?	121	18.3%
FLWs who correctly mention 60 mg elemental Iron and 400mcg FA as recommended under national guidelines	394	59.5%

FLWs Practice towards Maternal Nutrition

The end line study also addressed frontline health workers' (FLWs) usual routine activities in the field, particularly focusing on how they interact with pregnant women and lactating mothers. Questions were posed about the specific maternal nutrition services they provide as part of their routine. This included assessing their practices in supporting maternal nutrition, such as nutritional counseling, monitoring of dietary practices, and ensuring adherence to supplementation guidelines. Understanding their day-to-day

practices helped gauge the extent to which FLWs apply their knowledge and skills in real-life settings to address the nutritional needs of mothers effectively (Table 6).

Table 6: Frequency of responses on practice scale (n= 662)

Questions	Results
FLWs who encourage pregnant women to take nutritional supplements	99.9 %
FLWs who ask pregnant women to take nutritional supplements containing Iron and Folic Acid (IFAS) daily during duration of pregnancy	98.5 %
FLWs who discuss women nutrition issues to the family members including husbands and mothers-in-laws	98.5 %

Knowledge of FLWs regarding the components of maternal nutrition

The responses from frontline health workers (FLWs) indicated that their understanding of maternal nutrition includes fruits and vegetables (92.1%), folic acid (89.6%), iron (87.2%), meats and fish (80.7%), and calcium (79.2%). Other components mentioned were proteins, vitamin D, and carbohydrates. While FLWs appear to have a broad awareness of different nutritional elements, the study highlighted the need for further capacity building on the specific roles these components play and the consequences of their deficiencies. This emphasizes the importance of not only knowing the nutritional elements but also understanding their impact on maternal and child health to ensure effective counseling and intervention. Further details of these findings are provided in the figure 18, below.

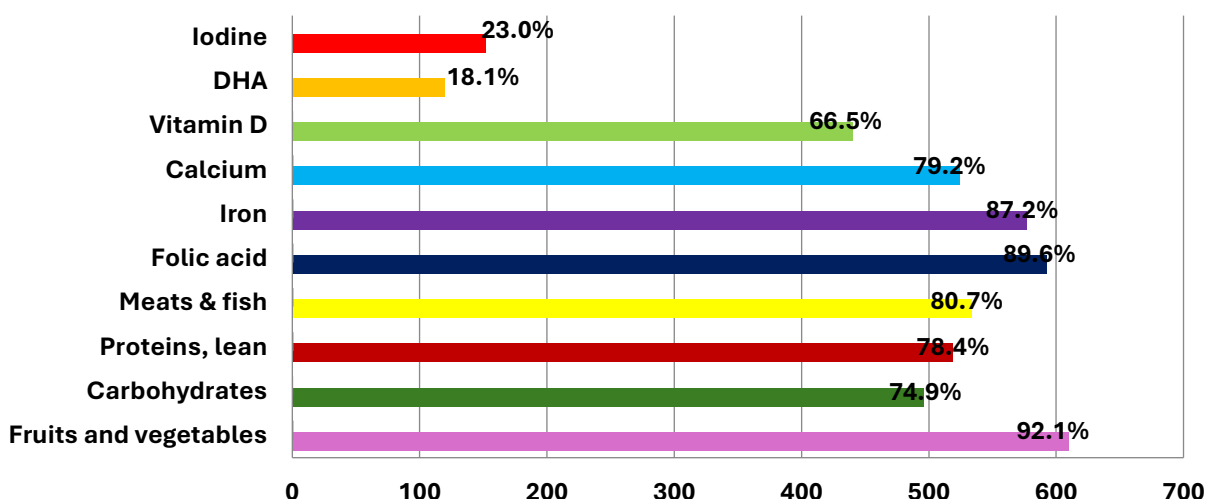


Figure 18: Knowledge of FHWs regarding Maternal nutrition components (n=662)

Knowledge of FLWs regarding the recent guidelines and policies

A significant majority of respondents (97.9%) feel adequately informed about recent guidelines and policies related to maternal nutrition following the NourishMaa campaign. The campaign included training sessions that effectively enhanced the knowledge of frontline health workers (FHWs). Post-campaign, FHWs reported a strong understanding of various nutritional strategies and guidelines, with 86% familiar with the Pakistan Maternal Nutrition Strategy, 45.7% knowledgeable about the Pakistan Adolescent Nutrition Guidelines, and 48.1% aware of the Pakistan Nutrition Guidelines for the Management of Acute Malnutrition (CMAM)(Figure 20).

Importantly, the findings emphasize the need to develop key messages around global standards in the local language to ensure effective communication and implementation among FLWs, facilitating better outreach and understanding of maternal nutrition practices in the community.

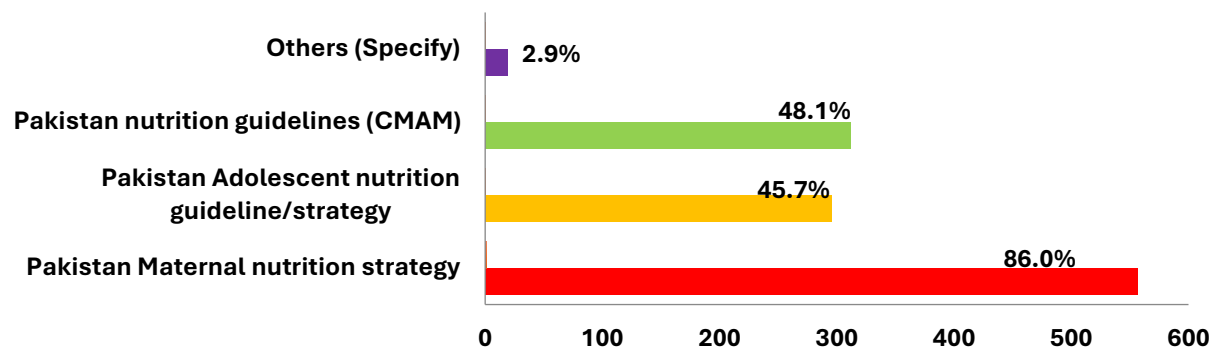


Figure 19: Knowledge about recent guidelines and policies on maternal nutrition (n=662)

Knowledge of FLWs regarding care during pregnancy and antenatal services

The responses from frontline health workers (FLWs) highlight the key antenatal services they provide to pregnant women. The results indicate that:

- ❖ 77.2% of FLWs administer Tetanus Toxoid (TT) injections.
- ❖ 71.3% distribute Iron and Folic Acid (IFA) supplements.
- ❖ 64.4% conduct blood pressure checkups.
- ❖ 53.5% perform abdominal examinations.

These services are critical for ensuring the health and well-being of pregnant women, reflecting the FLWs' understanding of essential maternal care practices. The detailed breakdown of these services is illustrated in the figure 20, below.

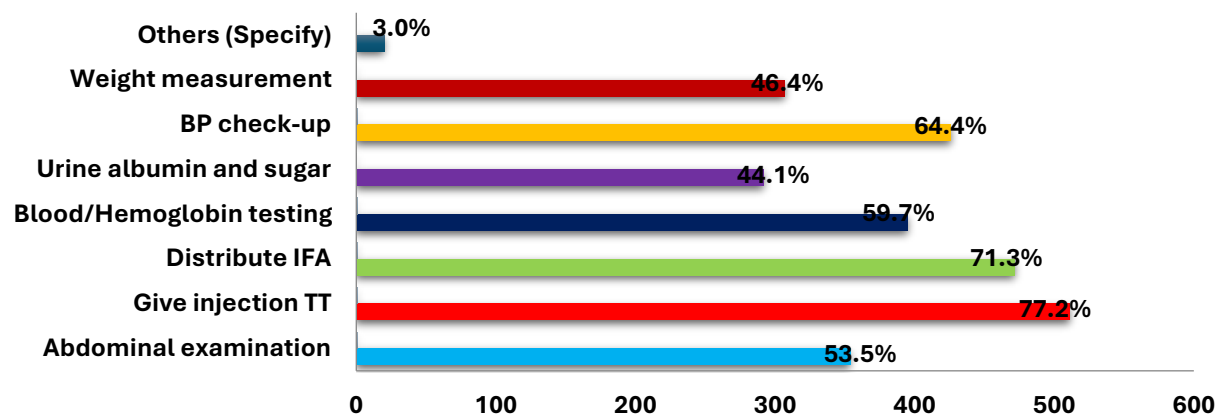


Figure 20: Knowledge about care during pregnancy and of antenatal services (n=662)

The responses from frontline health workers (FLWs) regarding care during pregnancy reveal several key beliefs about essential practices for pregnant women. The results indicate that:

- ❖ 57.6% of FLWs believe that pregnant women should avoid heavy work.

- ❖ 63.7% advocate for women to receive Tetanus Toxoid (TT) injections.
- ❖ 64.2% emphasize the importance of getting adequate sleep and rest.
- ❖ 72.1% recommend taking Iron and Folic Acid (IFA) supplements.
- ❖ 52% suggest that women should take Calcium tablets.

Additionally, FLWs also highlighted the significance of consuming nutritious food and attending Antenatal Care (ANC) visits. The detailed breakdown of these beliefs is illustrated in the figure 21, below.

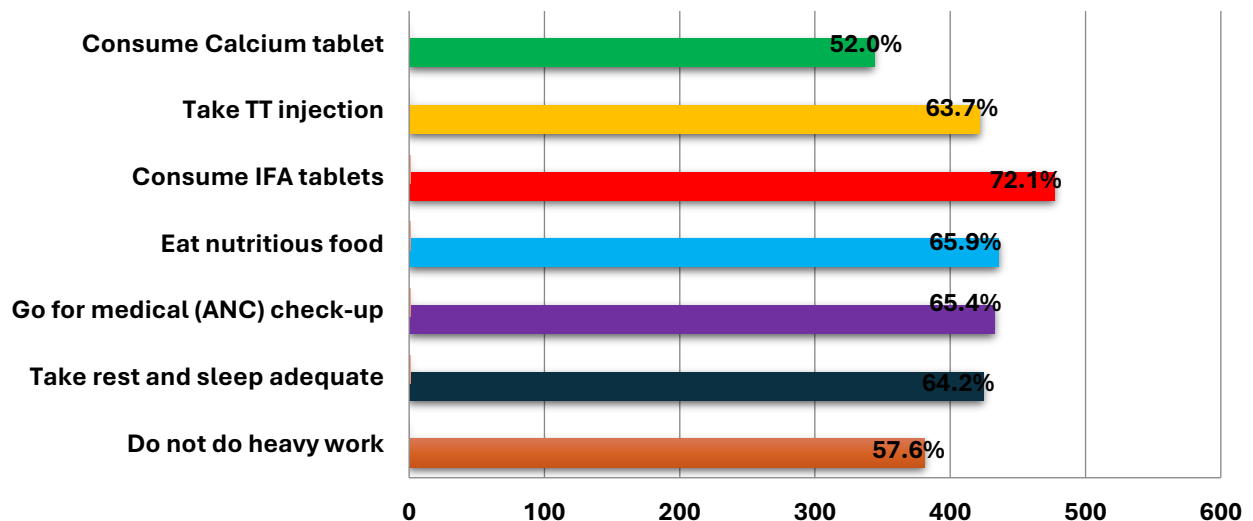


Figure 21: Care during pregnancy (n=662)

Knowledge of FLWs regarding maternal malnutrition can be prevented

The responses from frontline health workers (FLWs) regarding the prevention of maternal malnutrition highlight several critical strategies:

- ❖ Health and nutrition education was identified by 74.6% of FLWs as a key method for preventing maternal malnutrition.
- ❖ The availability and accessibility of Iron and Folic Acid (IFA) supplements, alongside nutrition counseling, were noted by 67.4% of FLWs as essential components for effective prevention.
- ❖ Promoting healthy dietary habits among pregnant women was recognized by 56% of respondents as a significant preventive measure.

Additionally, 67.1% of FLWs mentioned the importance of monitoring for high blood pressure and generalized body swelling as indicators of maternal malnutrition. Further details and insights into these preventive strategies are illustrated in the figure 23, below.

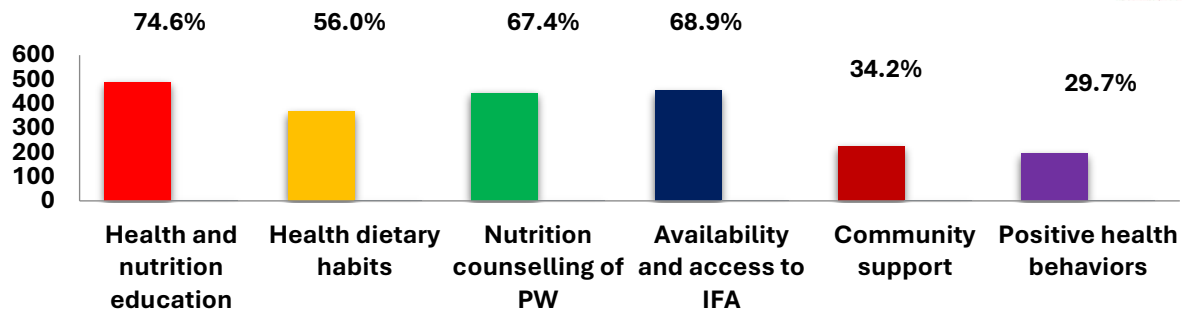


Figure 22: Maternal malnutrition can be prevented (n=662)

The responses from frontline health workers (FLWs) regarding dietary intake interventions to improve maternal nutrition highlight several key strategies:

- ❖ Counseling on healthy eating and maintaining physical activity was identified by 74.6% of FLWs as the most crucial intervention to address maternal malnutrition.
- ❖ Nutrition education was also emphasized, with 54.6% of respondents acknowledging its importance in enhancing maternal nutrition.
- ❖ Recommendations for balanced energy and dietary protein supplementation were mentioned by 33.2%** of FLWs as a necessary dietary intake intervention.

