



MATERNAL NUTRITION IN INDONESIA: LANDSCAPE ANALYSIS AND RECOMMENDATIONS

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CONTENT

Acronyms	vii
Acknowledgements.....	ix
Executive Summary	xi
Introduction.....	xi
Findings.....	xii
Adolescent Girls and Women of Reproductive Age	xii
Pregnant Women.....	xii
Postpartum Women.....	xiv
Priority Recommendations.....	xv
Introduction	1
Objective.....	2
Methodology	3
Desk Analysis.....	3
Secondary Desk Analysis.....	4
Field Observation and Data Collection	4
Stakeholder Consultations on Recommendations.....	5
Summary of WHO and UNICEF guidelines.....	7
Results.....	11
Maternal Health and Nutrition Profile	11
Findings by Beneficiary and Nutrition Intervention	11
1. Adolescent girls and menstruating women.....	11
1.1 Anaemia prevention and management (including IFA supplementation)	13
1.2 Dietary counselling	15
1.3 Deworming.....	15
2. Pregnant women	15
2.1 Dietary counselling (including restricting caffeine intake)	15
2.2 Food supplementation and balanced energy supplements	18
2.3 Anaemia prevention and management (including IFA supplementation)	20
2.4 Multiple micronutrient supplementation (MMS).....	24
2.5 Deworming.....	24
2.6 Calcium supplementation	25
2.7 Other supplementation	27
3. Postpartum women.....	28
3.1 IFA supplementation.....	28

3.2 Deworming and dietary counselling	28
3.3 Other supplementation (vitamin A)	28
Recommendations.....	30
Overall Recommendations for All Maternal Nutrition Interventions.....	30
Recommendations for Adolescent Girls and Women of Reproductive Age (WORA)’s Nutrition	31
Recommendations for Pregnant Women’s Nutrition	32
Recommendations for Postpartum Women’s Nutrition	35
Recommendations on the Areas for Further Assessment and Research	37
References	38
Annexes	53
I. Methodology: Further details	53
II. Information related to maternal nutrition in MCH book	59
III. Maternal cohort form.....	60
IV. Distribution of human resources for nutrition by provinces	61
V. Coverage of antenatal service by socioeconomic status	62
VI. Stakeholder recommendations from workshops 1 and 2, by priority and beneficiary	63

LIST OF TABLES

1. Summary of WHO recommendations for maternal nutrition	7
2. Summary of epidemiological data on indicators of reproductive, maternal and neonatal health and nutrition	11
3. PICOS: Systematic search strategy	53
4. Grey literature search strategy.....	54
5. List of participants at national and sub-national levels	57
6. Distribution of human resources for nutrition by province in Indonesia	61
7. Coverage of antenatal service by socioeconomic status (2017)	62
8. Summary of stakeholder recommendations on malnutrition programs in Indonesia.....	62

LIST OF FIGURES

1. Field observation participants (national and sub-national).....	5
2. UNICEF-supported interventions to prevent malnutrition in women before and during pregnancy ..	9
3. Prevalence trend of anaemia in women 15-49 years of age in Indonesia, 2010-2019	20
4. Prevalence of anaemia in pregnant women, by age group (2018)	21
5. Flow chart of selection of eligible literature	56
6. Monitoring card for IFA supplementation	59
7. Recommendations on ANC visits	59
8. Suggestion to attend Kelas Ibu Hamil.....	59
9. Daily care during pregnancy	59
10. Monitoring graph during pregnancy	60
11. Images from Maternal cohort form.....	60

ACRONYMS

ANC	Antenatal Care
APBD	Anggaran Pendapatan dan Belanja Negara (State revenue and expenditure budget)
APBN	Anggaran Pendapatan dan Belanja Daerah (Regional revenue and expenditure budget)
Bappenas	Badan Perencanaan Pembangunan Nasional (Ministry of National Development and Planning)
BKKBN	Badan Kependudukan dan Keluarga Berencana Nasional (National Population and Family Planning Board)
BOK	Bantuan Operasional Kesehatan (health operational support fund)
BPJS	Badan Penyelenggara Jaminan Sosial (social security)
CED	Chronic Energy Deficiency
CERIA	Cegah Anemia Remaja Indonesia (national self-reporting system for weekly IFA consumption of adolescent girls)
CHW	Community Health Workers
DAK	Dana Alokasi Khusus (special allocation fund)
DALYs	Disability-Adjusted Life Years
DHS	Demographic and Health Survey
e-PPGBM	<i>Elektronik Pencatatan dan Pelaporan Gizi Berbasis Masyarakat</i> (Electronic-based Nutrition Recording and Reporting)
Garuda	Garba Rujukan Digital
HIV	Human Immunodeficiency Virus
IFA	Iron and Folic Acid
IOM	Institute of Medicine
IYCF	Infant and Young Child Feeding
LBW	Low Birthweight
LMIC	Low and Middle-Income Countries
MCH	Maternal CHILD HEALTH
MDA	Mass Drug Administration
MMS	Multiple Micronutrient Supplementation
MoH	Ministry of Health
MUAC	Mid-Upper Arm Circumference
NGO	Non-Governmental Organisation
NLiS	Nutrition Landscape Information System
OB-GYN	Obstetrics And Gynaecology
PERSAGI	Persatuan Ahli Gizi Indonesia (Indonesian Nutrition Association)
Puskesmas	Pusat Kesehatan Masyarakat (primary health center)
PKH	Program Keluarga Harapan (national program for poor family)
PMK	Peraturan Menteri Kesehatan (Ministry of Health Regulation)
PNPM	<i>Program Nasional Pemberdayaan Masyarakat</i> (National Program of Community Empowerment)
POGI	Perkumpulan Obstetri dan Ginekologi Indonesia (Indonesian Associations of Obstetrics and Gynaecology)
Rifaskes	Riset Fasilitas Kesehatan (health facility research)

Riskesdas	Riset Kesehatan Dasar (basic health research)
RPJMN	Rencana Pembangunan Jangka Menengah Nasional (National Medium- Term Development Plan)
SBCC	Social and Behaviour Change Communications
SGA	Small for Gestational Age
SOP	Standard Operating Procedure
SUPAS	Survei Penduduk Antar Sensus (population survey done every five years after the regular census)
STH	Soil-Transmitted Helminth
SUMMIT	Supplementation with Multiple Micronutrients Intervention Trial
UGM	Universitas Gadjah Mada
UKS/M	Usaha Kesehatan Sekolah/Madrasah (school/madrasah health program)
UNICEF	United Nations Children’s Fund
UNIMMAP	United Nations International Multiple Micronutrient Preparation
WHO	World Health Organization
WORA	Women of Reproductive Age

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EXECUTIVE SUMMARY

Introduction

Maternal nutrition starts from preconception, carries through the ante and postpartum periods and continues throughout the reproductive period and the transformative years from the foetal stage to adolescence. The World Health Organization (WHO) targets different types of nutritional interventions for adolescent girls, women of reproductive age, pregnant women and postpartum women.

The root causes of nutritional problems in menstruating women (women of reproductive age) include the lack of – or excessive consumption of – macronutrients as well as micronutrient deficiencies. This is due to an imbalanced diet, limited access to healthy food and an increased physiological demand for nutrition due to infections such as malaria, HIV, tuberculosis and growth problems, such as malabsorption or an altered metabolism (Hanson, et al., 2015). Underlying issues related to social determinants of health also play a role in maternal nutrition outcomes. Issues include poor socioeconomic status, low educational levels and insufficient availability and/or access to nutrition services, as well as issues exacerbated by inequality that prevent access to quality diets and health care (Oh et al., 2019). From a wider policy perspective, national and local nutrition policies and implementation of sustainable solutions to nutritional issues provide the opportunity for women to access a healthy diet and assistance from crucial nutrition programs.

Many maternal health programs have been implemented in Indonesia, including routine iron and folic acid (IFA) and postpartum vitamin A supplementation, supplementary feeding for undernourished pregnant women and nutrition education and counselling. It is important to periodically review these programs to ensure alignment with the most up to date evidence and global recommendations, to address barriers and bottlenecks and to adjust programming for maximum impact. Additionally, the COVID-19 pandemic has worsened maternal nutrition outcomes due to deleterious effects on health care delivery systems, including restrictions in accessing maternal health care services.

Indonesia has a high prevalence of maternal malnutrition coupled with high rates of maternal and neonatal mortality; 1 in 2 pregnant women are anaemic, 1 in 6 are thin, 1 in 3 are short stature (Riskesdas, 2018). This landscape analysis seeks to better understand the current state of maternal nutrition programs in Indonesia, it aims to provide a systematic identification of barriers – from the policy level to program implementation – of maternal nutrition interventions in Indonesia and their alignment with the 2016 WHO recommendations on antenatal care for a positive pregnancy experience (as well as the relevant WHO nutrition recommendations for menstruating women and postpartum women). Additionally, the analysis also aims to understand the direct and indirect impact of the COVID-19 pandemic and the preparedness of the health systems in dealing with uncertainties due to the impact of the pandemic.

The landscape analysis draws on data collected from a desk review of existing literature, secondary data analysis, as well as field observation in four districts of South Sulawesi (Makassar and Jeneponto) and East Java (Surabaya and Jember). The landscape analysis findings were presented to maternal nutrition stakeholders in Indonesia (at national and sub-national levels; consisted of experts, government and non-government organizations, academia, professional organizations, and UN agencies) through a series of workshops and meetings to identify recommendations and build consensus towards next steps. The desk review compiles findings from over 200 literature sources and utilizes data from the Demographic and Health Survey (DHS) 2007-2017 and other data repositories, such as Riskesdas (Indonesia Basic Health Research), Indonesia's Ministry of Health

(MoH) and the World Bank. Six to seven community health centres (*puskesmas*) and two to three private midwifery and obstetrics and gynaecology (OB-GYN) clinics in each district were included in the field observation, which was conducted in 2021. The four districts were selected to ensure a range of characteristics, including urban/rural, development indicators, maternal nutrition indicators and staffing qualifications in the *puskesmas*.

Findings

Findings are summarized according to the intended beneficiary during three distinct stages: before pregnancy (adolescent girls and women of reproductive age); during pregnancy (pregnant women); and after pregnancy (postpartum women). WHO recommends a set of interventions intended for each beneficiary group, based on contextual factors. The findings of the landscape analysis are structured around those interventions, many of which are implemented in Indonesia, and some that are not.