Additionally, a minority of respondents (18.1%) noted the significance of lowering daily caffeine intake during pregnancy as a preventive measure. These insights indicate a strong emphasis on education and counseling as foundational components in improving maternal nutrition through dietary interventions (Figure 23).

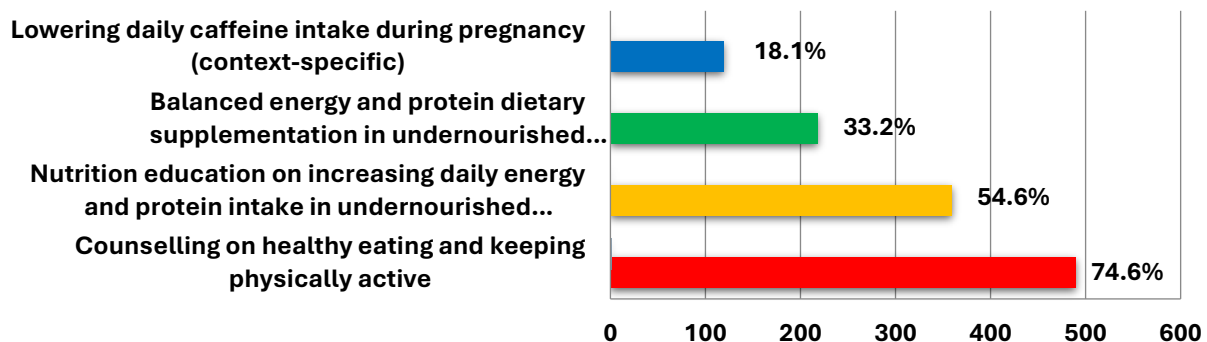


Figure 23 : Possible Dietary intake interventions can improve maternal nutrition programs (n=662)

Knowledge of FLWs regarding causes of maternal malnutrition

The frontline health workers (FLWs) identified several key causes of maternal malnutrition based on their knowledge and experience:

- ❖ Undernutrition was recognized as the most significant cause of maternal malnutrition by 68.3% of the respondents.
- ❖ Other contributing factors included:
- ❖ Inadequate provision of services
- ❖ Micronutrient malnutrition

❖ Poor dietary practices

These findings suggest that addressing undernutrition and improving service provision and dietary practices are essential components in tackling maternal malnutrition. Further details can enhance understanding of these issues and guide intervention strategies (Figure 24).

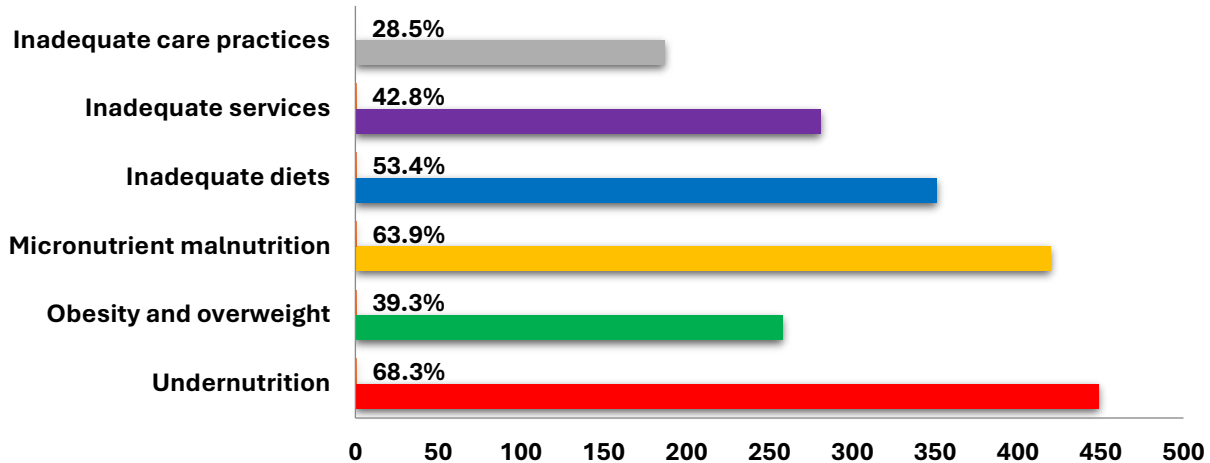


Figure 24: Knowledge about the Key Causes of Maternal Malnutrition (n=662)

The data highlights the significant effects of maternal malnutrition as reported by the frontline health workers (FLWs):

- ❖ Maternal Underweight: A majority of respondents (76.4%) identified underweight as the primary effect of maternal malnutrition.
- ❖ Micronutrient Deficiency: Approximately 50.7% of FLWs acknowledged that deficiencies in essential micronutrients are a common consequence.
- ❖ Maternal Obesity: 56.8% of the respondents noted maternal obesity as another significant effect linked to malnutrition.

These findings indicate a critical need for targeted interventions addressing both undernutrition and obesity, as well as strategies to prevent micronutrient deficiencies among mothers (Figure 25).

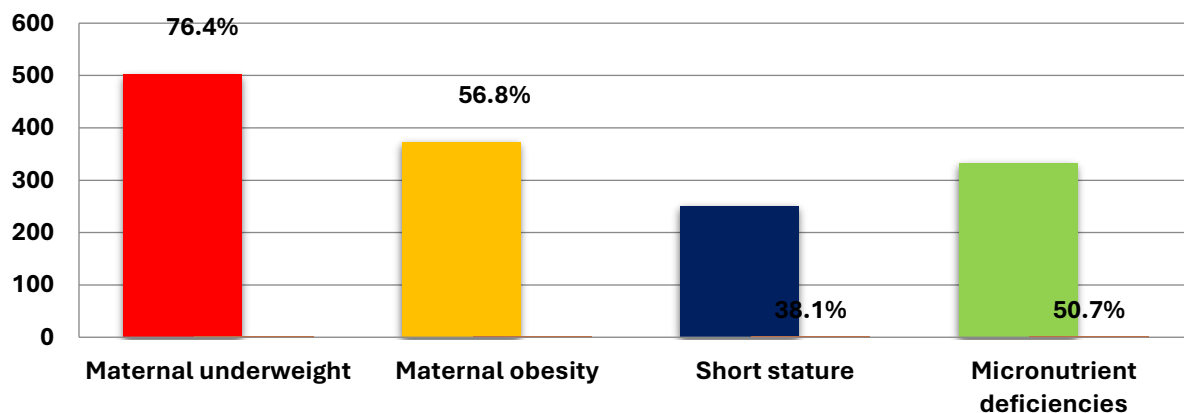


Figure 25: Key effects of maternal malnutrition (n=662)

Sources of maternal nutrition knowledge for FLWs

The findings from the frontline health workers (FLWs) reveal their perceptions regarding the sources of information on maternal nutrition:

- ❖ Training by NourishMaa: An overwhelming 89.7% of respondents identified training sessions conducted by the NourishMaa campaign as their primary source of knowledge.
- ❖ NourishMaa Facebook Page: Approximately 42.6% cited the NourishMaa Facebook page as a reliable resource for information on maternal nutrition.

In contrast, healthcare providers (HCPs) reported relying more on research studies and academic sources for information. Other minor sources mentioned by the FLWs included:

- ❖ Research Studies and Academic Sources
- ❖ Courses
- ❖ Internet Resources

This discrepancy highlights the importance of tailored communication strategies for different groups to enhance their knowledge base effectively. The emphasis on training by FLWs suggests a practical approach to knowledge dissemination, which may differ from the theoretical focus seen among HCPs (Figure 26).

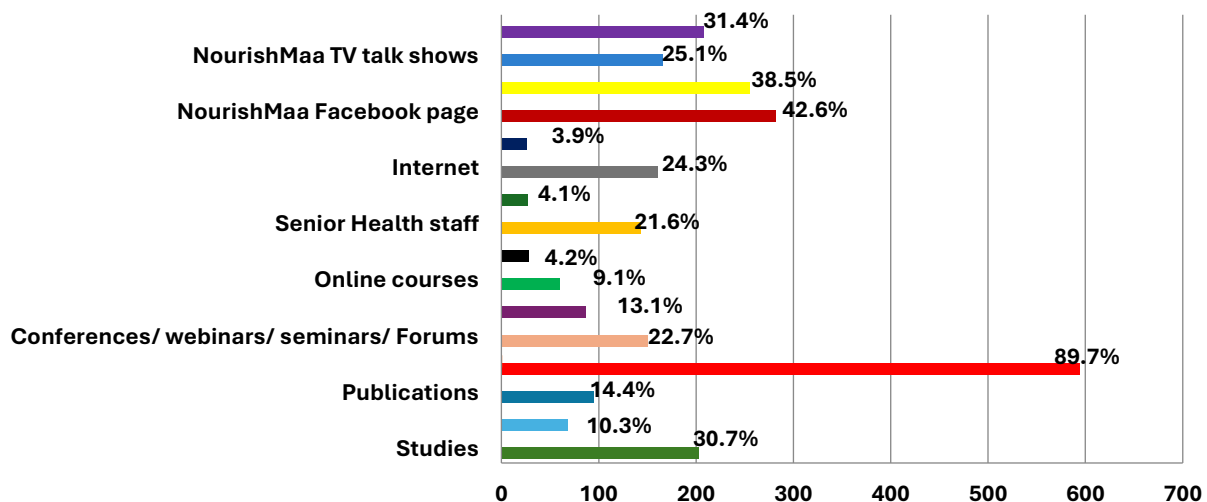


Figure 26: Sources of knowledge and information on maternal nutrition (n=662)

FWLs Attitude towards Maternal Nutrition

The composite score of participants' attitudes, practices, and motivation regarding maternal nutrition was assessed using a Likert scale, where the maximum score is 5 (for positive statements and the other way around for negative statements). The scale is defined as follows:

- ❖ 1 = Strongly Disagree
- ❖ 2 = Somewhat Disagree
- ❖ 3 = Neither Agree nor Disagree
- ❖ 4 = Somewhat Agree
- ❖ 5 = Strongly Agree

Attitude Assessment

The responses from the frontline health workers (FLWs) indicate a strong consensus on the importance of maternal nutrition. The following key points summarize the findings:

1. **Importance of Maternal Nutrition:** A significant majority of respondents recognized maternal nutrition as vital for the health of both mothers and their infants.
2. **Responsibility to Assess Nutritional Status:** Many FLWs felt a personal responsibility to assess the nutritional status of pregnant women, aligning with current guidelines in maternal healthcare that emphasize this responsibility.
3. **Association Between Maternal Weight and Complications:** The majority acknowledged the correlation between maternal weight and pregnancy-related complications, indicating a strong understanding of the risks associated with both underweight and overweight mothers. This is supported by scientific evidence highlighting the increased risks of complications due to maternal malnutrition.
4. **Awareness of Pre-Pregnancy Nutrition:** The findings suggest that most respondents understand the critical importance of nutrition before and during pregnancy, which is crucial for promoting healthy outcomes for both mothers and babies.

Implications for Practice

These results underscore the necessity for ongoing educational initiatives aimed at increasing awareness about pre-pregnancy nutrition. Effective strategies must be developed to promote healthy dietary practices among women of reproductive age, focusing on:

Nutrition and Fertility: Emphasizing the impact of nutrition on fertility.

Fetal Growth and Development: Educating women on how proper nutrition influences fetal health.

Maternal Health: Reinforcing the role of nutrition in preventing complications during pregnancy.

Given the importance of these factors, interventions can be designed to improve the nutritional knowledge and practices of women planning to conceive. This approach is likely to lead to better maternal and fetal health outcomes, ultimately enhancing the overall well-being of families and communities (Table 7).

Table 7: Maternal nutrition related attitude of FLWs (n=662)

Questions	Frequency
FLWs who think the issue of maternal nutrition is important	97.3 %
FLWs who feel internally motivated to work on maternal nutrition	94.9 %
FLWs who love/like to provide nutrition related education to all the clients	95.6 %
FLWs who feel, assessing the nutritional status of pregnant women and lactating mothers is their responsibility	95.6 %
FLWs who feel, it is important to assess the nutritional status of pregnant women and lactating mothers.	95.3 %
FLWs who think, underweight and overweight women experience more complications during pregnancy and delivery than others	95.5 %
FLWs who feel, all the pregnant women and lactating mothers should have knowledge about adequate and nutritious diet	95.3 %
FLWs who think all women should be encouraged to take Iron and Folic Acid Supplements (IFAS) during pregnancy irrespective of their hemoglobin levels.	94.3 %
FLWs who think, pre-pregnancy nutrition status influences a woman's ability to conceive, fetal growth and development as well as health of mother	95.8 %
FLWs who agree that maternal nutrition is highly important for a successful pregnancy, child delivery and lactation	93.1 %

FLWs who feel educating mothers on importance of healthy eating during pregnancy is responsibility of health workers	93.4 %
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FLWs Motivation towards Maternal Nutrition

Measurement of Motivation

To assess the motivation of respondents regarding maternal nutrition, a similar Likert scale was employed, where the scoring system is as follows:

- ❖ 1 = Strongly Disagree
- ❖ 2 = Somewhat Disagree
- ❖ 3 = Neither Agree nor Disagree
- ❖ 4 = Somewhat Agree
- ❖ 5 = Strongly Agree

Motivation Assessment Results

The following key findings emerged from the motivation-related questions:

1. Motivation towards Job Roles:

A majority of respondents disagreed with the statement, "I am motivated towards my job roles and responsibilities." This indicates a significant gap in motivation, warranting an exploration of underlying factors contributing to this sentiment. Factors influencing motivation may include workplace management practices, career development opportunities, and incentives provided by employers.