Adolescent Girls and Women of Reproductive Age

Iron folic acid (IFA) supplementation and anaemia prevention: Almost one in three (31 per cent) non-pregnant, menstruating women in Indonesia were anaemic in 2019 (World Bank, 2019), and one in four adolescent girls suffered from anaemia in 2013 (Riskesdas 2013). WHO recommends weekly IFA containing 60mg elemental iron and 2800mcg folic acid as prevention¹, and Indonesia's guideline states that intermittent IFA (60mg elemental iron and only 400mcg folic acid) should be delivered through health facilities to all girls in junior and senior high school, young female workers in the workplace and brides-to-be. One tablet is given once a week for 52 weeks. In practice, the program is focused only on adolescent girls in schools. Nationally, poor coverage (23 per cent) and even lower consumption of weekly IFA (<5 per cent) were reported in the 2018 Riskesdas. In a smaller study with high coverage (98 per cent), IFA distribution did not translate to high consumption rates (20 per cent) (Hurfiati et al., 2018). Issues related to acceptability, poor monitoring and lack of coordination between the health sector and schools were found. IFA supplementation for women of reproductive age, including working women and brides-to-be, is not implemented at scale, nor is any anaemia screening provided for this beneficiary group.

Dietary counselling and deworming: The WHO recommendation to provide dietary counselling and deworming to women of reproductive age is not being implemented at scale in Indonesia.

Pregnant Women

Dietary counselling: Indonesia faces a double burden of malnutrition in pregnancy, however, national data on overweight and obesity in pregnancy is limited. Undernutrition correlates significantly with the socioeconomic status of pregnant women in Indonesia. Nutrition counselling is delivered through antenatal care (ANC) and monitoring targets related to weight gain during pregnancy and dietary intake as per recommended nutrition requirements. Nutrition information for pregnant women is provided in the Maternal Child Health (MCH) book that is provided through ANC counselling; however, the MCH book is underutilized by pregnant women and counselling during ANC is often ineffective. Pregnancy classes offered by the *puskesmas* are poorly attended. Existing social safety net programs, such as the national program for poor family (*Program Keluarga Harapan*, or PKH) and the National Community Empowerment Program: Healthy and Smart Generation (*Program Nasional Pemberdayaan Masyarakat*, or PNPM *Generasi Sehat dan Cerdas*), could help alleviate undernutrition related to social determinants, but guidelines do not facilitate the integration of pregnant women into these demand-side interventions. Low capacity of health workers around dietary counselling coupled

¹ Treatment for anaemia: daily IFA containing 120mg iron and 400mcg folic acid until hemoglobin levels reach minimum cut-off

with low demand for assistance by pregnant women as well as misconceptions around diet during pregnancy have led to an overall lack of awareness of maternal nutrition. Monitoring systems also fail to capture dietary counselling and program data.

Food supplementation: The prevalence of undernutrition during pregnancy reduced from 24 to 10 per cent between 2013 and 2020 (Ministry of Health Republic Indonesia, 2013b, 2021a), however disparities persist in many provinces (up to 37 per cent, Ministry of Health Republic Indonesia, 2019d). Pregnant women aged 15-19 years also have a much higher prevalence of undernutrition (34 per cent nationally, Ministry of Health Republic Indonesia, 2019d) compared to older pregnant women. Pregnant women diagnosed as undernourished in the first trimester (based on mid-upper arm circumference or MUAC measurement) should receive supplementary feeding along with nutrition education and counselling. Throughout much of the country, a 90-day recovery program consisting of biscuit supplementation is distributed through *puskesmas* or *posyandu* during ANC. Though coverage is relatively high (~90 per cent of undernourished pregnant women receive the biscuits), only 65 per cent consumed any of the biscuits (Ministry of Health Republic Indonesia, 2019d) and no data is available on consumption of the full 90-day supply. An unpleasant taste (too sweet), lack of variety and sharing biscuits with family members were reported as the main barriers. There is no large-scale evaluation on the program's effectiveness but smaller studies found the biscuits were significantly associated with an increase in weight gain and MUAC during pregnancy. The Ministry of Health is considering transitioning to local food supplementation due to the high cost of the biscuit program, poor compliance and palatability issues.

IFA supplementation: The prevalence of anaemia among pregnant women in Indonesia is one of the highest among low and middle-income countries (LMICs) at 44.2 per cent in 2019, according to World Bank data, and 49 per cent in 2018, according to Indonesia health data (Riskesdas), and is on an upward trend. Anaemia is also considerably higher among younger pregnant women aged 15-24 years (85 per cent). Iron deficiency anaemia accounts for 43 per cent of all anaemia cases in pregnancy. The current IFA supplementation program for pregnant women in the country provides one tablet daily for at least 90 days during pregnancy, while WHO has recommended IFA supplementation throughout pregnancy. Although the program is one of the most well-established compared to other nutrition interventions, with the majority of pregnant women (88 per cent) receiving IFA tablets, only 38 per cent consumed at least the recommended 90 tablets during pregnancy (Riskesdas 2018). Low compliance is linked to poor knowledge and low advocacy about anaemia and IFA supplementation. The unpleasant taste, forgetfulness and side effects of nausea and constipation are the most commonly cited reasons for non-compliance by pregnant women. In addition, low or non-existent stock were a problem for many facilities observed, alongside a low level of compliance monitoring by health workers during ANC visits.

Anaemia screening: All pregnant women should be tested for anaemia via a haemoglobin test as part of the full nutrition assessment in the first trimester of pregnancy and a second test should be provided in the third trimester. If anaemia is detected, further haemoglobin tests should be administered periodically throughout pregnancy until normal levels are reached. There is no national target for reducing anaemia in pregnancy, unlike the yearly malnutrition targets listed in the National Medium-Term Development Plan (RPJMN). Non-standardized equipment is available at *puskesmas* for haemoglobin testing and there is no routine recording of anaemia testing for population level data; only survey (Riskesdas) data is available.

Multiple micronutrient supplementation (MMS): After rigorous research, WHO recommends multiple micronutrient supplementation (MMS) instead of IFA as MMS has been shown to further reduce the risk of low birthweight. Currently, Indonesia does not have a national regulation on MMS,

although trials conducted in Indonesia using the UNIMMAP formulation² found an 18 per cent reduction in early infant mortality, particularly if the mother was undernourished or anaemic, and an 11 per cent reduction in foetal loss and neonatal death. MMS has also been consistently associated with improvements in cognitive and motor skills in children. Cost factors, current demand-side challenges with the IFA program and the risk of additional barriers around introducing a new product have meant the MMS program has not been scaled-up beyond trials. A cost-benefit analysis conducted by Nutrition International in 2019 suggests that transitioning from IFA to MMS in Indonesia will yield benefits that are 483 times greater than the cost over ten years, including the cost of supplements, delivery through public health system and program costs such as administration and training, and estimates that 925,250 Disability-Adjusted Life Years (DALYs) can be averted.

Deworming: There is no recent national or large-scale data on intestinal helminth infection (STH) in Indonesia. Smaller studies over the last 25 years have found infection rates between 47 per cent and 70 per cent for pregnant women (Nurdiati et al, 2001 and Pradana et al, 2014). Maternal deworming is not included in national nutrition strategies and action plans but is part of the national target to reduce the prevalence of STH to <10 per cent in every district through provision of anthelmintic (deworming). Deworming regulation is difficult to comprehend as there is no clear management flow chart for health workers to follow and it does not align with the WHO guideline to provide prophylaxis for helminth infections to *all* pregnant women after the first trimester, given the high burden of anaemia in pregnancy. Data on deworming distribution is not regularly recorded - but it was infrequently observed - and stock-outs of deworming medicines were observed to be common.

Calcium supplementation: The overall low calcium intake from dietary food among pregnant women in Indonesia is concerning and further reinforces the need to implement the WHO recommendation for calcium supplementation of 1.5-2.0 mg daily in order to reduce the risk of pre-eclampsia. Indonesia's guideline on calcium supplementation is unclear and poorly implemented. There is limited data on procurement/stock, service delivery and consumption. Field observations showed variability in the dose of calcium prescribed. Pregnant women also had low awareness of the benefits of calcium supplementation.

Postpartum Women

IFA supplementation: The WHO recommendation to provide IFA supplementation to postpartum women as a continuation of IFA supplementation during pregnancy is not being implemented in Indonesia.

Dietary counselling and deworming: There is no data on dietary counselling in the postpartum period, and deworming is not currently provided to postpartum women in Indonesia.

Vitamin A supplementation (VAS): There is no national data on the prevalence of vitamin A deficiency in postpartum women, however, Indonesia has been providing two 200,000 iu retinol capsules to postpartum women in health care facilities after birth for nearly 30 years. This program no longer aligns with WHO recommendations (2011 and 2016) which state that vitamin A supplementation does not improve maternal and perinatal outcomes. Riskesdas 2018 reported a 57 per cent coverage rate (but only 23 per cent received both capsules), although postpartum VAS is often under-reported as it is not a mandatory indicator. There is no national program or large-scale

² UNIMMAP formulation contains 30mg iron (ferrous fumarate) and 400 mcg folic acid along with 800 mcg retinol (retinyl acetate), 200 IU vitamin D (ergocalciferol), 10 mg vitamin E (alpha-tocopherol acetate), 70 mg ascorbic acid, 1.4 mg vitamin B1 (thiamine mononitrate), 18 mg niacin (niacinamide), 1.9 mg vitamin B6 (pyridoxine), 2.6 mcg vitamin B12 (cyanocobalamin), 15 mg zinc (zinc gluconate), 2 mg copper, 65 mcg selenium, and 150 mcg iodine.

research to evaluate the short and long-term effects of postpartum VAS on maternal and infant morbidity and mortality in Indonesia in order to inform the continuation of the program.

Priority Recommendations

Findings from the landscape analysis were presented to maternal nutrition stakeholders in Indonesia during a series of meetings and workshops in April and May 2022. Stakeholders were presented with the key barriers to maternal nutrition, as well as recommendations to mitigate issues causing the barriers. Recommendations were discussed and expert opinion was sought to select the priority interventions regarding feasibility of implementation and potential for impact. The full set of recommendations are listed in the corresponding section, and priority actions (short-term) are as follows:

Priority recommendations for adolescent girls and women of reproductive age

- Develop and implement a package of nutrition interventions for all adolescent girls (including out-of-school girls) and women of reproductive age (brides-to-be and female workers), including weekly IFA and deworming
- Strengthen multi-sectoral stakeholder coordination, including capacity building for the School Health Program
- Ensure an adequate stock of IFA through improved supply chains and clear procurement processes and introduce a user-friendly reporting system (CERIA) for weekly IFA supplementation.
- Increase the demand to adolescent nutrition programme through Social and Behaviour Change Communications (SBCC)
- Strengthen the capacity and increase the numbers of adolescent health cadres/champions for nutrition

Priority recommendations for pregnant women

- Develop and implement a package of nutrition interventions for pregnant women including IFA, calcium, deworming, dietary counselling and food supplementation
- Develop guidelines for deworming during pregnancy
- Revise and advocate for the anaemia management guideline, including a flow chart
- Ensure adequate materials for haemoglobin testing are available
- Update and socialize the technical guideline on calcium supplementation
- Strengthen the capacity of health workers on maternal nutrition interventions through pre-service and in-service trainings, especially around counseling, planning and budgeting, stock management, program monitoring and screening of malnourished pregnant women
- Strengthen the distribution and uptake of MCH books
- Develop targets and appropriate indicators for reduction of malnutrition in pregnancy, including chronic energy deficiency, anemia and obesity
- Gradually roll out a redesigned, balanced energy food supplement using local foods by modelling in several districts before scale-up
- Develop an SBCC strategy for improved knowledge of risks and actions related to maternal nutrition

Priority recommendations for postpartum women

- Develop and implement a package of nutrition interventions for postpartum women, including IFA and deworming
- Capacity building for health workers to improve quality and quantity of nutrition counselling in postpartum, including through home visits
- Prioritize the budget for health operational funding for 3-4 postpartum visits



A midwife consults a pregnant mother and her husband at a community health center in Pamekasan, East Java Province.

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INTRODUCTION

The scope of maternal nutrition starts from preconception, carries through the ante and postpartum periods, continues throughout the reproductive period and then through the transformative years from the foetal stage to adolescence (Hanson et al, 2015). The World Health Organization (WHO) has targeted different types of nutritional interventions for adolescent girls, women of reproductive age, pregnant women and postpartum women (*see Summary of WHO and UNICEF Guidelines*). The root causes of nutritional problems in menstruating women (women of reproductive age) include the lack of, or excessive, consumption of macronutrients as well as micronutrient deficiencies due to imbalanced diet, limited access to healthy food, or increased physiological demand for nutrition due to infections (i.e., malaria, HIV, tuberculosis) or growth problems (malabsorption or altered metabolism) (Hanson et al, 2015). Underlying issues related to social determinants of health such as poor socioeconomic status, low educational levels and insufficient nutrition services, as well as inequality issues in accessing quality diet and health care also play a role in maternal nutrition outcomes. From a wider policy perspective, national and local nutrition policies and the implementation of sustainable solutions to nutritional issues provide the opportunity for women to access a healthy diet and crucial nutrition programs (Oh et al, 2019).

Women in Indonesia suffer from various nutritional deficiencies and higher rates of morbidity and mortality during pregnancy, which can also result in poor outcomes for their babies. The maternal mortality rate is 305 deaths per 100,000 live births (SUPAS, 2015). Nearly half (48.9 per cent) of pregnant women

are anaemic (Riskesdas, 2018), 17.3 per cent are undernourished (i.e., chronic energy deficiency (CED) (Riskesdas, 2018) and 17.1 per cent are vitamin A deficient (WHO global database). There is no national data on the prevalence of overweight and obesity in pregnancy, however, one study estimated a 27 per cent prevalence (Soltani et al, 2017). Outside of pregnancy, adolescent girls aged 12-18 years and women of reproductive age (15-49 years) suffer from anaemia at a rate of 22.7 per cent (Riskesdas, 2013). Among adolescents, iron deficiency is the underlying cause of 53-58 per cent of cases of anaemia, while other causes (including folate, vitamin A and B12 deficiencies, helminth and other infections) are attributed to the remaining 42-47 per cent of anaemia cases (van Zutphen, 2021).

Multiple maternal health programs have been implemented in Indonesia, including routine IFA and postpartum vitamin A supplementations, supplementary feeding for undernourished pregnant women and nutrition education and counselling. It is important to review these programs from time to time, to ensure alignment with the latest evidence and global recommendations, address barriers and bottlenecks and adjust programming for maximum impact. Many of these programs have had historically low coverage, and thus their effectiveness is estimated to be suboptimal. Additionally, the COVID-19 pandemic has worsened maternal nutrition outcomes due to effects on health care delivery systems, including restrictions in accessing maternal health care services. The reduction in the number of women seeking antenatal and postnatal care has been reported in other countries, but data from Indonesia is limited.

OBJECTIVE

Given the high rates of maternal and neonatal mortality and the high prevalence of maternal malnutrition in Indonesia, this landscape analysis seeks to better understand the current situation of maternal nutrition programs in Indonesia. Interventions to improve maternal nutrition should be provided as a continuum of care approach covering preconception, pregnancy and postpartum periods; however, the scope of this desk review and field observation focuses more heavily on interventions in pregnancy, while also addressing some interventions during preconception and postpartum. This landscape analysis aims to provide a systematic identification of barriers – from the policy level to program implementation – of maternal nutrition interventions in Indonesia and their alignment with the 2016 WHO recommendation on antenatal care for a positive pregnancy experience (and other relevant WHO nutrition recommendations for menstruating women and postpartum). Additionally, the analysis also aims to understand the direct and indirect impact of the COVID-19 pandemic and the preparedness of health systems in dealing with uncertainties due to the pandemic.



A health worker examines a pregnant mother at a Community Health Center in Pamekasan, East Java Province.

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METHODOLOGY

The landscape analysis uses data collected from a desk review of existing literature, secondary data analysis, as well as field observation in four districts of South Sulawesi (Makassar and Jeneponto) and East Java (Surabaya and Jember). The landscape analysis findings were presented to maternal nutrition stakeholders in Indonesia (at national and sub-national levels) through a series of workshops and meetings to identify recommendations and build consensus towards next steps. Those recommendations are presented in text boxes throughout the 'results' section and are listed comprehensively in the 'recommendations' section.

Desk Analysis

The desk review compiled findings from over 200 pieces of published and unpublished literature, including research and government reports, policies, programs, legislation and guidelines related to maternal nutrition in Indonesia. It also utilized data from DHS 2007-2017 and other data repositories, such as Riskesdas, the Ministry of Health and the World Bank. The objective of the desk review was to identify information on nutrition interventions or programs targeting women of reproductive age and/or adolescent girls, including pregnant and postpartum women. Nutrition interventions include micronutrient supplementation, food supplementation and dietary counselling. Key nutrition indicators were identified and problems or trends around program implementation or adherence were explored. In addition to nutrition interventions regulated by the government of Indonesia, researchers also searched for activities or programs that complement or accelerate the implementation of nutrition interventions for women, including antenatal care, maternal support groups, the School Health Program, etc.

In the context of COVID-19 pandemic, researchers distinguished between published and grey literature pre- and during COVID-19, including any new guidelines or policies that were adapted to the pandemic.

The identified information was reviewed and compared with the WHO 2016 recommendation on antenatal care for a positive pregnancy experience and its 2018 update, the

WHO 2018 guideline on implementing effective actions for improving adolescent nutrition, the WHO 2011 guideline on intermittent iron and folic acid supplementation in menstruating women and the WHO 2016 guideline on iron supplementation in postpartum women. The nutrition interventions listed in these guidelines are summarized below (*see WHO Guideline Summary* section).

Researchers systematically searched Ovid MEDLINE and Ovid Embase using keywords and thesaurus and 'PubMed' using keywords only to retrieve electronic publications and items not indexed in MEDLINE. Similar search strategies for grey literature were performed in Google, Google Scholar and *Garba Rujukan Digital (Garuda)* using search terms. Manual searching of major public health organizations' websites (i.e., government, academic or non-governmental organisations (NGOs) as well as relevant national and sub-national policies and legislations on the Indonesia Ministry of Law and Human Rights website and the national database of legal documents was conducted. The systematic database searching strategy and search terms and keywords are provided in Annex 1.

In order to assess the most current and relevant evidence, regulations and program information, researchers limited their search to publications from the last five years (2015-2021). Literature searches were performed between 12 June and 30 October 2021.

Additionally, key stakeholder mapping was performed by collecting information on who is doing what, where and at what scale. Researchers adapted the WHO's Landscape Analysis on Countries' Readiness to Accelerate Action in Nutrition (World Health Organization, 2012) that contains a useful analytical framework for mapping policy commitments and capacity to accelerate actions in maternal nutrition. Further, the adapted framework also takes into account the Menon et al. (2014) nutrition implementation research, the Maternal and Child Nutrition Study Group's 'Framework for actions to achieve optimum foetal and child nutrition and development' that was published in The Lancet (Black et al., 2013) and the framework introduced by The Lancet Global Health Commission on 'High quality health systems in the Sustainable Development Goals era' (Kruk et al., 2018), as well as the revised

Secondary Desk Analysis

Secondary data analyses were performed to complement the desk review. The analyses aimed to 1) map the current maternal nutrition status in Indonesia, to serve as baseline information; and 2) assess the coverage of all programs relevant to maternal nutrition. Data from the Demographic Health Survey (DHS) between 2007 and 2017 was utilized. A total of 39,700 women aged 15-49 years who gave birth within three years prior to each survey were included in the analyses. DHS datasets were weighted according to sampling strategies of the surveys.

Analysis of the coverage of ANC (number and timing of ANC visits, as well as components of the ANC service) and rates of adherence of micronutrient supplementation were included.

Field Observation and Data Collection

Data collection was conducted at the national and sub-national levels in 2021. At the national level, key stakeholders were selected that were involved in the planning and implementation of maternal nutrition programs. In the two selected provinces – South Sulawesi and East Java – two districts in each province (four in

framework for the classification nutrition actions (Keats et al., 2021).

The researchers used an adapted health systems perspective to assess the commitment and capacity to accelerate maternal nutrition actions in Indonesia. In addition to the health service delivery of the various interventions listed in the WHO Guideline Summary, the components of the health systems include the policy and regulations, financing, human resources, infrastructure and health supplies as well as the health information system pertaining to maternal nutrition programs. The use of these specific factors allows for a systematic assessment of the opportunities, challenges and barriers that affect the process of care and the attainment of desirable impact of the various maternal nutrition interventions in Indonesia.

Determinants of the utilization and adherence to maternal nutrition services were assessed, including: 1) socioeconomic determinants of the women (level of education, maternal age, economic status); 2) access to health services; and 3) external factors (regional residence and development level of the district).

This study also reviewed other published data repositories including the World Bank microdata catalogue, the MoH health profile and databases on human resources and health supplies and the Basic Health Research (Riskesdas) reports from 2010 to 2018. Analysis was conducted at the national level, provincial level and for the two selected regions of the field observation (East Java and South Sulawesi), subject to data availability.

total) were selected for observation, according to the following criteria: urban or rural characteristics; development indicators; maternal nutrition status; and recommendations from the provincial health authorities. Surabaya and Makassar were selected to represent districts with urban characteristics and better-

performing maternal nutrition indicators (though program coverage was not necessarily higher). Jember and Jenepono were selected to represent rural characteristics as well as a higher prevalence of maternal anaemia and malnutrition. Six to seven community health centres (*puskesmas*) in each district were included in the field observation, selected according to geographic location, availability of staff with nutrition qualifications, and type of *puskesmas* (financial autonomy, level of emergency care) and maternal nutrition program outcomes. List of field observation participants at national and subnational level is available in Figure 1.

Semi-structured interview and discussion guidelines were developed according to the WHO guidelines for landscape analysis in nutrition which were adjusted to the desk review findings and the Indonesian context. The interviews covered key topics in maternal nutrition, policies and program implementation, funding, coordination mechanisms, human resources for nutrition, nutrition information systems, advocacy, scale-up, enablers and barriers. Each topic covered was tailored to the stakeholder's scope of expertise. The impact of the COVID-19 pandemic on maternal nutrition was also discussed with participants, including regional impact, adaptations and preparedness.