2. Commitment to Duties:

Despite the low motivation scores, a significant proportion of respondents expressed strong commitment to performing their duties sincerely. This commitment can positively impact job performance and overall effectiveness in their roles.

3. Support from Local Influencers:

A notable finding is the perceived lack of support from local influencers and community elders. Many frontline health workers (FLWs) felt that insufficient backing from these key figures hampers their ability to drive change in maternal nutrition within the community. Enhanced community mobilization and strong campaigning are necessary to foster local support, which is vital for the success of maternal nutrition initiatives (Table 8).

Recommendations for Improvement

Based on the findings, several strategies can be recommended to enhance motivation and support for FLWs:

- ❖ **Management Evaluation** Employers should evaluate management practices to identify areas for improvement that can boost motivation among employees.
- ❖ **Career Development Opportunities:** Providing training, education, and advancement opportunities can help individuals take a more proactive approach to their roles and responsibilities.
- ❖ **Job Aids and Reference Materials:** Offering tools and resources can help FLWs perform their duties more effectively and with greater confidence.
- ❖ **Community Mobilization:** Strengthening campaigns and involving community influencers can enhance local support for FLWs, facilitating the necessary changes in maternal nutrition practices.

The results suggest a critical need for targeted interventions to address the motivation of FLWs in maternal nutrition roles. By implementing strategies that foster commitment and support, the effectiveness of these

health workers can be significantly enhanced, leading to much improved maternal and child health outcomes within the community.

Table 8: Motivation of the FLWS to work on maternal nutrition (n=662)

Questions	Results
FLWs who are motivated towards job roles and responsibilities	98.3 %
FLWs who claim they know all their roles and responsibilities clearly	96.7 %
FLWs who claim they perform all functions, roles and responsibilities with sincerity	96.2 %
FLWs who are overburdened with additional job responsibilities every now and then	76.7 %
FLWs who think the work stress and work load effects their motivation	79.6 %
FLWs who feel quite satisfied to work with the community with their specified roles	94.3 %
FLWs who feel being given adequate remuneration for job responsibilities	88.4 %
FLWs who feel there is need of extra allowances, trainings and benefits to keep employees motivated regarding their work	96.5 %
FLWs who think work pressure and attitude of higher officials affects their motivation towards work	88.7 %
FLWs who experienced positive and appreciating attitude and behavior of community to keep motivated	90.9 %
FLWs who receive/ experience local community influencers support in performing their roles and responsibilities	94.6 %

5.3 Comparison of Health care providers (HCPs) Attitude regarding Baseline and End line Survey

The following table summarizes the baseline (pre-test) and end line (post-test) results from 783 healthcare professionals (HCPs) regarding their attitudes towards nutrition in maternal and child health services, assessing various key variables (Table 9).

Table 9: Pre and Post-campaign percent change in attitudes of the HCPs

Question/Variable	Baseline (Pre-Campaign)	End line (Post-Campaign)	Change (%)
Nutrition is an integral part of maternal and child health services.	84.1%	93.4%	+9.3%
Counseling/educating patients is part of a doctor's responsibility.	92.9%	88.5%	-4.4%
Nutritionists should play a major role in counseling and education regarding nutrition.	N/A	88.5%	N/A
Pregnant women and lactating mothers should be knowledgeable about the need for adequate nutrition.	84.5%	91.7%	+7.2%

5.4 Key Findings

1. Increased Recognition of Nutrition's Importance:

There was a significant increase in the percentage of HCPs who recognized nutrition as an integral part of maternal and child health services, rising from 84.1% to 93.4%. This change reflects the positive impact of the NourishMaa Campaign and related training efforts.

2. Attitudes Toward Counseling Responsibilities:

While 92.9% of HCPs initially believed that counseling and providing education is part of a doctor's responsibility, this figure slightly decreased to 88.5%. This indicates a shift in perspective, suggesting that there may be a growing belief that nutritionists should take a more prominent role in counseling regarding nutrition.

3. Knowledge Empowerment for Women:

The attitude toward the importance of knowledge among pregnant women and lactating mothers regarding adequate nutrition improved significantly, moving from 84.5% to 91.7%. This change signifies a heightened awareness of the need for maternal education on nutrition.

The results demonstrate a marked improvement in the attitudes of HCPs regarding the role of nutrition in maternal and child health following the NourishMaa Campaign. While there was a slight decline in the belief that education is solely the responsibility of doctors, the recognition of nutritionists' roles has increased, suggesting an evolving collaborative approach to maternal nutrition. Overall, these findings underscore the effectiveness of training initiatives in promoting awareness and knowledge regarding nutrition among healthcare professionals.

The following table gives the Baseline & Endline (Pre-Post-campaign) gross results against different questions/variables to assess attitude of HCPs regarding nutrition.

Table 10: Comparison of Health care providers (HCPs) Attitude regarding Baseline and Endline Survey (n=783)

Questions	Baseline (%age)	Endline (%age)
HCPs who think the issue of maternal nutrition is important	96.9 %	91.8 %
HCPs who think nutrition is an important / integral part of Maternal and child health services?	84.1 %	93.4 %
HCPs who feel Due to interactions with NourishMaa, it has sensitized you for the importance of maternal nutrition actions in your clinical practice?	92.9 %	91.8 %
HCPs who feel Counselling/education on nutritional aspects is also part of every Doctors responsibility?	92.9 %	88.5 %
HCPs have critical role in improving the nutritional status of Pregnant women?	95.1 %	86.7 %
HCPs who feel, It is important to assess the nutritional status of all mothers admitted to the ward?	94.0 %	89.7 %
HCPs who think, Counselling/education on nutritional aspects is also part of every Doctors/FLWs responsibility?	94.0 %	90.0 %
HCPs who feel, Underweight and overweight women experience more complications during pregnancy and delivery than normal women?	95.1 %	90.8 %
HCPs who think All pregnant women and lactating mothers should be knowledgeable about the need for an adequate and nutritious diet?	84.5 %	91.7 %
HCPs who think All women should be encouraged to take Iron and Folic Acid Supplements (IFAS) during pregnancy irrespective of their hemoglobin levels?	97.0 %	87.5 %
HCPs who think All women should be counselled on adequate and healthy weight gain during pregnancy	97.8 %	88.9 %
HCPs who think, All women at risk including adolescents, HIV-positive women, and women in emergency situations should receive special nutrition support?	98.0%	92.1%

Questions	Baseline (%age)	Endline (%age)
HCPs who agree that Pre-pregnancy nutrition influences a woman's ability to conceive, determines fetal growth and development as well as the health of the mother?	96.0 %	92.3 %
HCPs who feel Good maternal nutrition is important for a successful pregnancy, child delivery and lactation	97.0 %	84.4 %
HCP who thinks that educating mothers on the importance of healthy eating during pregnancy is one of the responsibilities of a nurse?	96.9 %	86.7%

5.5 Comparison of Health care providers (FLWs) knowledge regarding Baseline and Endline Survey

The following table (11) depicts the Baseline & Endline (Pre-Post-campaign) results against different questions/variables to assess the knowledge of Frontline Workers (FLWs) regarding nutrition. The pre-campaign (baseline-results) and post-test (end line-results) shows a significant increase in their knowledge level among 662 FLWs along with percent change for each variable.

The results illustrate the impact of the NourishMaa Trainings, Facebook page, and WhatsApp groups in enhancing their knowledge

Table 11: Pre and Post-campaign percent change in attitudes of the FLHWs

Question	Pre-Campaign (%)	Post-Campaign (%)	Percent Change (%)
Correctly mentioned 5 food groups recommended for PW	24.4	39.9	+15.5
Acknowledged need for adequate diet starting months before conception	28.3	95.3	+67.0
Recognized need for Iron and Folic Acid Supplements during pregnancy and after delivery	34.7	98.5	+63.8
Upgraded knowledge regarding Folate and vitamin B-12 for red blood cells synthesis	17.7	98.9	+81.2

For example, those FLWs who correctly mentioned the 5 food groups recommended for Pregnant Women (PW) increased from 24.4% to 39.9%. The percentage of FLWs who stated that a pregnant woman needs to take an adequate diet beginning months before conception and continuing through the period of lactation rose significantly from 28.3% to 95.3%. This improvement is attributed to the conduction of NourishMaa trainings, advertisements on the Facebook page, and engagement in WhatsApp groups, all of which played significant roles in enhancing knowledge.

Moreover, the percentage of FLWs who acknowledged that pregnant women need Iron and Folic Acid Supplements (IFAS) throughout pregnancy and after delivery increased from 34.7% to 98.5%. Furthermore, FLWs who joined different training sessions significantly upgraded their knowledge regarding Folate and Vitamin B-12 as nutrients required for the synthesis of red blood cells during pregnancy, with an increase from 17.7% to 98.9% (Table 12).

Table 12: Comparison of Frontline Health Workers (FLWs) knowledge regarding Baseline and Endline Survey (n=662)

Individual Items (Questions)	Baseline (%age)	Endline (%age)
FLWs who correctly mentioned 5 food groups recommended for PW	24.4%	39.9%
FLWs who correctly mentioned 3 meals + 2 snacks a day as ideal frequency of meals for PW in 2 nd trimester	30.0%	55.1%
FLWs who mentioned that a pregnant woman needs to take adequate diet beginning months before conception occurs and continuing through the period of lactation.	28.3%	95.3%
FLWs who mentioned Folate and vitamin B-12 as nutrients required for the synthesis of red blood cells during pregnancy	17.7%	98.9%
FLWs who mentioned 12-15 kg weight gain for a healthy woman during pregnancy	29.1%	10.0%
FLWs who reported the desirable period for a successful pregnancy longer than 37 weeks	91.5%	91.5%
FLWs who mentioned whole-grain cereals, vegetables, and fruits to avoid constipation, the pregnant woman should increase intake of	83.9%	83.9%
FLWs who mentioned “physiological anemia of pregnancy” a result of increase in the mother’s blood volume	29.4%	23.7%
FLWs who mentioned the pregnant women need Iron and Folic Acid Supplements (IFAS) throughout during pregnancy and after delivery	34.7%	98.5%
FLWs who reported that one IFA tablet a pregnant woman must consume throughout her entire pregnancy?	25.5%	98.9%
FLWs who reported, one IFA tablet daily a post-partum woman must consume post-delivery for 3 months?	21.3%	41.5%
FLWs who reported that one calcium tablet a pregnant woman must consume throughout her entire pregnancy?	77.5%	52.0%
FLWs who reported, one calcium tablet daily a post-partum woman must consume post-delivery for 3 months?	82.6%	44.3%
FLWs who reported, IFA and Calcium cannot be taken together?	47.8%	18.3%
FLWs who correctly mention 60 mg elemental Iron and 400mcg FA as recommended under national guidelines	20.6%	59.5%

The following table depicting that the Baseline & Endline (Pre-Post-test) results against different questions/ variables to assess knowledge of FLWs regarding nutrition. i.e. with respect to pre-test (baseline-test), post-test (Endline-test) shows significant increase in their practice levels from 84.8% to 98.5% by considering the discussion of women nutrition issues to the family members including gate keepers such as mother-in-law and husbands.

Table 13: Frequency of responses on practice scale (n= 662)

Questions	Baseline (%)	End line (%)	Percent Change(%)
FLWs who encourage pregnant women to take nutritional supplements	99.1	99.9	+0.81
FLWs who ask pregnant women to take nutritional supplements containing Iron and Folic Acid (IFAS) daily during duration of pregnancy	96.8	98.5	+1.76
FLWs who discuss women nutrition issues to the family members including husbands and mothers-in-laws	84.8	98.5	+16.16

The following table presents the baseline and end line (pre-post-campaign) results for various questions and variables assessing the knowledge of frontline workers (FLWs) regarding nutrition. The results indicate a slight increase in the attitudes of FLWs concerning the importance of maternal nutrition; specifically, the percentage of those who consider maternal nutrition to be a significant issue rose from 92.0% to 97.3%, representing a 5.76% increase, and the percentage of FLWs who believe that all pregnant women and lactating mothers should possess knowledge about an adequate and nutritious diet increased from 93.9% to 95.3%, resulting in a 1.49% increase. This finding highlights a growing recognition among FLWs of the necessity for pregnant and lactating women to be informed about nutrition, which is essential for both maternal and infant health.

However, certain findings warrant attention. For example, the percentage of FLWs who believe that underweight and overweight women experience more complications during pregnancy and delivery decreased from 96.4% to 95.5%, indicating a decline of 0.93%. Additionally, the proportion of FLWs who think that all women should be encouraged to take Iron and Folic Acid Supplements (IFAS) during pregnancy—regardless of their hemoglobin levels—declined from 95.0% to 94.3%, reflecting a 0.74% decrease. Similarly, the belief that pre-pregnancy nutritional status influences a woman's ability to conceive, fetal growth, development, and maternal health also decreased from 96.4% to 95.8%, resulting in a 0.62% decline.