Key participant interviews and focus group discussions were conducted either offline (in

Stakeholder Consultations on Recommendations

The researchers, assisted by UNICEF, convened a group of approximately 50 stakeholders in maternal nutrition in Indonesia through a series of workshops and meetings. The objective was to build consensus around the recommendations for maternal nutrition that emerged from this landscape analysis. A summary report was shared with all stakeholders and researchers presented the findings in a seminar held on 26 April 2022. The maternal nutrition portfolio was divided into five sub-topics based on the intended beneficiary (adolescent girls, pregnant women and postpartum women) and the type of

person) or online, depending on the level of COVID-19 restrictions in each district, availability of reliable internet connection and adeptness of participants. Interviews were conducted by a team dedicated to each district and recorded with permission. Interviews and discussions ranged from 30 to 120 minutes.

Field observation was performed in person by trained enumerators in different health facilities, including *puskesmas*, private midwifery clinics and OB-GYN clinics. The instrument was a checklist that covered six domains to be observed:

1. Information related to the health facility
2. Availability of medical devices and materials
3. Tools for recording and reporting
4. Availability of nutrition supplements
5. Antenatal care (observed while the midwife delivered ANC)
6. Nutrition counselling during ANC visits (observed while the nutritionist delivered nutrition counselling)

Consent was obtained from the pregnant woman prior to observation of ANC and nutrition counselling. If consent was not obtained to observe these sessions, an in-person exit interview with the pregnant women was conducted after ANC or counselling.

intervention (IFA supplementation, dietary interventions, etc.) Individuals representing organizations and programs with deep experience in at least one area of the maternal nutrition portfolio were identified in advance and asked to review the landscape analysis findings to identify key program gaps and barriers and to subsequently draft initial recommendations to remedy any shortcomings. During the workshop that followed the seminar presentations, those individuals led smaller group discussions around the recommendations for their assigned topic of maternal nutrition in order to build consensus amongst stakeholders.

A follow-up meeting was held on 20 May 2022 to present the recommendations and receive further input from technical and programmatic experts in different areas of maternal nutrition. Following the meeting, the MoH Nutrition

Directorate circulated notes summarizing the discussion and inputs from stakeholders. UGM researchers and UNICEF used these notes to finalize the recommendations that are found in this report.

Figure 1. Field observation participants (national and sub-national)

Stakeholders	Number of participants
National stakeholder	
Ministry of Health	11
Other ministries	10
Provincial stakeholder	
Provincial health office	4
Professional organization	4
Provincial national family planning office	2
District stakeholder	
District health office	11
Midwives	26
Nutrition officer	25
District planning office	3
Women empowerment office	4
Professional organization	3
Community	
CHWs	24
Pregnant women	42



A session of mother support group conducted at a village facility by a river in Aceh Jaya district

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SUMMARY OF WHO AND UNICEF GUIDELINES

The following table summarizes the WHO recommendations for maternal nutrition, found in the [2016 WHO recommendations for positive pregnancy](#) and the [2020 update](#), and other WHO nutrition recommendations for [adolescents](#), [menstruating](#) and [postpartum women](#).

Table 1. Summary of WHO recommendations for maternal nutrition

Life stage	Type of intervention	Specific intervention
Adolescents and Menstruating Women	Dietary	No specific guideline for dietary counselling for adolescents. General guidelines include: 1) reducing intake of free sugars to less than 10% of total energy intake; 2) increasing potassium intake from food in children aged 2-15 years to control blood pressure; 3) reduction in sodium intake in children aged 2-15 years; and 4) providing additional micronutrients through fortification of staple foods and targeted supplementation in adolescents
	Iron folic acid (IFA)	Weekly iron and folic acid supplementation (60mg elemental iron, 2.8mg folic acid) is recommended as a public health intervention in all menstruating adolescent girls and adult women living in settings where anaemia is highly prevalent (>20% in non-pregnant women of reproductive age), to improve their haemoglobin concentrations and iron status and reduce the risk of anaemia ³ . Daily iron and folic acid supplementation is recommended where anaemia is highly prevalent (>40%).
	Deworming	Regular (annual or bi-annual) deworming (albendazole or mebendazole for soil transmitted helminths and praziquantel for schistosomes) for non-pregnant adolescent girls (aged 10-19 years) and non-pregnant women of reproductive age (aged 15-49 years) living in areas endemic for STH and schistosomes (>20%).
Pregnancy ⁴	Dietary	A.1.1: Counselling about healthy eating and keeping physically active during pregnancy is recommended for pregnant women to stay healthy and to prevent excessive weight gain during pregnancy.
		A.1.2: In undernourished populations, nutrition education on increasing daily energy and protein intake is recommended for pregnant women to reduce the risk of low-birth-weight neonates

³ Three months supplementation followed by three months of no supplementation after which provision of supplements should restart. If feasible, intermittent supplements could be given throughout the school or calendar year.

⁴ 2016 WHO Recommendation on antenatal care for a positive pregnancy experience, and WHO 2020 *Nutrition Interventions Update: Multiple micronutrient supplements during pregnancy*

Life stage	Type of intervention	Specific intervention
Pregnancy		A.1.3: In undernourished populations, balanced energy and protein dietary supplementation is recommended for pregnant women to reduce the risk of stillbirths and small for gestational age (SGA) neonates.
		A.1.4: In undernourished populations, high-protein supplementation is not recommended for pregnant women to improve maternal and perinatal outcomes.
	Iron folic acid (IFA)	A.2.1: Daily oral iron and folic acid supplementation with 30 mg to 60 mg of elemental iron and 400 mcg (0.4 mg) of folic acid is recommended for pregnant women to prevent maternal anaemia, puerperal sepsis, low birthweight and preterm birth
		A.2.2: Intermittent oral iron and folic acid supplementation with 120 mg of elemental iron and 2800 mcg (2.8 mg) of folic acid once weekly is recommended for pregnant women to improve maternal and neonatal outcomes if daily iron is not acceptable due to side effects; and in populations with an anaemia prevalence among pregnant women of less than 20%.
	Calcium	A.3: In populations with low dietary calcium intake, daily calcium supplementation (1.5–2.0 g oral elemental calcium) is recommended for pregnant women to reduce the risk of pre-eclampsia.
	Vitamin A	A.4: Vitamin A supplementation (up to 10,000 IU daily or up to 25,000 IU weekly) is only recommended for pregnant women in areas where vitamin A deficiency is a severe public health problem, to prevent night blindness
	Zinc	A.5: Zinc supplementation for pregnant women is only recommended in the context of rigorous research.
	Multiple micronutrient (MMS)	A.6: (Updated in 2020) Antenatal multiple micronutrient supplements that include iron and folic acid are recommended as the result of rigorous research.
	Vitamin B6	A.7: Vitamin B6 (pyridoxine) supplementation is not recommended for pregnant women to improve maternal and perinatal outcomes.
	Vitamin E+C	A.8: Vitamin E and C supplementation is not recommended for pregnant women to improve maternal and perinatal outcomes.
	Vitamin D	A.9: Vitamin D supplementation is not recommended for pregnant women to improve maternal and perinatal outcomes.
	Restricting caffeine intake	A.10: For pregnant women with high daily caffeine intake (more than 300 mg per day), lowering daily caffeine intake during pregnancy is recommended to reduce the risk of pregnancy loss and low birthweight neonates.
	Maternal assessment	B.1.1: Full blood count testing is the recommended method for diagnosing anaemia during pregnancy. In settings where full blood count testing is not available, onsite haemoglobin testing with a haemoglobinometer is recommended over the use of the haemoglobin colour scale as the method for diagnosing anaemia in pregnancy.

Life stage	Type of intervention	Specific intervention
Pregnancy	Maternal deworming	C.4: In endemic areas, a preventive anthelmintic treatment is recommended for pregnant women after the first trimester as part of worm infection reduction programs
Postpartum Women	Iron folic acid (IFA)	Iron supplementation, either alone or in combination with folic acid supplementation, is recommended for postpartum women for 6-12 weeks following delivery, in settings where gestational anaemia is of public health concern (>20%).
	Deworming	Regular deworming (albendazole or mebendazole) is recommended for postpartum and lactating women, in areas endemic for soil transmitted helminths and where anaemia is a severe public health problem.
	Other	Vitamin A supplementation in postpartum women is not recommended for the prevention of maternal and infant morbidity and mortality.




[UNICEF's maternal nutrition programming guidance](#) aims to provide UNICEF country teams and their partners with guidance to design, implement and monitor evidence-based programmes to improve the nutrition of women before and during pregnancy and while breastfeeding. The guidance supports UNICEF's vision for improving the diets, services and practices of women as described in the *UNICEF Nutrition Strategy 2020–2030*. Summary of UNICEF-supported interventions to prevent malnutrition in women before and during pregnancy is shown in Figure 2.



Village midwives discuss activity plan on maternal nutrition programme with their puskesmas midwife coordinator

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Figure 2. UNICEF-supported interventions to prevent malnutrition in women before and during pregnancy

			
Interventions aimed at benefiting all women	Before pregnancy	During pregnancy	While breastfeeding
Policies, legislation, and guidelines to make nutritious foods more available and affordable	•	•	•
Policies and legislation to support maternity protection			•
Nutrition education and counselling on nutritious and safe diets, physical activity and rest, appropriate weight gain, and micronutrient supplementation	•	•	•
Large-scale food fortification			•
Supplementation with iron containing supplements (IFA)	•		
Supplementation with iron containing supplements (IFA or MMS)		•	•
Anthropometric assessment (height, weight, BMI or MUAC), counselling and referral as needed	•	•	•
Gestational and post-natal weight gain monitoring		•	•
Screening for anaemia and treatment	•	•	•

Interventions aimed at benefiting adolescent mothers and other nutritionally at-risk women	Before pregnancy	During pregnancy	While breastfeeding
Social protection interventions (cash, vouchers, food rations, and food supplements)		•	•
Deworming prophylaxis	•	•	•
Nutrition education on increasing daily energy and protein intake		•	
Balanced energy-protein dietary supplementation (prevention and treatment)		•	
Calcium supplementation and nutrition counselling to increase consumption of calcium-rich foods		•	
Vitamin A supplementation		•	

UNICEF and WHO guidelines were referenced when identifying whether Indonesia's maternal nutrition policies aligned with global recommendations, and also for stakeholders to identify recommendations.

RESULTS

Maternal Health and Nutrition Profile

The country profile on maternal health and nutrition is illustrated in Table 2.

The maternal mortality rate remains high at 305 deaths per 100,000 live births, which is above the 2024 national target of 183 per 100,000 live births: It far exceeds the Sustainable Development Goals' target of 70 per 100,000 live births. The major causes of maternal deaths are postpartum haemorrhage and pre-eclampsia. Evidence has shown that these can be prevented by nutritional interventions such as iron and calcium supplementation during pregnancy.

Anaemia is a significant public health concern in Indonesia. The rate of anaemia in pregnancy

is 48 per cent, while the rate of anaemia for all women of reproductive age is 23 per cent.

Given these high rates, iron supplementation is recommended by the WHO to reduce the risk of anaemia for all women of reproductive age, pregnant women and postpartum women.

Dietary interventions pre-pregnancy and during pregnancy are effective strategies to improve maternal nutrition status, reducing not only the risk of maternal morbidity and mortality, but also the risk of newborn morbidity and mortality, including stunting.

Findings by Beneficiary and Nutrition Intervention

The following sections present the key findings from the desk review and field observation. Findings are presented by intervention (or groupings of interventions where findings overlapped or service delivery is similar) as per the [2016 WHO recommendations for positive pregnancy](#) and the [2018 update](#), and other WHO nutrition recommendations for [adolescents](#), [menstruating](#) and [postpartum women](#), (see *WHO Guideline Summary*).



A pregnant mother is being checked on her Mid-Upper Arm Circumference for chronic undernutrition detection, in a village in Central Java province

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Table 2. Summary of epidemiological data on indicators of reproductive, maternal and neonatal health and nutrition

	Year	Value	Source info
Maternal mortality rate (per 100,000 live births)	2015	305	The 2015 Intercensal population survey (or SUPAS)
Neonatal mortality rate (per 1,000 live births)	2017	15	Indonesia DHS, 2017
Perinatal mortality rate ⁵ (per 1,000 pregnancies)	2017	21	Indonesia DHS, 2017
Stillbirth rate (per 1,000 total births)	2019	9.46	WHO Global Health Observatory data
Preterm birth rate (per 100 live births)	2010	15.5	Blencowe et al., 2012 (Lancet publication)
Total fertility rate (children per woman)	2017	2.4	Indonesia DHS, 2017
Median birth intervals (months)	2017	64.6	Indonesia DHS, 2017
Rate of pregnancy outside marriage	N/A	N/A	N/A
Secondary school attendance among female students aged 13-17 years (%)	2017	86.8	Indonesia DHS, 2017
The ratio of female to male students attending secondary school	2017	1.03	Indonesia DHS, 2017
Rate of child marriage	N/A	N/A	N/A
Median age at first marriage among men aged 25-49 years (years)	2017	24.6	Indonesia DHS, 2017
Median age at first marriage among women aged 25-49 years (years)	2017	20.8	Indonesia DHS, 2017
Median age at first birth among women aged 25-49 years (years)	2017	22.4	Indonesia DHS, 2017
Teenage childbearing ⁶ (%)	2017	7.0	Indonesia DHS, 2017
Anaemia in female adolescents aged 12-18 years (%)	2013	22.7	Riskesdas, 2013
Anaemia in woman of reproductive aged 15-49 years (%)	2013	22.7	Riskesdas, 2013
Anaemia in pregnancy (%)	2018	48.9	Riskesdas, 2018
Chronic undernutrition in pregnancy (or CED) (%)	2018	17.3	Riskesdas, 2018
Maternal overweight and obesity (%)	2010	27.0	Soltani et al., 2017 (small-scale study, N=607)
Vitamin A deficiency among pregnant women (%)	2003	17.1	WHO global database on vitamin A deficiency
Night blindness among pregnant women (%)	2003	1.7	WHO global database on vitamin A deficiency
Zinc deficiency among pregnant women (%)	2012-2015	81.2	Wibowo et al., 2017 (small-scale study, N=234)
Zinc deficiency in first trimester (%)	2013-2014	35.0	Bardosono, 2016 (small-scale study, N=143)
Pre-eclampsia rate ⁷ (%)	2018	3.3	Riskesdas, 2018
Intestinal helminth infection in pregnancy (%)	1996-1998	69.7	Nurdiati et al., 2001 (small-scale study, N=442)
Coverage of first visit of ANC (K1) (%)	2020	93.3	The 2020 Indonesia Health Profile
Coverage of fourth visit of ANC (K4) (%)	2020	84.6	The 2020 Indonesia Health Profile
Birth skill attendant (%)	2020	89.8	The 2020 Indonesia Health Profile
Postpartum haemorrhage (%)	2018	1.5	The 2018 Riskesdas
Low birthweight (<2,500 gr) (%)	2020	3.1	The 2020 Indonesia Health Profile
Neural tube defect	2014-2018	18.4	Surveillance report on birth defects cited in 2018 Infodatin

⁵ The sum of the number of stillbirths and early neonatal deaths divided by the number of pregnancies of seven or more months' duration

⁶ Women aged 15-19 years who have given birth or are pregnant with their first child

⁷ Pre-eclampsia, also referred as hypertension during pregnancy

1. Adolescent girls and menstruating women

1.1 Anaemia prevention and management (including IFA supplementation)

Epidemiology: Almost one in three (31 per cent) non-pregnant menstruating women (15–49 years) in Indonesia were anaemic in 2019 (World Bank, 2021). Although the prevalence is not as high as it is for pregnant women, the prevalence for adolescent girls was at an alarming rate of 23 per cent in 2013 (Riskesdas 2013). The Riskesdas 2018 survey does not disaggregate by sex, however, 27 per cent of 5–14-year-old boys and girls, and 32 per cent of 15–24-year-old boys and girls were anaemic. It is expected that the prevalence for adolescent girls aged 12–19 years may be even higher. The Riskesdas 2013 survey reported that 23 per cent of menstruating women were anaemic (there was no data on women of reproductive age in the 2018 Riskesdas).

Evidence: The WHO recommends weekly IFA supplementation with a tablet containing 60mg of elemental iron and 2800mcg of folic acid as prevention for all menstruating (non-pregnant) women and daily IFA containing 120mg of elemental iron and 400mcg of folic acid as treatment when anaemia is diagnosed. Treatment should be continued until haemoglobin levels reach the minimum cut-off. However, given there is no screening program for anaemia in non-pregnant women in Indonesia, it can be assumed that anaemia is not treated in that demographic unless clinical signs of anaemia are detected during other health visits.



Adolescent girls consume iron-folic acid tablets at a school in Klaten district

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Policy: National regulations state that intermittent IFA (with 60mg of elemental iron and 400mcg of folic acid) should be delivered to all girls in junior and senior high school, young female workers in the workplace, and brides-to-be through health facilities (*Pedoman Pencegahan dan Penanggulangan Anemia pada Remaja Putri dan Wanita Usia Subur*, 2018). This is the same tablet delivered during pregnancy (daily), however the amount of folic acid in the weekly IFA tablet for non-pregnant women is insufficient to prevent neural tube defects, as per WHO recommendation to supplement with 2800mcg of folic acid weekly.

Tablets are to be given once a week for 52 weeks. In practice, the program is focused on adolescent girls in schools. Most (87 per cent, DHS 2017) adolescent girls attend secondary school, hence the program to deliver intermittent IFA through schools is a logical distribution mechanism. The Ministry of Health Strategic Plan target, by 2024, is for 90 per cent of adolescent girls to receive IFA tablets weekly and for 58 per cent of all adolescent girls to routinely consume them. Further, in priority areas, the Ministry of Health aims for 80 per cent of adolescent girls to consume IFA tablets weekly (Ministry of Health Republic Indonesia, 2015f).

Haemoglobin tests are not covered by social security (BPJS) for adolescent girls and women of reproductive age. There is no anaemia screening for the bride-to-be in the current package of interventions offered at the health centre. There is also no clear target for anaemia prevalence reduction in the MoH performance indicators, for either adolescent girls or women of reproductive age. The School/Madrasah Health Program (UKS/M), a multisectoral platform among four ministries managed under the Ministry of Education in collaboration with local *puskesmas* delivers a routine health screening to every student every six months, but anaemia is not routinely screened (clinical signs, nor haemoglobin test). The UKS/M also

manages the IFA tablet distribution in schools and is integrated with the Healthy School Model.

Field observations in 2021 showed a lack of coordination between the IFA supplementation program and the School Health Program.

Financial: The procurement of IFA for adolescents is covered by state (APBN) and regional (APBD) budgets (Ministry of Health Republic Indonesia, 2018a). The budget for school distribution varies by region and even by year, however, it should theoretically be sufficient to cover the need for one year. It is ordered through regional pharmacy installations from the MoH Directorate General of Pharmaceutical and Medical Devices.

Some local governments may also have allocated budget to cover IFA supplementation for the bride-to-be program in health facilities, as observed in the 2021 field observations. However, there is limited data available to *puskesmas* to estimate the number of brides-to-be (or menstruating women more generally) who should receive IFA, which therefore limits program outreach, adequate stock ordering and coordination.

Supply: One study reported a disconnect in the supply provided by *puskesmas* to the schools, as well as unclear instructions to the teachers who are responsible for distributing the IFA to adolescent girls (Hurfiati et al., 2018). The division of tasks between the health sector and school staff lacked coordination, as observed in two studies (Hurfiati et al., 2018; Yudina & Fayasari, 2020). The national guideline states that teachers are expected to distribute the tablets, record and ensure compliance in consumption.

Service delivery: The previously referenced 2018 study found that the high distribution of IFA (99 per cent of adolescent girls in school) did not correspond to high consumption of the IFA tablets (only 20 per cent), often due to forgetfulness (Hurfiati et al., 2018). Riskesdas 2018 found that only 23 per cent of adolescent girls aged 10-19 years had received iron tablets,

and <5 per cent took 52 tablets in a year.

Students were not provided with the knowledge and skills to manage the side effects of supplementation (such as nausea, heartburn, constipation and headache), which reduces the compliance level. In one study, compliance was higher when adolescent girls were aware they were anaemic prior to receiving supplementation, compared to those who were not (Permatasari et al., 2018). The involvement of school principals, teachers, district education offices, religion offices and community leaders, as well as overall school support for the program also played an important role in program's success. However, the 2021 field observation in two provinces showed that multi-sectoral coordination between government, health care providers, the private sector, schools, NGOs and the community is insufficient to ensure adequate procurement, distribution, recording and reporting.

The effect of the IFA supplementation program for adolescent girls is difficult to evaluate without any haemoglobin analysis, however, given the data that indicates low consumption, one can assume the impact is suboptimal.

In the two provinces visited as part of the field observations, the nutritionist at the *puskesmas* manages the IFA supplementation for adolescent girls in schools, including the distribution to the schools and program monitoring. A one-month supply (four tablets per girl) is generally provided in each delivery to the schools. Students did not always receive and keep the report book to record when they consumed IFA, though the district health officials confirmed the availability of the report book in their areas.