Furthermore, there was a notable decrease in the percentage of FLWs who agree that maternal nutrition is highly important for a successful pregnancy, child delivery, and lactation, falling from 96.3% to 93.1%, which corresponds to a 3.32% reduction. Additionally, the belief that educating mothers on the importance of healthy eating during pregnancy is the responsibility of health workers declined from 96.3% to 93.4%, indicating a decrease of 3.01. This change suggests that the awareness and acknowledgment of maternal nutrition as a critical concern have improved significantly among FLWs (Table 13).

These results highlight the need for continued efforts to enhance the awareness and education of FLWs regarding maternal nutrition, ensuring that positive attitudes are reinforced and negative perceptions are addressed effectively.

Table 14: Maternal nutrition related attitude of FLWs (n=662)

Questions	Baseline (%)	Endline (%)	Percent Change (%)
FLWs who think the issue of maternal nutrition is important	92.0	97.3	+5.76
FLWs who feel internally motivated to work on maternal nutrition	93.7	94.9	+1.28
FLWs who love/like to provide nutrition related education to all the clients	94.3	95.6	+1.38
FLWs who feel, assessing the nutritional status of pregnant women and lactating mothers is their responsibility	94.0	95.6	+1.70

Questions	Baseline (%)	Endline (%)	Percent Change (%)
FLWs who feel, it is important to assess the nutritional status of pregnant women and lactating mothers.	93.8	95.3	+1.60
FLWs who think, underweight and overweight women experience more complications during pregnancy and delivery than others	96.4	95.5	-0.93
FLWs who feel, all the pregnant women and lactating mothers should have knowledge about adequate and nutritious diet	93.9	95.3	+1.49
FLWs who think all women should be encouraged to take Iron and Folic Acid Supplements (IFAS) during pregnancy irrespective of their hemoglobin levels.	95.0	94.3	- 0.74
FLWs who think, pre-pregnancy nutrition status influences a woman's ability to conceive, fetal growth and development as well as health of mother	96.4	95.8	-0.62
FLWs who agree that maternal nutrition is highly important for a successful pregnancy, child delivery and lactation	96.3	93.1	-3.32
FLWs who feel educating mothers on importance of healthy eating during pregnancy is responsibility of health workers	96.3	93.4	-3.01

The following table demonstrates a significant increase in the motivation levels of frontline workers (FLWs) to engage in maternal nutrition initiatives following the implementation of training sessions, both online and offline. Specifically, the percentage of FLWs who feel motivated to fulfill their job roles and responsibilities surged from 14.0% to 98.3%, reflecting an extraordinary increase of 84.3%. Furthermore, FLWs who reported experiencing a positive and appreciative attitude from the community—an important factor in maintaining motivation—showed a notable rise from 15.1% to 90.9%, resulting in a percentage change of 75.8%. Additionally, FLWs who acknowledged that work stress and workload impacted their motivation saw an increase in motivation and commitment levels from 52.2% to 79.6%, translating to a 27.4% improvement (Table 15).

Questions	Baseline (%)	Endline (%)	Percent Change (%)
FLWs who are motivated towards job roles and responsibilities	14 .0	98.3	+84.3
FLWs who claim they know all their roles and responsibilities clearly	14.3	96.7	+82.4
FLWs who claim they perform all functions, roles and responsibilities with sincerity	26.2	96.2	+70.0
FLWs who are overburdened with additional job responsibilities every now and then	27.4	76.7	+49.3
FLWs who think the work stress and work load effects their motivation	52.2	79.6	+27.4
FLWs who feel quite satisfied to work with the community with their specified roles	13.3	94.3	+81.0
FLWs who feel being given adequate remuneration for job responsibilities	3.5	88.4	+84.9
FLWs who feel there is need of extra allowances, trainings and benefits to keep employees motivated regarding their work	56.1	96.5	+40.4
FLWs who think work pressure and attitude of higher officials affects their motivation towards work	32.7	88.7	+56.0

FLWs who experienced positive and appreciating attitude and behavior of community to keep motivated	15.1	90.9	+75.8
FLWs who receive/ experience local community influencers support in performing their roles and responsibilities	11.2	94.6	+83.4

Table 15: Motivation of the FLWS to work on maternal nutrition (n=662)

These findings underscore the effectiveness of the training programs in enhancing motivation among FLWs, indicating a successful strategy for improving maternal nutrition efforts within the community. The substantial increases in motivation and engagement reflect the importance of community support and clear role definitions in fostering a dedicated workforce.

5.6 Summary of the comparative analysis of baseline and endline results:

The campaign greatly improved knowledge. For example, the percentage of frontline health workers (FLWs) who correctly mentioned the five food groups recommended for pregnant women increased from 24.4% at the baseline to 39.9% at the end of the campaign. Additionally, the knowledge of the need for Iron and Folic Acid Supplements (IFAS) during pregnancy and after delivery rose from 34.7% to 98.5%. Similarly, the campaign successfully increased awareness. A significant percentage of healthcare providers (91.8%) acknowledged the importance of maternal nutrition, and the campaign sensitized 92.9% of them to the role of nutrition in their clinical practice.

The campaign also increased the uptake of healthy nutrition behaviors. A large majority (99.9%) of FLWs encouraged pregnant women to take nutritional supplements, and 98.5% specifically promoted Iron and Folic Acid supplementation. There was also a significant rise in counseling and nutritional advice provided to pregnant women by healthcare workers.

While the results could not explicitly mention a quantitative reduction in low birth weight or preterm birth rates, it does highlight improvements in maternal health practices. For instance, 96.2% of healthcare providers performed systematic anthropometric screenings at antenatal care (ANC) and postnatal care (PNC) clinics, which suggests better monitoring of maternal and fetal health.

The campaign effectively reached its target audience, including healthcare providers and FLWs. Nearly all FLWs (97.3%) reported having high levels of knowledge on maternal nutrition, and 95.6% felt motivated to provide nutrition-related education.

The most effective communication channels were face-to-face training sessions (82.9% of HCPs relied on this), followed by digital platforms like the NourishMaa Facebook page, which 43.6% of HCPs used. The campaign also leveraged other channels like research articles and the internet, but in-person training remained the most impactful.

The behavioral changes among the service providers show promise for sustainability, as 94.9% of FLWs reported being internally motivated to continue promoting maternal nutrition. However, maintaining behavior change will likely require ongoing training, community support, and policy reinforcement. Recommendations include enhancing local support for frontline workers and providing additional job aids, allowances, and training to keep health workers motivated.

6. Qualitative Results:

In the NourishMaa campaign, we expanded our qualitative study to include four newly added districts: Batagram, Mardan, Karachi Korangi, and Qambar Shahdadkot, in addition to the original districts—Rawalpindi, Bahawalpur, Karachi East, and Larkana. This expansion aims to assess the effectiveness of our interventions across a broader range of regions. By incorporating these new districts, we are able to gain a deeper understanding of how the NourishMaa initiatives are impacting diverse communities, allowing us to capture a wider range of outcomes. The insights from these areas will enable us to refine and adapt Nourishmaa interventions, ensuring the campaign remains responsive to the specific needs of different populations, ultimately leading to more targeted and effective results.

This section presents findings primarily of a qualitative nature, derived from discussions with healthcare professionals (HCPs) from both the private and public sectors, as well as lady health workers (LHWs), frontline health workers (FHWs), and Key Opinion Leaders (KOLs). The information gathered was meticulously analyzed to evaluate the knowledge acquired by these stakeholders and to assess the impact of the NourishMaa campaign on their practices. Additionally, the discussions explored how the campaign has influenced their systems for assessment and treatment, providing a comprehensive view of its effects on healthcare delivery in these regions.

Maternal Nutrition Awareness:

Healthcare providers (HCPs), both in private and government setups, have observed a general lack of awareness about maternal nutrition among women in the community, along with a lack of family support. Many women prioritize feeding their families first and consume what's left. HCPs and Key Opinion Leaders (KOLs), acting as master trainers in the program, noted that this issue is particularly prevalent among women in urban slums and rural areas. Traditionally, there is a belief that the mother should feed her family first, resulting in many women being unaware of their proper dietary needs during pregnancy and lactation

“One significant issue is that there is often a lack of family support. For example, in my family, there are many people who do not promote breastfeeding. When I try to educate them, they say they can afford formula milk instead. Additionally, our society is male-oriented; for instance, if a pomegranate is brought home, the male eats first, followed by the woman. This creates difficulties for women, especially when they are pregnant and breastfeeding, as they need more nutrition than an average woman.”

Pregnant and lactating women frequently encounter nutritional deficiencies, including vitamin E, iron, and vitamin C deficiencies, which can exacerbate the risk of infections and lead to various health complications. Prior to the implementation of the NourishMaa initiative by NI, many women held the misconception that the consumption of iron and folic acid tablets alone was sufficient, without recognizing the broader dietary needs essential for their health.

The high patient turnover in outpatient departments restricts the time clinical officers can allocate to each individual, resulting in a primary focus on clinical assessments during antenatal visits. Consequently, there

is often insufficient time for comprehensive counseling on maternal nutrition, which is crucial for optimizing health outcomes for both mothers and their infants.

“I’m telling you, our gynecology OPD handles around 120 to 200 patients daily. We cannot do this for every patient. Honestly, it didn't happen.”

Pregnant women seek advice at various stages—some in the first month, others in the third or fourth, and some only at full term. HCPs emphasize the importance of a nutritious diet for both mother and child during and after pregnancy. However, HCPs recognize their responsibility to guide that pregnant and lactating women take appropriate supplements and maintain a healthy diet for themselves and their children to prevent malnutrition.

Lady Health Workers (LHWs) and Frontline Health Workers (FHWs) raise nutritional awareness by visiting homes. At Basic Health Units (BHUs), healthcare providers check patient vitals. If a mother is anaemic, necessary tests are conducted, and dietary guidance is provided.

Engagement and Impact of the NourishMaa Project:

The NourishMaa campaign is commendable across all regions, offering essential information for antenatal and postnatal care. It has significantly increased knowledge among adults, especially regarding postnatal visits. Even HCPs’ found the information valuable. They shared that, the NourishMaa project has significantly enhanced awareness regarding the importance of maternal health and nutrition. It helped them refresh their knowledge and acquire new information, serving as a reminder of important concepts while introducing them to innovative ideas.

Doctors believe the NourishMaa campaign has been beneficial for both their learning and staff training. Lower-level staff, which was not included in the training, also learned by observing these practices.

Healthcare providers confirm the campaign’s relevance to their work, stressing that better maternal nutrition leads to improved child health outcomes. Most rate the improvement in their counselling and nutritional knowledge due to the training as 4 out of 5.

“I received training about ‘NourishMaa’. It’s a very good initiative. They help with the proper nourishment of mothers. Before this, I had no clear idea about the first, second, and third trimesters during pregnancy, even as a gynaecologist. I didn’t know how many calories to add based on BMI or how to counsel mothers properly. This program, ‘NourishMaa’, is focused on nourishing mothers and is really helpful.”

Private and public HCPs expressed that they found the NourishMaa project exceptionally commendable, particularly given the challenging state of maternal nutrition in their respective regions. They acknowledged the project’s significant impact and benefits.

They found the NourishMaa campaign to be highly relevant and shared valuable insights. During the two-day training for the NourishMaa campaign, they learned about the critical importance of maternal nutrition, including antenatal nutrition and even nutrition prior to conception. This is essential for the future health of the child, as a mother's good nutrition benefits the next generation. Additionally, they discovered that many people may not realize the significance of maintaining proper nutrition from adolescence, which can have a positive impact on future pregnancies. As healthcare professionals, they received extensive guidance on adolescent girls and preconception mothers regarding appropriate prescriptions for them. This has proven to be incredibly helpful, as many young females experience menstrual cycle issues due to imbalanced diets. Consequently, they feel better equipped to provide effective guidance and support to these individuals.

As HCPs emphasized that Nourishmaa made them realize that relying on supplements alone is not sustainable, nor can any supplement truly replace a proper, well-balanced diet. There's nothing better than obtaining nutrition naturally from food. For instance, we stress the importance of a healthy breakfast as the foundation of good nutrition. However, we notice that today's generation often skips breakfast, opting instead for unhealthy alternatives like junk food or brunch. This habit can lead to nutritional imbalances and long-term health issues. Therefore, it's crucial to focus on real, nutritious food as the primary source of health, rather than supplements or quick fixes.

Several healthcare professionals (HCPs) first learned about the NourishMaa initiative through Facebook. The topic of maternal nutrition caught their attention when they came across the NourishMaa page and saw advertisements for workshops. Intrigued, they reached out for more information and attended a workshop, which subsequently led them to become actively involved in the project.

"I would rate the Nourish Maa project as very good. The project is quite beneficial. I first heard about it through Facebook. Initially, I came across their page and saw an advertisement for their workshop. Curious, I decided to contact them and eventually attended one of their workshops, which led me to become part of the project."

A few of them initially discovered the campaign through a TV advertisement and later received more information from colleagues. Their involvement became solidified when they received official training letters. Although some did not initially pay much attention to the TV ad, they found it memorable due to its emphasis on maternal health and nutrition, coupled with the catchy name, "NourishMaa." The delivery style of the message left a lasting impression. Following this, the department reached out to them, announcing their nomination for the project by the in-charge, and conducted initial training sessions with the assistance of a few doctors. Key Opinion Leaders (KOLs) were also selected and received nomination letters as part of this initiative.

The HCPs, LHWs and FHWs at District Health Unit (DHO) and the Basic Health Unit (BHU) shared that their names were selected by the government to participate in the NourishMaa campaign through the district head office.

“I don’t find training or sessions organized by pharmaceutical companies to be reliable. This is because the studies they present are often biased and tailored to their interests, so we cannot trust them. When the Ministry of Health makes a statement, we are obliged to attend the event. There hasn’t been any experience with SOGP or PMA yet; so far, all training or lectures have been coming from the District Health Office (DHO). I believe that if training comes from the Pakistan Medical Association, it would be more reliable”.

Those involved with the RMNCH (Reproductive, Maternal, Newborn, and Child Health) and IRMNCH (Integrated Reproductive, Maternal, Newborn, and Child Health) programs mentioned that they are part of this initiative, but they noted that there hasn’t been extensive training at their level in that program. NourishMaa, on the other hand, appears to offer more in-depth or specialized training. They expressed that they are generally interested in participating in such training when selected by the government, as their busy schedules make it challenging to carve out time in the mornings or evenings from their private practices. However, when the government nominates names, it becomes easier for them to participate.

LHS (Lady Health Supervisors) and LHWs (Lady Health Workers) mentioned that they also work on mother and child health in other programs, but they feel that in this initiative, things have been explained in a much more comprehensive way.

“ Absolutely, because in our own program, we also focus on discussing the health of mothers and children, NourishMaa serves as a great platform. Through this initiative, we’ve helped women understand how to prioritize their own health. Until they start thinking about their own well-being, their health cannot improve. We’ve emphasized the importance of being nutritionally sufficient, ensuring that their diet includes micronutrients. We’ve taught them that their plate should contain a balanced mix of essential components like carbohydrates, proteins, and other vital nutrients to maintain their health effectively. ”.

Organizations like SOGP (Society of Obstetricians and Gynaecologists of Pakistan), PMA (Pakistan Medical Association), and the Ministry of Health are generally regarded as reliable sources.

“I was nominated through the SOGP platform along with the General Secretary of SOGP. For this, we attended a training workshop in Islamabad last year, which took place over 3 to 4 days in October.”

Among these, the Ministry of Health and its provincial departments are particularly considered more trustworthy for nutrition-related matters. Nutrition International also has a strong reputation, which encourages health care professionals (HCPs) and nutritionists to engage in activities or campaigns organized by them.

“My main objective is to bring together all NGOs and individuals working with maternal and pediatric patients onto a common platform so that we can achieve a more widespread impact. Instead of keeping this project limited, we should all join forces to expand its reach. I have collaborated with many organizations and NGOs, and I believe NI is probably one of the best. They don’t abandon initiatives; many projects may receive attention for a short period, perhaps a week, but then are left behind. However, since the launch of the Nourishmaa campaign, NI has been dedicated to it. They established master trainers for malnutrition and then tasked them with training even more trainers. Awareness campaigns have been implemented through doctors targeting healthcare professionals who care for mothers and children. We have trained nearly 600 healthcare professionals and just under 600 advisors in a year. Many people may doubt such achievements, but Nourish Maa and NI have proven their commitment through action, which I find commendable.”

A few dietitians shared that they discovered the initiative through the internal mail system and colleagues, driven by personal interest, enrolled to be part of a program focused on mother and child nutrition.

However, nutritionists have expressed concerns regarding their participation in events based on the organizing bodies. They often prefer to attend events that specifically include discussions on nutritional issues. If the event primarily focuses on general health topics without adequate representation from nutritionists, they are likely to find it irrelevant. Their decision to attend hinges on the presence of a nutritionist who will address pertinent nutritional concerns, as this ensures the event aligns with their professional expertise. However, when professional organizations like the Pakistan Nutrition and Dietetics Society (PNDS) organize events for nutritionists, their interest significantly increases.

Knowledge Acquisition in NourishMaa:

Following training, HCPs, LHW and FHW felt significantly more knowledgeable about various aspects of maternal nutrition, including dietary habits, socioeconomic status, food diversity, and the "triple burden" concept (underweight, overweight, and micronutrient deficiency).

Almost all HCPs shared that they like the concept of **“MY PLATE”**, which introduced the idea that a nutritious diet doesn't solely depend on expensive food items like meat and eggs but can be maintained with local, affordable substitutes such as lentils. An HCP shared:

“I learned from this training what the concept of 'My Plate' is and what my plate should look like. Normally, the common perception, whether it's an educated or uneducated mother, is that a good diet consists of meat, eggs, and fruits. But we learned that there are substitutes for everything because not everyone can afford these items, especially nowadays when everything is so expensive. This training, in particular, made us understand what a mother's plate should look like. For example, if you are drinking tea in the morning, the milk in it will fulfil your calcium requirements. If you are adding sugar, it will help maintain your glucose levels. If you are eating bread, it will meet your carbohydrate needs, and if you are eating a paratha, it will fulfil your fat requirements. We explained to them properly that you can eat a simple paratha with leftover vegetables or lentils from the previous night. We understood how to guide people on making these switches, and it had a very positive impact. I would really like to say that this program should be continued.”

Pregnant females can eat whatever is available at home, like vegetables, lentils, and other affordable options. It's not necessary to have chicken, fish, or fruits regularly. They can eat according to their budget. It's about making the most of what's accessible and affordable to ensure proper nourishment. When women become pregnant, they often neglect nutritious food. HCPs advise them to eat in proper portions and to increase their water intake. Typically, in these situations, they may resort to cold drinks, believing it will alleviate discomfort. However, they are told that consuming cold drinks can lead to issues like diabetes. Instead, they encourage them to focus on regular food available at home, such as milkshakes, vegetables, and other locally accessible options to ensure they get the necessary nutrition during their pregnancy.

“First of all, patients need financial resources to access good nutrition. One positive aspect in our periphery is that many families have their own cows, so they don't face issues with milk availability. However, fruits are often seen as a luxury for them. So, we adapt to their socioeconomic reality. For instance, we suggest that they eat dates, which are easily available in most households, and substitute beans for meat. These are nutritious items that they can incorporate regularly. Since they can't afford to eat meat every day, or even every month, and may not feel full otherwise, we adjust our recommendations to match their financial means. If we know that the person isn't on other medications, we propose practical solutions, such as managing iron intake through affordable means. This way, at least they get some essential nutrients. If we prescribe something expensive, they simply won't be able to follow through, rendering the advice ineffective. Therefore, our first step is to assess their socioeconomic status and then tailor our nutritional advice accordingly. Fortunately, even in poorer households, there is often some balance in their diet. Many families consume milk, yogurt, and bread regularly. They also eat wheat and sometimes mix it with other grains, which is beneficial. They tend to cook with desi ghee, which we inform them is very healthy.”

A few of the HCPs in Mardan and Bhawalpur found My Plate concept a little tricky, especially when it came to certain aspects of the concept, such as how much fat or protein to include.

LHWs shared that when they first received the training and then visited the community to provide guidance, some community members remarked, “You haven’t mentioned this before.” In response, they explained that they had received new training on this topic and were not aware of it previously. Now that they’ve had the training, they are here to share the updated information.

Shift from traditional beliefs to understanding the importance of taking IFA tablets from the start of pregnancy or even before conception, not just after four months is also discussed by DHQ doctors.

Gynaecologists shared that, despite their specialization, the campaign introduced them to essential details about the nutritional requirements in the first, second, and third trimesters of pregnancy. This new knowledge has improved their ability to counsel pregnant women, considering their financial constraints and individual caloric needs. They acknowledged that the campaign served both as a refresher and a source of new information and result in increased awareness and counselling offered to patients during consultations

“ Like myself and other doctors who are running the OPD, if a mother comes in, whether she is lactating or pregnant, after this training, we have started calculating and advising her that in the season when apples are cheaper or mangoes are available at a low price, she should eat them, maybe not daily but at least on alternate days. She should eat some herself and give some to her children because often mothers say, 'How can we eat and not give it to our kids? We can't do that.' So now this has become a part of their OPD advice as well, where they are telling lactating mothers that if they think their dietary needs are over after pregnancy, that's not true. In fact, they need to focus even more on their diet. If they were taking 360 calories before, now they need to take 700 because the baby is getting nutrition from them through breast milk. If they don't focus on their diet, all the deficiency will impact them first. People have now understood that if they eat well, only then will their health improve. and they will be able to take better care of their

“Now, I know the indicators that I need to ask about for patients in the female or adolescent age group or women of reproductive age (15-49 years). I can ask about dietary habits, socioeconomic status, food diversity, and the triple burden concept we learned from this training. I know how to calculate BMI, height, and weight and assess whether a patient is underweight, obese, or overweight. BMI calculator is also very helpful tool, whereas EDD calculator is not that useful as a gynaecologist we were already using it. This training has brought a dramatic change in my practice.”

Participants learned how to calculate BMI accurately using the formula (weight in kilograms divided by height in meters squared) as were provided with **BMI calculators**. This understanding enables healthcare providers to assess patients' nutritional statuses and provide relevant counselling. While some healthcare providers mentioned that BMI can be calculated using mobile phones, having a dedicated BMI calculator on their table has made the process much easier and more efficient in practice. This tool allows for quick, on-the-spot assessments, ensuring that nutritional evaluations are conducted seamlessly during patient consultations

"I'm telling you, our gynaecology OPD handles around 120 to 200 patients daily. We cannot do this for every patient. Honestly, it didn't happen. If there is a height chart in the room and I am busy with a patient, I can ask my assistant to measure the height and inform me. Previously, we worked blindly and were unable to assess all patients. But now, I can share the workload with my assistant by using the provided tools. Everyone has access to a BMI calculator on their mobile phones, but I tell you that many people don't know how to use it properly. This also played an important role. Honestly, earlier, we couldn't do it for every patient."

The campaign supplied healthcare providers with **comprehensive diaries** containing WHO protocols on nutrition, anaemia, and BMI, which serve as vital references during patient consultations. Such material provide continuous learning support. Respondents highlighted the importance of regularly reviewing training materials, ensuring that they remain updated on the best practices and guidelines for maternal and child health.

"Whenever I get time, I sit in the OPD, read one page, and recall a lot. This is the best. Even I have a TCI diary. I show you. It doesn't have any literature in the start but you can see that this Nourishmaa diary has all the initial case literature. This is a very unique type of diary, and I have never seen a diary like this before. This is very good for all healthcare providers. They can be referred to whenever we get free time. I always carry this diary with me. I review one or two pages every few days to refresh my knowledge and continue my work. Especially for HCPs, It's crucial. Otherwise, how will we remember everything?"

Training included practical **Anthropometric Assessment Tools** for measuring nutritional status, such as mid-upper arm circumference measurements by using **MUAC tapes** for children and guidelines for assessing women during pregnancy.

"MUAC tape is a very good tool for measuring children. For children, we take anthropometric measurement in mid-upper arm circumference from 6 months to 2 years or 5 years. Women also have two conditions. If a woman is pregnant, then we will take the BMI calculation in the first trimester. But in the second trimester, we will use mid-upper arm circumference. This is also a very good tool that we can use for assessment of patient and find what their nutritional status is and what are the further requirements?"

One of the BHU in Mardan stated:

“They’ve provided materials like height and weight measurement tools. We’ve displayed these in our BHU, which we received from NourishMaa. Now, when patients come in, I can guide them properly. I calculated their mid-arm circumference, which I knew about before but hadn’t done myself. Now, I can calculate it accurately.”

However, some of the HCPs in all regions mentioned that they already had a MUAC tape, which they use for assessments, so they were already benefiting from that tool. As a result, they didn't gain much additional benefit from it.

For HCPs (Healthcare Providers), LHWs, and LHS during the NourishMaa initiative, they learned how many visits are required during pregnancy, particularly for antenatal patients.

“Initially, when I took this test, I didn’t fully understand and ended up giving the wrong answer. I wasn’t aware of how many visits were necessary for postnatal patients, and I used to believe that antenatal visits were more important than postnatal ones. But now, as a prenatal nurse, I realize that if I hold such beliefs, how can I expect the patient to approach this issue properly? I now understand that patients need equal attention both before and after delivery, and this initiative has given me valuable new information. .”

As part of the NourishMaa training, HCPs and LHWs emphasize the importance of proper prenatal checkups. After the baby is born, it’s crucial for the mother to breastfeed. Initially, some participants assumed that every mother breastfed her child, but through the training, they learned that in Pakistan, only 37% of mothers are breastfeeding their babies. This lack of breastfeeding contributes to malnutrition. Therefore, it is essential for mothers to understand the significance of breastfeeding for their child's health and well-being.

They now advise them to eat a nutritious diet and exclusively give their own milk to their child, as this is the best way to ensure their child's health. Mothers should exclusively breastfeed for the first six months, after which they can begin introducing other foods. By taking care of their own health and their children's needs, mothers can prevent their children from becoming nutrient deficient

Additionally, child specialist in Bhawalpur discussed that the NourishMaa campaign introduced the concept of proper weaning for children, which they are now teaching others, and it has been very beneficial. Previously, people were not aware of the concept of weaning.

HCP and KOLs' also shared that training sessions included statistics on malnutrition and anaemia, which increased awareness of these issues in the community.

Sharing personal experiences during training made the learning process more impactful and engaging.

Capacity Building in the NourishMaa Initiative:

Capacity building as part of the NourishMaa campaign played a crucial role in enhancing the effectiveness of the initiative for Key Opinion Leaders (KOLs), Healthcare Providers (HCPs), Lady Health Workers (LHWs), and Female Health Workers (FHWs).

Training sessions have been conducted to educate KOLs, HCPs and LHWs about maternal nutrition. The training included the concept of "My Plate," dietary requirements for pregnant and lactating women, and the importance of iron, folic acid, and other nutrients.