The blanket approach (and without any anaemia screening) of IFA for adolescent girls means the IFA dose is not adjusted if anaemia is present. The nutritionists reported a desire for a haemoglobin test to reinforce messaging for consumption of IFA, though further analysis is needed to determine if it may provide less incentive to consume IFA if anaemia is not detected. The age range for the adolescent IFA

program is unclear; the policy states girls aged 12-18 years (in junior and senior high schools, regardless of their menarche status), while in practice some areas give IFA to female students when they start menstruating. The distribution to brides-to-be is inconsistent; some districts distribute only if anaemia is detected or suspected, while others reported never distributing IFA to any bride-to-be. Only one midwife reported giving IFA to all brides-to-be. The IFA for brides-to-be seemed to be dependent on local government programming, as is it is not yet nationwide.

Demand and behaviour change: One of the greatest barriers to success is the low acceptability of IFA tablets by adolescent girls (reported side effects, unpleasant taste). Two studies showed that parental support and close supervision improved compliance levels amongst students (Hurfiati et al., 2018; Yudina

& Fayasari, 2020). Consuming the tablets at school with their peers (for example, through a breakfast program), rather than at home, also increased compliance and is also suggested in the national guideline.

Monitoring & evaluation: A Health Report Book provided to students is meant to record the date and quantity of IFA tablets consumed. Coverage of the IFA program is not well monitored and is estimated to be far below MoH targets (see above).

Field observations showed that monitoring of the IFA program relied on asking students about their consumption during a monthly visit. Some *puskesmas* utilized a checklist with students' names and indicated whether they consumed the tablet; while others reported they never monitored IFA distribution or consumption for adolescents. Some suggested the need for a more user-friendly reporting application.

1.2 Dietary counselling

No data was collected in the desk review nor in the field observations related to dietary counselling for adolescent girls and menstruating women.

Policy: There is no national regulation on providing dietary counselling and deworming for this demographic and, while the WHO provides no specific guideline for dietary counselling for adolescents, their general guidelines include

reducing the intake of free sugars to less than 10 per cent of total energy intake, increasing potassium intake from food in children aged 2-15 years to control blood pressure and reducing sodium intake in children aged 2-15 years. Finally, providing additional micronutrients through fortification of staple foods and targeted supplementation in adolescents is recommended.

1.3 Deworming

Evidence: The WHO recommends mass administration of deworming to adolescents given the estimated prevalence of both STH and anaemia for women of reproductive age in Indonesia.

Policy: There is a national target to reduce the prevalence of STH to <10 per cent in every district through the provision of anthelmintic

(deworming), however, there is no specific target for adolescents (Ministry of Health Regulation No 15/2017), nor any program monitoring data.

The desk review and field observations did not collect any data related to deworming for adolescent girls and menstruating women, given it is not widely implemented.

2. Pregnant women

2.1 Dietary counselling (including restricting caffeine intake)

Epidemiology: Indonesia faces a triple burden of malnutrition in pregnancy (undernourished, overweight and anaemic), but national data on

overweight and obesity in pregnancy is limited. Nearly nine out of ten (89 per cent) pregnant women have low energy intake during the first

trimester (considered to be less than 1700 kcal per day) (Wibowo et al, 2017) and at least six out of 10 pregnant women have an imbalanced diet containing less than five food groups (64 per cent) and consume sugary drinks (60 per cent) (Diana et al, 2016). Undernutrition is highly correlated with the socioeconomic status of pregnant women in Indonesia.

Policy: In Indonesia, nutrition counselling is primarily delivered through ANC with a complete nutritional assessment to be completed during the first trimester (per Ministry of Health Regulation No. 21/2021). National guidelines include information on a nutritious diet, adequate fluid intake and iodized salt intake, as well as the need for extra rest during pregnancy. Those guidelines also establish monitoring targets such as weight gain of at least ≥ 1 kg/month in trimester 1 and ≥ 2 kg/month in trimester 2 and 3, and dietary intake of at least ≥ 80 per cent of the recommended nutrition requirement (Ministry of Health Republic Indonesia, 2015b, 2018b). The ANC guideline and Maternal Child Health (MCH) book adopted the most recent Institute of Medicine (IOM) recommendation for healthy gestational weight gain, which is based on the pre-pregnancy BMI. Pregnancy classes (mother support groups) are also provided and a national guideline exists.

Service delivery: The 2020 version of the MCH book includes more comprehensive information on what constitutes a balanced diet and provides more practical information on physical exercise during pregnancy. A total of 33 of the 96 pages are dedicated to the maternal section (18 pages of which are pictorial). The MCH book is underutilized: According to one study in Central Java (Khuzaiyah et al., 2018), at least 25 per cent of pregnant women reported not owning the book, and only half who reported ownership stated that they only occasionally referred to it.

Nutrition counselling provided during ANC is often ineffective. Programme evaluations have shown that the duration of nutrition counselling provided is often below standard (<20mins) and

emphasizes more general topics, such as maintaining a healthy diet, consuming regular meals and avoiding fast food. More emphasis and information is required to address specific nutrition issues, such as recommended or non-recommended foods, nutrient-rich foods, portion sizes and ideal weight gain. Dietary counselling to reduce the prevalence of anaemia is infrequent (Heru et al., 2017).

The *puskesmas* also conduct pregnancy classes, providing group counselling, education and pregnancy exercise sessions for women and their families (Ministry of Health, Indonesia, 2013a, 2020d, 2020a, 2021b). The group format for nutrition counselling covers topics related to a balanced diet, nutritional problems such as undernutrition, micronutrient deficiencies and physical activities; but the counselling does not include topics related to overnutrition. A detailed explanation of each topic is also outlined in a handbook for the facilitators of the group counselling sessions. The content of this handbook is in line with the MCH book, but more detail is provided. The majority of *puskesmas* have held these sessions (70 per cent), but only 18 per cent of pregnant women reported participating in the sessions (Handayani et al., 2019), thus illustrating a large discrepancy between supply and uptake of this potentially important source of nutrition counselling and information. The cited reasons for low attendance include concerns that sessions held on weekdays cannot be attended by working women, that women had other family responsibilities or limited resources, and a general lack of awareness about the sessions (which applied to women in both rural and urban areas) (Rahmawati, Willcox, et al., 2021). There is also a wide regional variety in the quality, structure and monitoring/supervision of the sessions (Kusbandiyah, 2013 and Arifin, 2014). Some studies found positive experiences with the pregnancy classes, linking the sessions to increased confidence of pregnant women and providing a safe place for mothers' to share their experiences (Nafisah et al., 2016).

Existing social safety net programs that target poverty and other socioeconomic determinants

of health, such as the PKH and PNPM Generasi, could also help to alleviate undernutrition during pregnancy, however those programs are cumbersome and bureaucratic and guidelines are unclear on the actual services covered by the program for pregnant women.

During the field observation in 2021, most of the 42 pregnant women observed were counselled on a balanced diet during ANC (87 per cent), but fewer (71 per cent) received counselling on the consequences of inadequate nutrition, and only half (49 per cent) were counselled on undernutrition in pregnancy. Counselling was usually given by midwives, while women with nutritional problems were referred to nutritionists. Midwives and nutritionists reported challenges providing counselling to pregnant women, including inaccurate reporting by pregnant women on their dietary intake, low awareness of nutrition problems, low educational levels or language barriers which cause difficulty understanding the material. They also cited limited time available to provide counselling, a high number of pregnant women to counsel and small counselling rooms.

Capacity and training: The nutrition counsellor position at the *posyandu* level is not formally trained in maternal nutrition and often focuses more on infant and young child feeding (IYCF). Nutritionists in *puskesmas* are often tasked with more general administrative duties that reduce their availability to provide comprehensive maternal nutrition counselling. In-service nutrition training for maternal nutrition is embedded in the IYCF counselling module. A facilitator's guide for the pregnancy classes/mother support groups also exists and aligns with the content of the MCH book.

Demand and behaviour change: Most pregnant women in Indonesia have low awareness of maternal nutrition and only passively received nutrition information rather than proactively seeking it out (Rahmawati, Willcox, et al., 2021). The study further mentioned the factors which likely increase a pregnant woman's willingness to seek out

nutrition information include first pregnancies and a longer duration between pregnancies. Nutrition information is obtained through multiple sources including health workers (which are rated with a high degree of trust), family or friends, social media/internet (rated with a lower degree of trust). Food taboos during pregnancy also exist. For example, eating meat or seafood during pregnancy is often discouraged by relatives.

Field observations in 2021 reported that the MCH book was available in 84 per cent of health facilities visited, while other counselling media (leaflets, brochures and flip charts) was incomplete or unavailable in 40 per cent of those health facilities. Many pregnant women reported only reading it the first time they received the book, while other pregnant women only read the results of their examination written in by hand, not the rest of the information. Further explanation and guidance from the midwife to review the contents of the MCH book is expected but was not observed in practice.

Monitoring & evaluation: There is no direct indicator available to monitor counselling for a balanced and healthy diet and physical activity, so it is difficult to assess the coverage and quality of nutrition counselling on a routine basis. Indirectly, it can be monitored through indicators related to the achievement of target weight gain among undernourished pregnant women following counselling. Indicators exist to monitor attendance to mother support groups and the *puskesmas* offering these groups, however, it is unclear if these are well reported at a district level.

In field observations, researchers noted that nutrition counselling is not reported on the ePPGBM monitoring system, although the Maternal Cohort form collects data on whether the mother received general maternal health counselling.

Caffeine intake: Coffee and tea are the highest non-water beverages consumed by pregnant women (mean of 237mL/day). In one small study, tea was consumed by 92 per cent of

pregnant women (Hartini et al., 2003). Restricting caffeine intake (max two cups per day) has been recommended since 2014 but was only added to the ANC service guideline in 2020. There is no mention of caffeine intake in the MCH book and there is limited national data on the provision or quality of counselling for restricted caffeine intake.

2.2 Food supplementation and balanced energy supplements

Epidemiology: A significant reduction in the prevalence of undernutrition during pregnancy between 2013 and 2020 occurred, with undernutrition falling from 24 per cent to 10 per cent (Ministry of Health Republic Indonesia, 2013b, 2021a). While this is a notable achievement, the disparity across provinces – which ranges from 2 to 37 per cent – highlights program gaps at the sub-regional level (Ministry of Health Republic Indonesia, 2019d). Age is also an important factor in the risk of undernutrition during pregnancy; 34 per cent of pregnant women aged 15-19 years are undernourished, while only 6.5 per cent of pregnant women aged 40-44 years are affected (Ministry of Health Republic Indonesia, 2019d). This points to a need to target programming to younger pregnant mothers in particular. The MUAC cut-off used in Indonesia provides a low sensitivity (38-47 per cent) and higher specificity (67-73 per cent), resulting in the potential misclassification of 50-60 per cent of pregnant women who are at risk of delivering a low birthweight newborn (Tang et al., 2016).

Policy: Pregnant women identified as undernourished based on the MUAC measurement (<23.5 cm) or BMI (<18.5 kg/m²) in trimester one should receive supplementary feeding along with nutrition education and counselling and advised to increase their energy intake by +500 kcal/day on top of their minimum energy requirement (which is calculated according to their body weight) (Ministry of Health Republic Indonesia, 2015b). Supplementary feeding is done in the form of a balanced energy protein biscuit⁸.