The training covered a variety of topics, including:

- Adolescent nutrition
- Preconception and conception care
- Nutritional needs of pregnant and lactating mothers
- Use of height charts, BMI & EDD calculators, and tapes

Before attending the training, healthcare providers lacked comprehensive knowledge about nutrition, dietary habits, and proper patient assessments. The training introduced essential tools and guidelines that are now integral to their daily practice. With the knowledge and tools gained from the training, HCPs can now engage with patients more effectively. They can provide tailored advice based on individual assessments, improving patient outcomes.

"They launched master trainers for malnutrition and then tasked them to train more trainers and conduct awareness campaigns through doctors and healthcare professionals who care for mothers and children. All of them were trained. I believe we have trained just under 600 health professionals and a similar number of advisors in one year. Can you believe it? Many people make claims, but Nourishmaa and NI said they would do it, and they actually did. I think it is commendable."

The training enabled HCPs to assess patients accurately. The inclusion of WHO guidelines and protocols from the Society of Obstetric Gynecology ensured that the information was relevant and up-to-date.

The training has not only benefited individual practitioners but has also been integrated into broader healthcare programs. The master trainers mentioned the collaboration with the Lady Health Worker Program, where trained health workers are now better equipped to identify and refer patients who need nutritional assessment and counseling.

The training has enabled healthcare providers to extend their reach into the community.

“When I got my training, we have another program attached, the Lady Health Worker Program. If I am doing OPD in a 50-bed facility, then the Lady Health Worker or Lady Health Program is associated. I have a health worker affiliated with me named Naseema. I have asked her to deliver this message to the community. If there is any delivery in your community, then you should assess the child's weight. If the child is under 2.5 kg, then he will be underweight. You bring that child to our OPD, we will do a clinical assessment. Then we will counsel his parents, grandparents, his father, and do an assessment of his mother. So my health worker has sent the same message to the community. I have personally identified 4 to 5 newborns in this Korangi district whose birth weight was less than 2.5 kg, meaning they were underweight, and then they were properly brought here from the community for counselling.”

Overall, the capacity-building efforts of the NourishMaa campaign have equipped healthcare providers with the necessary skills and tools to deliver more effective services. This has not only improved their clinical practice but has also had a positive impact on the communities they serve. For community engagements, LHWs regularly conduct community health sessions to spread awareness about maternal nutrition, dietary needs, and the importance of supplements like iron tablets.

“Programs like these should be implemented for capacity building because our society is such that until we consistently engage with individuals, we won't receive the desired response. Given the current economic challenges our country is facing, we see that awareness campaigns for polio and COVID-19 eventually lead to responses. This maternal health program is extremely sensitive, so sustainability and capacity building are essential. When I conducted the training, I covered two groups of doctors, LHS, and LHWs, but one group of paramedics was completely missed. If we include sanitary workers all the way up to nurses in such programs, we would receive valuable feedback. This is important because it enables the sanitary workers, who might encounter patients, to share at least two key pieces of information. If they discuss Nourishmaa in their communities, that would also be a significant achievement. Sharing knowledge about a vitamin or balanced diet would be another win for us.”

Visual aids like the use of colorful and pictorial material, like charts, was very effective in conveying messages. It attracted attention and made concepts clearer for HCPs as well as LHWs.

LHWs and FHWs create nutritional awareness. The health workers acknowledged that before the training, their approach was not as structured. Now, they are better equipped to guide mothers on nutrition, create meal plans, and emphasize the importance of regular check-ups.

They learned about tools like fortified foods, iodized salt, and deworming medication, which they now promote within their communities. They also highlighted the importance of specific nutritional elements like legumes, vegetables, and pulses for improving overall health.

“Tu poverty ke hawaly se bhi unko yeh mushqilaat ka samna hai. Kyun ke jab hum achi ghizza ke baray mein unko batatay hain, tu kuch log aise hote hain ke jin ko 2 waqat ki roti bhi sahi tareeqay se nahi milti hai. Tu unko yahi basic problem tha ke hum achi ghizza kaise lein? Tu uss ke liye hum ne unko iss liye guide kiya ke agar aap fruits waghaira nahi le saktay, ya agar koi meat waghaira nahi le sakte hain, tu uss ke alternate aap yeh kar sakte hain ke ghar mein aap jo hain thori buhat achi si sabziyaan aap ugga saktay hain, unko le sakte hain, ghar mein aap lassi ya doodh, ya ghar mein koi janwar hote hain ghar mein tu unka doodh aap istemaal kar sakte hain. Iss ke elawa basic ghar ki jo roti hai uss ko ache tareeqay se istemaal, agar aik dafa khatay hain tu uss ko aap din mein 3 dafa ache tareeqay se khayien. Issi tarah pani ka istemaal bhi zayada karien. Jo ghar mein cheezien available hain, jo khoraak available hai, uss ko ap ache tareeqay se utilize karien.”

The NourishMaa training provided them with clear, simple language and structured approaches to explain nutritional needs to various groups (e.g., pregnant women, adolescent girls, and their families).

“Earlier, we would talk to people without a clear sequence, picking up one point here and another there. However, after receiving training in groups, we learned to present information more effectively. We guide them to create a chart where they can write down important items, and this has greatly improved our approach.”

NourishMaa provided us with valuable insights. We now train those who are better off differently from those who are in need, addressing each group with a tailored approach. Previously, we would simply tell them what to eat or how to eat without detailing the timing or the proper sequence. But after the training, we can now explain step-by-step how they should proceed with their nutrition

LHWs and FHWs emphasize the importance of educating mothers, especially regarding nutrition and breastfeeding. They provide knowledge about consuming liquids to increase milk production and the importance of hygiene, such as washing hands

LHWs and FHWs shared the importance of collaborative learning and mentioned that they assist each other by sharing knowledge and filling in gaps during community visits or discussions, which helps reinforce the training they received.

Women are advised to have at least 8 check-ups during pregnancy. Two mandatory TT injections are recommended, although the goal is to have at least 8.

Workers are aware that ongoing community engagement leads to gradual behavior change. They emphasize that repeated training helps refresh their minds and keeps them motivated, which in turn influences the community.

Transforming Perspectives: Behaviour Change through NourishMaa:

HCPs had a perspective that the *NourishMaa* program really helped change perspectives, especially in light of the current economic challenges. HCPs shared that since the NourishMaa project by NI (Nutrition International) launched, they've noticed a positive impact. Before this, women didn't understand the importance of nutrition; they simply took iron and folic acid tablets without much awareness about other nutritional requirements.

Most of them think that there's been a noticeable shift. Mothers are now more aware of the importance of their diet, not just for themselves but for the well-being of their children. They're paying more attention to what they eat, understanding that their health directly impacts their ability to care for their children.

"The NourishMaa initiative has had a positive impact in our hospital. Previously, when patients visited us, we often provided them with iron or calcium supplements without paying much attention to their diet. Now, we have shifted our focus to nutrition, and as a result, we are seeing significant improvements. This includes a decrease in pregnancy complications and better outcomes in postpartum care. Overall, we have observed a beneficial impact on our patients' health and well-being". "

General physicians have also discussed the outcomes of NourishMaa, highlighting that the program fundamentally focuses on diet, particularly in treating anemia and the dietary strategies involved in that process. It's essential to educate parents about these nutritional needs to promote better health outcomes for their children. By raising awareness and providing practical guidance, they are helping families making informed choices that positively impacting their children's health and development

"Yes, absolutely. We sometimes see cases of malnourishment referred to general physicians. For example, not long ago, a baby came to me who was struggling with growth issues. I discussed various dietary options that could support his development and growth. NourishMaa emphasized many of these aspects, helping us identify the important nutritional components for growth. I focused on the building blocks of nutrition essential for development. This guidance proved to be quite helpful, and Alhamdulillah, the baby's health has significantly improved since then. ". "

One more piece of evidence is:

“Yes, definitely. For example, we had some diabetic patients who managed their condition solely through dietary management, so they didn't need to take medication. Their diabetes control improved significantly. I provided them with a diet chart according to a specific schedule, and they mentioned that they felt so satisfied with their diet that they didn't feel the need to take any medicine. This highlights the effectiveness of proper nutrition in managing health conditions. “. ”

LHWs discussed a notable improvement has been observed in the behaviour of community members, with more people following nutritional advice and showing interest in regular health check-ups

“In this training, the basic aspect is that when we meet with mothers, the feedback we receive is significant. When we visit again the following month, the women at home tell us that last month we advised them about good nutrition and balanced meals. They share that they have changed their routines accordingly. For example, they used to eat one flatbread, but now they have started eating two, realizing that a pregnant woman or a breastfeeding mother need double the nutrition. So, when we return the next month, they give us positive feedback. The campaign and training have benefited them, as they have shifted from consuming inadequate nutrition to adopting a more substantial diet.”

The practice of wasting colostrum (the first breast milk) is also mentioned, but with consistent awareness efforts, more mothers are beginning to understand its importance. Feeding practices for newborns are discussed, particularly how rural mothers are now more receptive to breastfeeding and understand the immunity benefits of colostrum. Community workers noticed changes in behaviour among mothers after being educated.

For instance, one mother who was initially feeding her baby formula switched to breastfeeding after improving her own nutrition, resulting in better health for both mother and child.

They repeatedly emphasized the benefits of breastfeeding over formula feeding and encouraged women to stick to this practice for six months. As mothers experienced better results, they adopted these suggestions.

Encouraging mothers to drink more water and other liquids to naturally boost milk supply led to significant behavioural shifts in how they approached breastfeeding

HCPs and LHWs also shared that their encouragement of pregnant women to increase their antenatal visits from 4 to at least 8 also yielded positive results. Pregnant women are encouraged to attend regular checkups to monitor both the mother's and baby's health. They check for anemia and weight gain, guiding mothers to consume nutrient-rich foods like dates, liver, and vegetables to improve their health.

LHWs and FHWs observed behavioural changes in the communities they work with. People are now more curious and ask relevant questions about health and nutrition, indicating better understanding and engagement.

LHWs and FHWs mentioned that even if not continuous like polio or nutrition campaigns, leave a lasting impact on their minds and the community. While the information remains with them, and they are

committed to passing it on to others even after the campaign ends, however it might not be very frequent as there is a possibility of forgetting some details due to their busy schedules and other responsibilities.

They see behavior changes when they consistently engage with the community. For example, mothers and families respond better to health advice when they repeatedly hear it from workers and professionals.

BHU doctors shared that they have trained LHWs and they will continue working on this project even if it ends as giving awareness is something which can't be taken back so they will keep on educating people.

NourishMaa's Integration with Maternal and Child Health Programs:

HCPs shared that NourishMaa goals are definitely aligned with national health policies.

Doctors at Basic Health Units (BHUs) shared that Lady Health Workers (LHWs) go into the field to collect data on households, such as the number of children and the spacing between them, which helps them assess the nutritional needs of families. The same staff provides guidance on family planning, child health, and maternal nutrition, so NourishMaa is actually aligned with other programs.

The *IRMNCH*, child health, maternal nutrition, family planning, and *NourishMaa* campaigns are all aligned in their goals. They emphasize the importance of women's health and how a child's health is directly linked to the well-being of the mother. These initiatives provide essential guidance on how women should take care of their health, with a particular focus on the benefits of breastfeeding and its significance. LHWs were trained on numerous key points to effectively guide patients. However, some challenges arose, such as time constraints, where LHWs found it difficult to balance their regular duties with the *NourishMaa* training.

"In the IRMNCH, family planning and other trainings, the same topics are discussed, and they are a regular part of our practice. The guidelines provided by NourishMaa are also aligned with international standards and are similar to what we have seen before, but in this training, the concepts were explained in a much simpler way. We integrate these guidelines with those of IRMNCH and follow them together in our practice".

HCPs and LHWs believe that the campaign has largely achieved its objectives, significantly raising awareness about proper nutrition for pregnant and lactating women and adolescent girls. In areas where the distance between health centers and patients was greater and outreach efforts were limited, the campaign faced some difficulties. Despite this, patients are now more informed, showing healthy weight gain during pregnancy, and there has been a noticeable decrease in anemia-related cases. Community education and the support of LHWs and FHWs have played a vital role in the success of the campaign. However, cultural differences and conservative mindsets in some families sometimes present challenges, particularly when nutritional needs are not met, which remain two of the main obstacles.

Majority shared that NourishMaa has been able to achieve its objective, but for sustainability such programs should be more frequent. It's not enough to train once and consider the job done. We need refresher courses every year or two because people tend to forget, especially when they don't practice certain skills regularly.

“In my area I am handling 200 LHWs, I am doing my best to spread as much awareness as possible. The committee's work is going well, but there are some areas where more attention is needed because of lack of resources. We will continue running this program for as long as we remain in contact with you. In NourishMaa project the funding has been utilized effectively. When you asked us for a presentation after the training, it's clear that this is a very cost-effective and transparent organization. We come from far to provide training, even during the hot days when there were electricity issues. I have dedicated my time and energy to this work and kept everyone fully engaged. Based on this, I believe if you ask anyone, they would agree that this was a very cost-effective amount. We are delivering NI's message to the community”.

Key Challenges in Running the NourishMaa Campaign:

The major obstacles HCP's faced is the absence of locally tailored guidelines on maternal nutrition. Despite the significance of international resources like WHO (World Health Organization) and the RCOG (Royal College of Obstetricians and Gynecologists) guidelines, gynecologist expressed frustration, stating,

“We don't have guidelines of our own regarding nutrition. This gap in localized data left gynecologists in Pakistan with limited direction, particularly when trying to address the unique needs of their patients”.

The struggle didn't end with a lack of guidelines. In discussions with HCPs and Lady Health Workers (LHWs), another challenge became evident—many patients simply could not afford the nutrition-related recommendations provided during consultations. There is a need for continuous education on affordable nutrition options and strategies tailored to the socioeconomic status of the community.

As one LHW lamented,

“When we discuss nutrition or pediatrics, we provide recommendations, but they often respond that they can't afford to implement them. Financial constraints frequently stood between patients and their ability to follow through on critical health advice.”

HCPs and LHWs shared that when they only offer advice, people tend to pay less attention. However, if they provide supplements, multivitamins, or something similar along with the advice, people are more likely to listen. This presents a challenge for the NourishMaa campaign in terms of effectively engaging the community and ensuring that the health advice is taken seriously.

To enhance the effectiveness of the NourishMaa campaign, it is essential to involve more staff in training, such as paramedics.



“When I conducted the training, two groups were successfully covered: the doctors, LHS, and LHWs. However, one group was completely missed—the paramedics. If you conduct such programs, including everyone from sanitary workers to nurses, you will receive valuable feedback. The reason is that, in this scenario, if someone accompanying a patient is sitting outside, and even if the sanitary worker shares just two key points from six, it would be a significant achievement for us. Moreover, if that same sanitary worker goes back to their community in the evening and talks about Nourish Maa, that too would be an accomplishment. Even if they share information about something like vitamins or balanced diet, it would contribute to our overall success.”

HCP's shared their experiences with the local community, where traditional beliefs often hindered progress. The cultural resistance that HCP's had mentioned also resonated with the LHWs' in Mardan. “People here are mostly backward. It's not as advanced in this area. There's a lot of backwardness,” they echoed, suggesting that the involvement of religious leaders and madrassas could help overcome these barriers because their influence is significant, and more people in the community listen to them and trust them,” they recommended, recognizing the role of trusted figures in shaping community health behaviors.

The lack of written materials in local languages was yet another issue that complicated outreach efforts. LHW's & HCP'S emphasized how much easier it would be if resources were more accessible. “If it's written in Urdu, then it's helpful,” highlighting the need for localized educational materials to bridge the gap between healthcare providers and patients.

Moreover, there were gaps in coordination and access to research tools. HCP's appreciated the efforts of the NourishMaa campaign but pointed out that they lacked the means to track patient progress effectively. As HCP's thoughts drifted to the broader healthcare system, noted the absence of group discussions and collaborative platforms that could foster more effective teamwork. Without such forums, there are limited opportunity for healthcare professionals and district coordinators to collaborate and learn from each other.



HCPs recognized the importance of these training sessions but pointed out there were logistical challenges such as inadequate electricity, distant training venues, and a limited amount of training material.



Most doctors reported that training materials, such as the height chart, BMI calculator, and MUAC tape, were either not provided after the training or received very late. Nevertheless, they believe that these materials would still be highly beneficial. One HCP shared that she did not receive any official materials but found the information very useful for treating her patients. To meet her needs, she took the initiative to write key points on charts and hang them on the wall. While this may not be visually appealing, it at least fulfills her demand for disseminating information. However, she emphasized that the materials provided should be of higher quality and more pictorial.

The training materials were not provided in printed form. Offering the materials on a USB is not ideal. HCPs shared that having the materials in printed form would allow them to use it as a reference whenever needed.

In Mardan, some doctors found tools like measuring tapes for head circumference to be relatively new, and their usage has not yet been fully integrated into practice. The training can place greater emphasis on the importance of using these tools for doctors of these areas.

Some participants raised complaints regarding the training venue, expressing the need for improvements to ensure it is more accessible and suitable for the specific area. They also highlighted that the compensation paid to participants for attending the training should be reasonable. For instance, individuals traveling from distant parts of Karachi may spend up to 3,000 rupees on petrol or rideshare services like Uber or Careem. Furthermore, it is crucial that payments are made in a timely manner, as delays can create additional inconveniences for those already incurring significant expenses to attend the training.

Lastly, a concern about reaching adolescent girls, a demographic often overlooked in healthcare. "They only come to the doctor if they have a problem, otherwise they don't," she observed, highlighting the need for more preventive interventions to address nutritional issues before they become severe.

LHWs shared that they won a quiz during the NourishMaa campaign but did not receive any incentive, which led to disappointment. This poses a challenge, as NourishMaa needs to address such issues to generate positive word of mouth and keep participants motivated.

As HCP's reflected on the various challenges, they understood that while the NourishMaa campaign had made strides, there was still much work to be done.

Prioritizing Adolescent Health: Next Steps for NourishMaa:

While the primary focus is on lactating and pregnant women, adolescent girls are also important in this regard. HCPs really liked the idea of giving more emphasis on adolescent girls and pre-conception mothers in the next phase of NourishMaa.

"You see, when we talk about children, we also talk about pregnant women, but in reality, we should start with adolescent girls. Unfortunately, many of our current programs don't provide the wider funds needed to begin at that stage. However, this is what we strive for because when a girl is healthy, anemia-free, and has adequate nutritional reserves, she is more likely to experience a healthy pregnancy and deliver a positive outcome. So, the starting point should be adolescent girls. If NourishMaa focuses on adolescent girls and the girl child, it could address the distribution of household resources, ensuring they are equally shared between boys and girls. Additionally, the discussion should include physical abuse, as some of these issues are tied to diet, and there must also be a conversation about equal opportunities for girls".

Now, if we look at adolescent girls, they usually only visit doctors when they face a problem. Otherwise, they don't seek medical help. Most of the time, when they come to us, it's due to issues like PCOS. While we guide them at that point, community engagement through sessions at colleges and universities would be more effective, such as seminars or workshops.

Several healthcare providers (HCPs) noted that prior to the NourishMaa campaign, iron and folic acid (IFA) tablets were perceived as exclusively for pregnant women, typically recommended to begin only after the fourth month of pregnancy. Many mothers were reluctant to administer these supplements to adolescent girls or women before conception, operating under the belief that IFA tablets were strictly for use during pregnancy.

The NourishMaa campaign has fostered an understanding that IFA tablets should ideally be initiated at the onset of pregnancy or even before conception. This proactive approach addresses iron deficiency in young women and girls early on, preventing potential complications during pregnancy. Health workers are now conducting community sessions aimed at raising awareness among mothers and adolescent girls about the critical importance of starting these supplements at an earlier stage.

Lady Health Workers (LHWs) reported that they were assigned specific areas, typically encompassing around 150 households each. They visit 5 to 7 homes daily and conduct community health sessions every

1 to 2 weeks. During these sessions, they educate the community, especially mothers, about various health issues, including the significance of iron supplementation for adolescent girls to prevent iron deficiency.

Mothers are advised to provide their adolescent daughters with iron supplements before any signs of deficiency arise. Given that young girls often do not consume a balanced diet, early supplementation is essential in preventing anemia. This proactive approach ensures that when these young girls eventually become mothers, they are less likely to suffer from iron deficiency.

“The Nourishma project should develop materials, such as brochures and charts. These materials are crucial for educating the community and should be designed in ways that attract mothers and girls (e.g., pink and white colors representing mothers and females). The visual appeal of the Nourishma materials can help capture attention, especially of beauty-conscious mothers and girls. The colors and representation encourage them to ask questions, making it easier for health workers to engage in discussions about health and nutrition. During training sessions, health workers can emphasize the benefits of iron supplements for their own beauty, such as glowing skin and healthy hair, alongside the health benefits. This approach is highly effective because women, regardless of class, are generally conscious of their appearance.”

In Mardan reaching out to younger girls was identified as a challenge due to cultural norms. Families often restrict girls from interacting with the LHWs. To overcome this, community workers can devise a strategy to collaborate with schools, where teachers could help convey the message.

Social Media and Traditional Media: Key Drivers of Community Engagement in NourishMaa:

Most HCPs noted that the NourishMaa campaign initially gained attention through brief video clips shared on Facebook, highlighting social media's significant role in raising awareness about maternal and child health. Media campaigns on platforms like Facebook and TV were recognized as essential tools for promoting maternal nutrition and health interventions.

“I saw it on social media. Their clinic was coming up, which I found relevant as they were discussing maternal health. This topic is my area of specialty, so when I logged into their video, it was a detailed discussion. They said they would do this program weekly and that it would be aired on PTV. They also mentioned different platforms on social media. I got interested in one program and then started following the next one. I read all their social media updates on Facebook. The next day, when I am on duty at the health facility, I discuss with my subordinates or lady health workers that Tauseeq Haider will be doing a program tomorrow, so at least the community should know. This is an informal way, but I try to share what I have learned to spread the message.”

All healthcare providers (HCPs) reported that the WhatsApp group serves as their primary source of information, as content shared within this closed group tends to receive heightened attention. There were

resources provided on topics such as the stature of the baby, growth retardation, and similar subjects. These included videos, websites, and daily slides that were shared through WhatsApp groups.

In addition to WhatsApp, platforms such as Facebook, Instagram, and YouTube are regarded as equally valuable sources of information. The effectiveness of Facebook and WhatsApp in engaging HCPs can be attributed to their convenience and widespread usage. Specifically, WhatsApp groups facilitate instant communication and enable the sharing of updates, functioning as a critical tool for information dissemination among Lady Health Workers (LHWs) and HCPs.

“The campaign should definitely be conducted through social media. While some may say they use Twitter, I don’t; instead, I’m part of WhatsApp groups, including those for NourishMaa, UNICEF, WHO, and various medical groups. I also use Facebook, Instagram, and Google for research. Although I don’t use TikTok, I do listen to podcasts and rely on YouTube for knowledge on these topics.”

The NourishMaa YouTube channel has the potential to function as a structured and reliable source of information for both patients and healthcare providers (HCPs); however, increased awareness is necessary to encourage more visits to the channel. Touseeq Haider's podcasts have garnered considerable appreciation and are frequently recalled by numerous HCPs and Lady Health Workers (LHWs). In the NourishMaa podcast, more Lady Health Workers (LHWs) should be featured so that a wider audience can relate to their experiences and feel more connected. Their participation will help bridge the gap between healthcare workers and the community, making the content more engaging and relevant for listeners. Mr. Touseeq Haider shared:

“In this way, a single podcast can feature one Lady Health Worker (LHW) with 20 years of experience and another with just a few years of experience. They can sit together in front of Touseeq Haider and share their experiences with each other. This would create an engaging and insightful conversation, highlighting different perspectives and challenges from both seasoned and newer health workers. .”

A notable instance of community engagement on social media was a successful quiz competition organized for LHWs and HCPs, demonstrating the effectiveness of media in enhancing participation and fostering a deeper understanding of critical health messages.

“Luckily, I won a quiz hosted by Mr. Touseeq. It was on anemia, and I was the winner of the quiz. I think it was either the first or second quiz.”

Healthcare providers (HCPs) expressed appreciation for the concept of online sessions and webinars; however, some suggested scheduling these events in the afternoon, as this timing allows for a brief interval before they transition to private practice. Others recommended hosting webinars later in the evening, after 9:00 PM, to accommodate a larger number of attendees.

Concise messaging, such as 30-minute podcasts, was proposed as an optimal strategy to engage busy HCPs. A gynecologist emphasized the importance of brief, digestible content that aligns with the demanding schedules of healthcare providers. Additionally, a child specialist highlighted the role of social media in disseminating health information, noting that mothers predominantly utilize Facebook for maternal health

resources, while TikTok also serves as a crucial platform for reaching mothers and their families. As stated by the child specialist, "For mothers and their families, TikTok and Facebook are more effective."

While HCPs frequently engage with the NourishMaa campaign online, traditional media—such as television and radio—have proven to be more effective in reaching a broader audience at the community level, particularly among individuals who are less active on social media. However, language barriers present challenges to effective message comprehension. HCPs noted that sharing information in simple Urdu or local languages, such as Saraiki in Bahawalpur and Pashto in Mardan, enhances understanding and ensures that key messages resonate with the intended audience.

HCPs in Mardan and Bahawalpur recommended a dual focus on both digital and traditional media, highlighting that most patients come from low-income backgrounds and may not be familiar with digital platforms. These patients often prefer traditional media, such as radio, for information dissemination.

Regarding written materials, a child specialist underscored the utility of pamphlets in Urdu for educating the public, while stressing the need for more accessible resources to complement training and media content. Participants advocated for the incorporation of multimedia elements into training sessions at Basic Health Units (BHUs) to enhance patient engagement and understanding, particularly on complex topics related to maternal and child health.

HCPs emphasized the necessity of utilizing social media to effectively reach adolescents, indicating that media can play a transformative role in public health education. Both HCPs and Lady Health Workers (LHWs) rely heavily on printed materials, believing that these resources can be reviewed during free moments, whether while attending to patients or during breaks. HCPs reported that boards and charts displayed in waiting areas attract patients' attention, prompting inquiries about the information presented. LHWs also noted the significance of printed materials in their community sessions, with flip charts and brochures serving as valuable support.

A few of the HCPs and media personnel shared that dramas with strong social messages can inspire change and create empathy, which is why they are essential in modern entertainment.

"Future drama series can definitely be made like the one having Sania Saeed, where she had four daughters and endured many hardships, as well as Ahsan Khan's drama produced by Kashf Foundation, which highlighted the issue of child abuse. Creating such dramas is important because they address social issues and can have a significant impact by raising awareness. These types of stories resonate with a wide audience, and more series like them should be produced to reach more people and initiate discussions on critical societal topics."