In field observations, approximately half of the health facilities observed by researchers suggested restricting caffeine intake to pregnant women (56 per cent), often as an effort to optimize absorption of IFA. Counselling for caffeine intake was observed more in urban facilities (68 per cent) versus rural settings (39 per cent).

The Ministry of Health pocketbook for biscuit supplementation outlines a 90-day recovery program, which includes two biscuits per day during the first trimester and three biscuits per day during the second and third trimester. Biscuits are distributed through the *puskesmas* or *posyandu* during ANC visits.

Evidence: While WHO's recommendation does not stipulate the increased energy intake required, one study has recommended at least an additional 700 kcal/day for malnourished pregnant women is required for recovery (Ceessay et al., 1997).

Service delivery: The Ministry of Health aims to provide a 90-day supply of supplementary feeding to 95 per cent of undernourished pregnant women as per the 2015 target (Pedoman Proses Asuhan Gizi, 2018). Currently, 90 per cent have received biscuits, but not all received the full 90-day supply (Ministry of Health Republic Indonesia, 2019d). The target for 2024 was increased to 100 per cent of malnourished pregnant women in priority areas and reduced to 90 per cent overall (Presidential Decree No 72/2021 on Acceleration of Stunting Reduction).

Uptake is low; one in four undernourished pregnant women received the supplementary feeding biscuits in their first trimester, but over 30 per cent did not consume the full package of biscuits. The main barriers for uptake are the reported unpleasant taste (too sweet), a lack of variety and sharing biscuits with family members. The consumption rate (of any quantity of biscuits) is 65 per cent, but no data

⁸ Biscuits are enriched with vitamins A, D, E, B1, B2, B5, B6, B12, C and folic acid as well as iron, calcium, sodium, zinc, iodine, phosphorus and selenium, which is equal to 90 calories, 2g of protein and 4g of fat per package.

is available on the consumption for the recommended 90 days (Ministry of Health Republic Indonesia, 2019d).

At the health facility, nutritionists are responsible for the supplementary feeding program and, in practice, they work with midwives and community health workers (CHWs) to distribute the biscuits through antenatal care visits, at health posts and through home visits. However, a 2017 supplementary feeding evaluation reported that 16 per cent of pregnant women received biscuits without appropriate nutrition education and counselling (*Pusat Penelitian dan Pengembangan Upaya Kesehatan Masyarakat*, 2017). Printed guidelines on supplementary feeding are only available in provincial health offices and are socialized verbally to subordinate health offices and facilities, thus resulting in a lack of reference for health facility staff. Biscuits are also sometimes (12 per cent) given to non-target populations (*Pusat Penelitian dan Pengembangan Upaya Kesehatan Masyarakat*, 2017). Field observations in 2021 concurred: When surplus stock exists (e.g., approaching the expiration date), distribution to not only undernourished pregnant women but also pregnant women in poverty and/or young pregnant mothers was carried out, though often less than the 90-day supply for target populations.

The 2021 field observation also noted that BMI is not widely used to determine maternal under/overnutrition in Indonesia. Although the availability of weighing scales (98 per cent), microtoise (89 per cent) and MUAC tape (87 per cent) is adequate to support measurement for MUAC or BMI calculation, only weight is measured consistently during ANC. Height and MUAC were not measured in 4 per cent and 29 per cent of pregnant women observed.

Finally, the field observations also interviewed pregnant women about the supplementary biscuits they received. Pregnant women reported that they received biscuits in bulk quantity in the same flavour, which caused a lack of interest in consuming them.

Financial: The funding allocation for supplementary biscuits is large and represents 40 per cent of the total budget for the Ministry of Health Directorate of Community Nutrition (IDR 295,907,180). For stunting locus areas, the specific allocation fund (DAK) is used, while in non-stunting locus areas, the budget is provided by the Ministry of Health using state budget (APBN) (Ministry of Health Republic Indonesia, 2020h).

Supply: The standard nutrition content of supplementary biscuits was reduced in 2016 from the previous 2009 standard (500kcal to 450kcal per 100g; 25g fat to 20g per 100 g; 15g protein to 10g per 100g). The reason for the nutrition content reduction is unclear (Ministry of Health Republic Indonesia, 2016c). A 2016 evaluation found that some supplementary biscuits were below the 2009 standard (*Pusat Penelitian dan Pengembangan Upaya Kesehatan Masyarakat*, 2017). Based on the guideline to provide two biscuits per day in the first trimester and three biscuits per day in the second and third trimesters, the current nutrition content of the biscuits provides less than the additional calories and protein required by undernourished pregnant women.

Most provinces receive on-time distribution of supplementary feeding products. However, some provinces have a 7–12-month delay. Inadequate stock delivery was reported in 13 per cent of districts (*Pusat Penelitian dan Pengembangan Upaya Kesehatan Masyarakat*, 2017). The online supply chain system allows *puskesmas* to input procurement and distribution information for the biscuits to e-PPGBM, a tool used to identify and monitor nutritional data. (Ministry of Health Republic Indonesia, 2020d).

The field observations in 2021 found that districts reported stock-outs (for a 2–3-month period), though most received their supply of supplementary biscuits on time. However, many health facilities reported never having had any supplementary biscuits from the districts (42 per cent) and only 37 per cent had biscuits with a valid date.

Interestingly, due to poor compliance and palatability issues of the biscuits, local stakeholders also provide local-based supplementary feeding products such as mung bean porridge, dry rations, etc., in addition to the national program. The sustainability of funding to support locally produced supplementary feeding alternatives is challenging, as is the selection of locally available foods that meet the nutrition requirements, as well as acceptability. Food safety, handling and hygiene standards are also not well established in these locally produced alternatives, but cost and logistical complexity may be lessened compared to the centrally provided biscuits. The sources of funding for these programs were often the Village Fund and BOK but were also not consistently operational in some areas during the pandemic in 2021.

Monitoring & evaluation: The same system that collects procurement and distribution information for the biscuits (e-PPGBM) also records information on the number of undernourished pregnant women at the individual level, including anthropometric data and distribution of supplementary feeding biscuits. However, the monitoring system does not collect biscuit consumption data.

In practice, there is no clear local planning, monitoring, evaluation and task delegation for the program (Rohmah, 2020 and Prihatin, 2020).

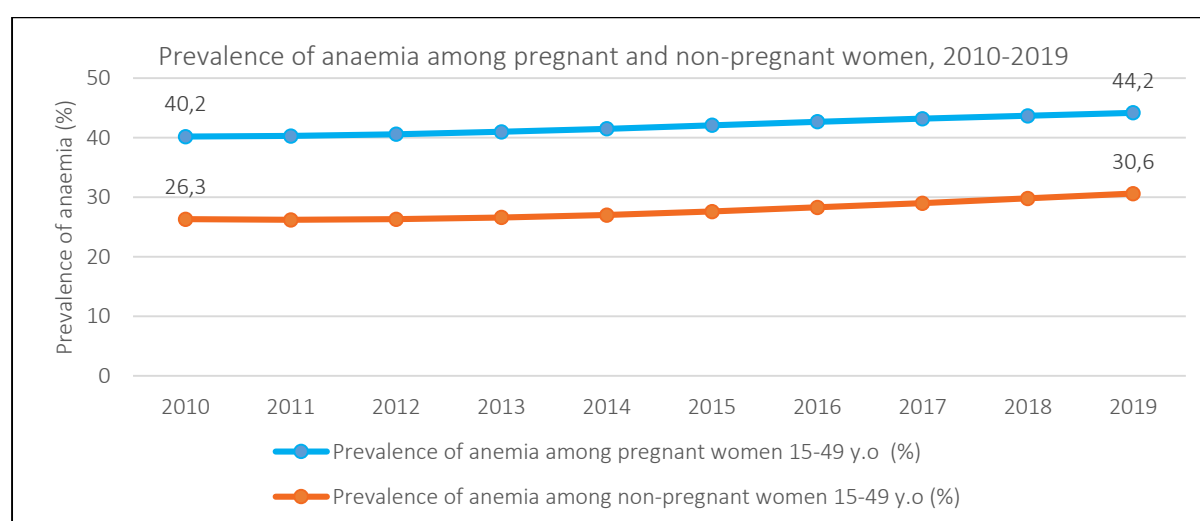
There is no large scale or national evaluation on supplementary biscuit program effectiveness. Smaller studies have found that the biscuits were significantly associated with an increase in weight gain (Andriani et al., 2018; Setyawati & Izzah, 2021; Silawati & Nurpadilah, 2019) and MUAC (Setyawati & Izzah, 2021; Utami et al., 2018) during pregnancy.

2.3 Anaemia prevention and management (including IFA supplementation)

Epidemiology: The prevalence of anaemia among pregnant women in Indonesia is one of the highest among LMICs (44.2 per cent in 2019, World Bank and 49 per cent in 2018

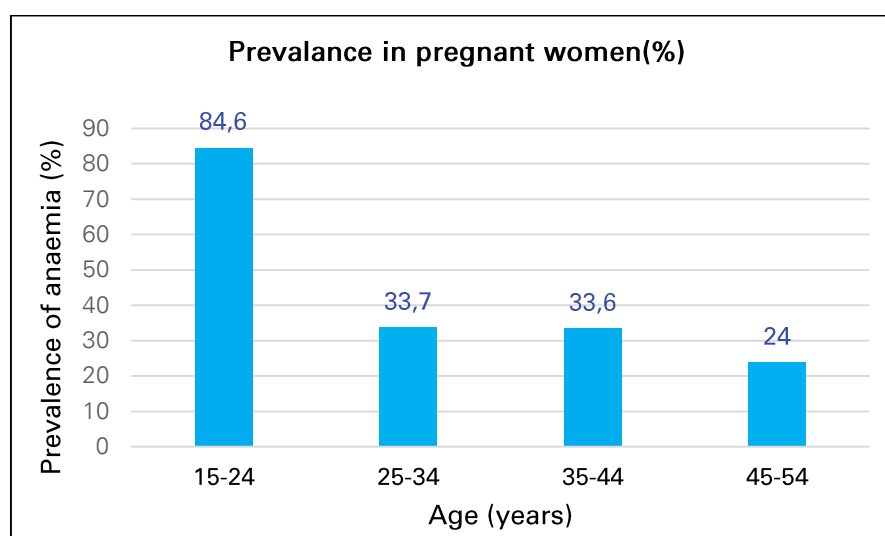
Riskesdas) and is on an upward trend (37.1 per cent in 2013 Riskesdas and 42 per cent in 2016 National Landscape Information System (NLIS) as shown in Figure 3.

Figure 3. Prevalence trend of anaemia in women 15-49 years of age in Indonesia, 2010-2019



It is also considerably higher amongst younger pregnant women aged 15-24 years who are at an 85 per cent risk of being anaemic (Riskesdas 2018) as shown in Figure 4.