To maximize engagement, printed materials should feature minimal text and an abundance of visuals to captivate patients' interest. Similarly, resources intended for HCPs should be concise to ensure clarity and effectiveness. Animated video messages were suggested as a compelling way to capture attention across both social media and television platforms.

These findings were consistent, and with a few added suggestions, from the added districts' interviews:

The HCPs from the new districts, especially Mardan, Batagram shared the importance of understanding the local context when planning outreach campaigns. In rural and remote areas where smartphone penetration is low, platforms like TV and radio are still the most effective means of communication. Moreover, using local languages like Pashto in regions where people are not fluent in Urdu is crucial to ensuring that the message is understood and accepted. Additionally, incorporating local cultural references and relatable messaging into the content would increase engagement

For instance, “If you're using Urdu, I don’t think it would be very effective because even the men here don’t understand Urdu well”. In more peripheral areas like Shumlai and Pirhada, which are very remote, a Pashto-language campaign through TV and radio would likely have a much greater impact than digital platforms like Facebook, especially when targeting the underprivileged populations.

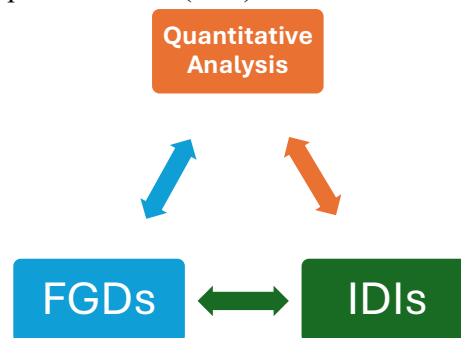
A few of the HCPs in Mardan found “My Plate concept a little tricky, especially when it came to certain aspects of the concept, such as how much fat or protein to include?”

LHW at Mardan and Batagram shared that there had been an increase in knowledge regarding the correct use of Folic Acid, Calcium, and Iron supplements. Previously, many were unaware that the Folic Acid and Calcium should not be taken together. Through Nourishmaa training, it was clarified that those two supplements should be taken at different times to ensure proper absorption. Additionally, it was emphasized that Calcium and Iron should also not be taken simultaneously.

Another key point of learning of Nourishmaa shared by LHWs was that supplements should not be taken with milk, as was previously common practice. Instead, it is now recommended to take them with lemon water or plain water, which improves absorption and effectiveness. This new understanding reflects a positive shift towards better supplement usage for health benefits.

7. Triangulation:

Triangular analysis is done by considering Quantitative analysis of HCPs & FLWs, Focus Group discussions (FGDs) and In-depth interviews (IDIs).



In the context of triangulation, we meticulously cross-check the information to ensure that the data is not biased toward the perspective of any specific group. The quantitative analysis objectives included assessing the percentage of healthcare providers (HCPs) and frontline health workers (FHWs) who demonstrated proficiency in maternal nutrition, with a reported rate of 81.7%. The same questions were also addressed in in-depth interviews (IDIs) and focus group discussions (FGDs).

The results of the NourishMaa campaign interventions, drawn from both qualitative and quantitative studies across the newly added and original districts, show alignment in their findings. Both types of studies highlight that healthcare professionals frequently encounter various maternal nutrition-related challenges during pregnancy, which can lead to serious health complications. The findings consistently reveal that improved dietary intake has a positive impact on both maternal and child health. NourishMaa’s training sessions have significantly enhanced the knowledge of healthcare professionals in this regard, providing them with the skills to address these nutrition-related issues more effectively.

Furthermore, both studies underscore the critical role of capacity building. The training provided by NourishMaa has proven to be highly beneficial for healthcare professionals, including lady health workers (LHWs) and frontline health workers (FHWs). The quantitative and qualitative analyses indicate that these workers are effectively disseminating the knowledge they have gained, particularly in relation to the nutritional elements of food groups. This is especially important for populations from lower socioeconomic backgrounds, as the dietary awareness provided allows individuals to make small yet impactful changes in their diets to improve health outcomes. Overall, both the qualitative and quantitative results are complementary, demonstrating the success of the NourishMaa campaign and its positive impact on maternal and child health in the targeted regions

Reinforcing Findings:

1. Awareness and Knowledge Gains:

Quantitative: There was a significant improvement in the knowledge of frontline health workers (FLWs) regarding maternal nutrition. For instance, the percentage of FLWs who knew about Iron and Folic Acid Supplements (IFAS) rose from 34.7% to 98.5%. Similarly, the number of FLWs who could correctly identify the five recommended food groups increased from 24.4% to 39.9%.

Qualitative: FLWs expressed that the campaign had enhanced their understanding of critical nutrition components. Many participants in focus group discussions (FGDs) noted that their ability to counsel pregnant women had improved, particularly in guiding them on food groups, meal frequency, and nutritional supplements.

2. Uptake of Healthy Nutrition Practices:

Quantitative: The data showed that nearly all FLWs (99.9%) encouraged pregnant women to take nutritional supplements and 98.5% promoted IFAS. The anthropometric screening for nutritional status during antenatal care (ANC) also improved significantly, with 88.5% of healthcare providers (HCPs) consistently screening mothers during ANC/PNC clinics.

Qualitative: HCPs in in-depth interviews (IDIs) confirmed that the training had enabled them to better monitor maternal health. They reported improved practices in advising women about nutrition and systematically performing anthropometric assessments.

3. Improvement in Attitudes toward Maternal Nutrition:

Quantitative: Attitudes towards the importance of maternal nutrition also saw a positive shift, with 91.8% of HCPs now recognizing the importance of maternal nutrition. The proportion of HCPs who believed nutrition counseling is part of a doctor's responsibility was high but showed a slight decrease (92.9% to 88.5%).

Qualitative: HCPs and FLWs consistently mentioned in FGDs and IDIs that they felt more motivated and aware of their critical role in improving maternal nutrition outcomes. Many reported that the campaign had sensitized them to the importance of nutritional counseling.

4. Increased Motivation Among FLWs:

Quantitative: FLWs reported high levels of motivation, with 94.9% feeling motivated to work on maternal nutrition post-campaign.

Qualitative: In FGDs, FLWs shared that the campaign had instilled a sense of responsibility and commitment to maternal nutrition. Many indicated they felt empowered to play a stronger role in advocating for proper nutrition among pregnant women and their families.

Conflicting Findings:

1. Challenges with Policy Implementation:

Quantitative: Despite high awareness levels, 48.7% of HCPs reported challenges in adopting maternal nutrition policy guidelines within their facilities.

Qualitative: HCPs echoed these sentiments in interviews, pointing to constraints such as inadequate resources, lack of institutional support, and unclear policy directives. Many expressed the need for more support to implement the nutrition guidelines effectively in their daily practice.

2. Workload and Motivation Impact:

Quantitative: While most FLWs were highly motivated, 76.7% reported feeling overburdened with additional job responsibilities, and 79.6% said that workload and stress affected their motivation.

Qualitative: FLWs voiced similar concerns during FGDs, mentioning the heavy workload as a barrier to fully engaging with maternal nutrition activities. Many requested additional support and resources to manage their duties more effectively.

3. Barriers to Sustaining Behavioral Change:

Quantitative: Though there was a strong uptake of recommended practices, the long-term sustainability of these changes was uncertain. For instance, only 41.5% of FLWs could consistently ensure postpartum women took calcium supplements for the recommended three months after delivery.

Qualitative: Participants highlighted that ongoing behavior change would be difficult without continuous training, community involvement, and policy reinforcements. They pointed out that while short-term improvements were evident, sustained efforts and monitoring were needed to keep momentum.

Summary:

The triangulation of data reveals that the NourishMaa campaign was largely successful in raising awareness, increasing knowledge, and improving maternal nutrition practices among healthcare providers and frontline workers. The qualitative insights reinforce the quantitative data on increased motivation and improved practices. However, both data sets point to challenges in policy implementation and sustaining long-term behavior change. These findings suggest that while the campaign had a positive immediate impact, addressing systemic barriers and providing continued support will be crucial for sustained improvements.

8. Suggestions for Future Campaigns

Based on the findings from the NourishMaa endline report, considering both qualitative and quantitative data, the following general and actionable recommendations can be made to ensure sustained improvements in maternal nutrition practices and outcomes.

General Recommendations

1. Sustaining Knowledge Gains:

The campaign has significantly increased knowledge among healthcare providers (HCPs) and frontline health workers (FLWs). To maintain this momentum:

Recommendation: Continue regular training sessions and refresher courses to ensure that knowledge is updated and retained. A structured system of continuous professional development (CPD) for both HCPs and FLWs should be established, focusing on the evolving guidelines and new evidence-based practices in maternal nutrition.

2. Enhancing Policy Implementation:

Many healthcare providers reported challenges in adopting maternal nutrition policy guidelines. These difficulties arise from inadequate resources and unclear institutional support.

Recommendation: Strengthen institutional support by providing clear policy directives, resources, and incentives to healthcare providers. Policies should be embedded in healthcare institutions at all levels, with oversight mechanisms to ensure implementation and adherence.

3. Motivating Healthcare Providers and Frontline Workers:

FLWs and HCPs showed strong motivation during the campaign, but workload and lack of support were significant demotivating factors.

Recommendation: Address workload challenges by redistributing tasks, improving job conditions, and providing mental health support. Career development opportunities, performance recognition, and incentives could further enhance motivation and job satisfaction.

4. Community Engagement and Sustainability:

Despite high awareness, the long-term sustainability of the behavior change achieved through the campaign is uncertain without consistent community engagement.

Recommendation: Develop community-level reinforcement strategies, such as ongoing nutritional education programs, support groups for mothers, and active involvement of community influencers (e.g., religious leaders, local influencers) to promote and sustain behavior change.

5. Tackling Nutritional Gaps:

The endline results showed that while awareness about general nutrition improved, there are still knowledge gaps, particularly in areas like dietary diversity and weight gain during pregnancy.

Recommendation: Focus on closing these gaps by targeting future campaigns on the less understood components of maternal nutrition (e.g., weight gain, meal frequency, specific nutrients). Tailored information, education, and communication (IEC) materials should be developed to focus on these areas.

Actionable Recommendations

1. Targeted Training for Knowledge Gaps:

Action: Organize targeted workshops on topics where knowledge is lacking, such as ideal weight gain during pregnancy, balanced diets, and meal frequency. Incorporate practical examples and case studies to make the training more relevant to real-life scenarios faced by HCPs and FLWs.

2. Strengthening Policy Adoption in Health Facilities:

Action: Create and distribute policy implementation toolkits that include step-by-step guides for integrating maternal nutrition protocols into routine practice. Assign local champions within each healthcare facility to ensure adherence and monitor progress.

Action: Establish a feedback loop between FLWs, HCPs, and policymakers to report on implementation challenges and provide real-time solutions.

3. Improving Incentives and Reducing Workload:

Action: Provide additional financial incentives, bonuses, or recognition awards for FLWs and HCPs who consistently meet maternal nutrition targets. Consider creating a career advancement pathway for those who excel in implementing maternal nutrition initiatives.

Action: Streamline the responsibilities of FLWs by deploying more community workers or redistributing non-essential tasks. Introduce digital tools for tracking pregnant women and nutrition assessments to reduce administrative burdens.

4. Integrating Digital Platforms for Continuous Learning:

Action: Leverage digital platforms, such as the NourishMaa Facebook page and WhatsApp groups, for continued education. Create a dedicated mobile app that provides easy access to updated nutritional guidelines, practical tips for counseling pregnant women, and a peer-to-peer support forum for FLWs.

5. Monitoring and Evaluation for Sustained Behavior Change:

Action: Set up community-based monitoring systems that involve local health committees in tracking and supporting maternal nutrition behaviors. Periodic home visits by FLWs should assess not only immediate outcomes but long-term adherence to nutritional advice (e.g., use of supplements, dietary changes).

Action: Collect follow-up data at 6-12 months intervals post-campaign to evaluate the long-term sustainability of behavior changes. Use this data to inform future campaigns and interventions.

6. Strengthening Community-Based Interventions:

Action: Create maternal nutrition support groups that engage women, their families, and community influencers to continue discussions on nutrition beyond healthcare settings. These support groups can act as informal peer networks to reinforce behavior change and disseminate practical nutrition information.

Action: Involve key community influencers, such as religious and local leaders, to promote maternal nutrition during community events, religious gatherings, and other local engagements.

7. Scaling Up Nutritional Counseling Services:

Action: Expand nutritional counseling services to be available at all points of maternal healthcare, including postnatal visits, as some gaps were found in postnatal nutrition counseling. Include discussions on postpartum recovery, breastfeeding, and infant nutrition.

Action: Ensure that nutritional counseling is consistently provided as part of ANC services and consider establishing dedicated maternal nutrition counseling units in healthcare facilities.

8. Provision of Nutritional Supplements:

Action: Ensure a consistent supply of nutritional supplements (e.g., IFAS, calcium) at all healthcare facilities. Address stock shortages by creating partnerships with pharmaceutical companies and donors to secure a steady supply chain.

Action: Simplify supplement distribution by providing them directly during home visits by FLWs, alongside educational leaflets on their importance and use.

Summary:

The NourishMaa campaign has made significant strides in raising awareness and knowledge about maternal nutrition among healthcare providers and FLWs. However, to sustain and build upon these gains, it is critical to address systemic barriers related to workload, policy implementation, and community engagement. By focusing on these actionable steps, future interventions can ensure that the positive changes brought by the campaign are both deepened and sustained.