Figure 4. Prevalence of anaemia in pregnant women, by age group



The sampling framework used in measuring haemoglobin levels in national surveys does not allow for provincial level analysis to determine whether regional variations exist. Iron deficiency anaemia is estimated to account for 43 per cent of all anaemia cases in pregnancy, while the remaining 57 per cent is due to “other causes”, which may include inflammatory diseases, parasites, sickle cell anaemia and vitamin deficiency anaemia (B12 and folate) (Seu et al, 2019).

Policy: National policy for iron folic acid supplementation (IFAS) is that all pregnant women (regardless of anaemia status) should consume one tablet daily for at least 90 days during pregnancy. If anaemia is detected through haemoglobin examination, IFA tablets should be consumed twice daily until haemoglobin levels reach normal levels (≥ 11 g/dL) (Ministry of Health Republic Indonesia, 2014f). The IFA supplementation program is among the most well established interventions compared to other nutritional interventions in Indonesia. The national target for IFA consumption (90+ tablets) is 80 per cent by 2024 (*Peraturan Presiden* RI No. 72 Tahun 2021), and 100 per cent for pregnant women in priority areas (Ministry of Health Communication Strategy for Acceleration of Stunting Reduction).

No national target for reducing anaemia in pregnancy exists (unlike the CED reduction that has yearly targets listed in the RPJMN). National guidelines state that two haemoglobin tests should be done during pregnancy, one in the first trimester and another in the third trimester. An additional haemoglobin test might be performed in the second trimester when there are clinical signs or symptoms of anaemia detected during ANC visits (e.g., conjunctival pallor). If anaemia is confirmed through a haemoglobin test, periodical haemoglobin tests will continue to be administered - monthly if detected in the first trimester or fortnightly if detected in second trimester – throughout anaemia treatment, until reaching normal haemoglobin levels (>11 g/dL). For persistent anaemia after routine supplementation, referral to a higher-level health care facility is required (Ministry of Health Republic Indonesia, 2014f).

Supply: All commercially available IFA tablets used in the government’s program are regulated by the MoH (as per Ministry of Health Regulation No 88/2014), which is responsible for setting the standard product specification and registering the products. However, some districts have used their own funding and purchased and distributed commercial IFA tablets that do not align with MoH regulations. The standard composition of iron folic acid supplementation products available in Indonesia are ferrous sulphate, ferrous fumarate, or

ferrous gluconate, equivalent to 60 mg of elemental iron⁹ and 400 mcg of folic acid. A sugar-coated ferrous fumarate tablet is used in the national supplementation program. However, side effects of ferrous fumarate have been commonly reported, thus reducing compliance (Pramono, 2019). Another study proposed ferrous gluconate as an alternative regimen for pregnant women who could not tolerate ferrous fumarate (see *Service Delivery and Demand section below*).

During field observations in 2021, IFA tablets were available in 74 per cent of health facilities in the provinces visited, while separate iron (60mg) and folic acid (400mcg) tablets were available in 49 per cent and 35 per cent of health facilities respectively. One *puskesmas* reported having a stock-out for more than six months, while another reported a stock-out for a shorter period, due to its IFA stock being past expiration. One of the most common reasons for stock-outs at the *puskesmas* level was due to stock-outs at provincial or district warehouses.

The availability of equipment used to measure haemoglobin at health facilities was also assessed. Unstandardized equipment is typically available at *puskesmas* for haemoglobin checks. Sahli's hemoglobinometer is the most widely used method for haemoglobin analysis in Indonesia, although it has 10-13 per cent lower accuracy compared to WHO recommended methods (Cyanmethemoglobin and HemoCue). Sahli is available in 28 per cent of *puskesmas*, while other tools are not reported (Rifaskes 2019). While the MoH currently recommends at least one haematology analyser for full blood count, operations when electricity is interrupted was identified as a challenge during field observations (Faatih et al., 2017). Rapid test kits have been procured by some local governments in the two provinces visited, however it is unclear if refills for the test kits are being procured. The availability of functioning tools for

haemoglobin tests (including finger prick tests) is reported in 88 per cent of *puskesmas* and 50 per cent of private midwifery or OB-GYN clinics observed during field observation.



A pregnant mother consumes Iron and Folic Acid tablet at her home in North Jakarta

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Service delivery: The majority of pregnant women in Indonesia received IFA tablets (88 per cent), however, only 38 per cent adhered to the recommended 90 days or more consumption (Risksedas 2018). Significant variation in distribution and consumption rates between provinces also exists.

In field observations in 2021, *puskesmas* staff were not fully aware of the recommended treatment if anaemia was detected in pregnant women, and the management protocol was inconsistently applied. In some cases, they were referred to the hospital, while others were referred to the health facility or counselling was extended to target family members. Pregnant women and health workers are also not fully aware of how anaemia can cause complications during pregnancy and delivery.

While only 64 per cent of the 42 pregnant women observed were tested for anaemia, 91 per cent were recommended to consume IFA for at least 90 days and 85 per cent were given an adequate supply of IFA tablets until the next ANC visit. Education and counselling related to IFA consumption and storage were delivered in most health facilities observed, although gaps remain in some aspects: 73 per cent discussed

⁹ The equivalent of 60 mg of elemental iron is 300 mg of ferrous sulfate heptahydrate, 180 mg of ferrous fumarate, or 500 mg of ferrous gluconate

the benefits of IFA with pregnant women, 78 per cent instructed them to consume IFA after a meal, 56 per cent counselled to avoid tea and coffee consumption, 58 per cent discussed the potential side effects of IFA, and 49 per cent mentioned safe storage of the IFA tablets. Adherence follow-up (i.e., asking the pregnant women if she consumed the IFA tablets given previously) was only discussed with 76 per cent of pregnant women. Some alternative regimens were also observed, for example, IFA not being given in cases of hyperemesis.

The haemoglobin examinations are conducted in *puskesmas* by laboratory technicians except in auxiliary and mobile primary health centres (such as in *Puskesmas Pembantu* and *Puskesmas Keliling*) where nurses and midwives are in charge of administering haemoglobin tests. However, only 86 per cent of *puskesmas* have a dedicated space for a laboratory and only 69 per cent had technicians running the laboratory (Rifaskes, 2019). There is a lack of laboratory technicians to serve the populations in many regions.

Examinations to detect clinical signs of anaemia were performed in 62 per cent of selected health facilities visited during field observations in 2021, while blood work for anaemia testing was carried out for 64 per cent of the 42 pregnant women observed.

Demand and behaviour change: Low compliance is linked to both poor knowledge and weak communication about the risk of anaemia and benefits of IFA supplementation, for both the pregnant mother and the health professional (Fuady & Bangun, 2013). An unpleasant taste, forgetfulness and side effects of nausea and constipation are the most commonly cited reasons for non-compliance by pregnant women (Majid et al., 2018). There are also misbeliefs among pregnant women that caused low adherence to IFA supplementation; for example, that iron tablets would enlarge their babies and cause a difficult labour (Majid et

al., 2018), or that IFA contained porcine ingredients (Purwaningsih et al., 2018). Further, cultural norms such as drinking tea daily, reduces the absorption of iron consumed (Delimont et al., 2017).

Some behaviour change interventions exist to improve compliance. For example, the MCH book advises pregnant women to take IFA before bedtime to reduce side effects. Studies show pregnant women's knowledge of the risks of anaemia, having full family support (particularly from a husband) to take IFA, high attendance of ANC visits, and having a laboratory test for anaemia were factors that improved adherence (Wiradnyani et al., 2016).

Monitoring & evaluation: *Posyandu* uses *Sistem Informasi Terpadu* (SIT, an integrated information system) to record IFA distribution to pregnant women. The *puskesmas* record IFA distribution in the MCH book, as well as on the Maternal Cohort form and the Register for Antenatal Care. Records are submitted to the MoH via health offices at district and provincial levels, which can cause either double entry of the data and/or lead to incomplete reporting. There is limited/no data on the effect of the IFA program on haemoglobin levels at national or regional levels, or the prevalence of anaemia in each trimester which could potentially demonstrate the impact on anaemia before and after supplementation. Evaluation data on anaemia reduction programs overall (IFA and other interventions) is limited.

For data on anaemia testing, only survey data (e.g., *Riskesdas*) is available at the population level, as it is not recorded in any routine maternal health forms.

Field observations of recording and reporting of IFA distribution noted variations (such as double entries and incomplete data) in each region, possibly due to insufficient human resources available for data collection and monitoring.

2.4 Multiple micronutrient supplementation (MMS)

Evidence: While the WHO recommendation on multiple micronutrient supplementation is in the context of rigorous implementation research, multiple studies have been conducted in Indonesia, including a large-scale SUMMIT trial in 2008. Most studies have used the MMS UNIMMAP formulation, which contains 30mg iron (ferrous fumarate) and 400 mcg folic acid along with 800 mcg retinol (retinyl acetate), 200 IU vitamin D (ergocalciferol), 10 mg vitamin E (alpha-tocopherol acetate), 70 mg ascorbic acid, 1.4 mg vitamin B1 (thiamine mononitrate), 18 mg niacin (niacinamide), 1.9 mg vitamin B6 (pyridoxine), 2.6 mcg vitamin B12 (cyanocobalamin), 15 mg zinc (zinc gluconate), 2 mg copper, 65 mcg selenium, and 150 mcg iodine.

Most notably, the amount of elemental iron in the UNIMMAP formation (30mg) is lower than the current IFA tablet approved for distribution in Indonesia (60mg). Despite this difference, the SUMMIT trial found an 18 per cent reduction in early infant mortality when mothers consumed MMS versus IFA, particularly if the mother was undernourished or anaemic. Foetal loss and neonatal deaths combined were also reduced by 11 per cent (SUMMIT Study Group et al., 2008). Follow-up studies have shown that MMS has been consistently associated with cognitive and motor improvement of children 3.5 years later, and the higher cognitive development was sustained at 9-12 years of age¹⁰ (Prado et al., 2012 and 2017). A smaller study in West Java in 2009 compared the MMS UNIMMAP formula

with IFA containing 60mg iron and 250mcg folic acid and found no statistically significant difference in prevalence of low birthweight, but the MMS cohort had a significantly reduced risk of any poor pregnancy outcomes (miscarriage, stillbirth, or neonatal death) (Sunawang et al., 2009).

Policy: There is currently no national regulation on MMS in Indonesia. Although trials have been conducted in Indonesia over the past 15 years, they have not been scaled up for various reasons, including current demand-side challenges with the IFA program which may persist in a transition to MMS and the risk of additional barriers around the introduction of a new product.

Financial: Cost is also a factor, as MMS is more expensive than IFA. Rigorous research around cost-effectiveness of transitioning from IFA to MMS is limited, but modelling suggests a benefit to cost ratio of 483:1 over ten years (Nutrition International Policy Brief, 2021). Those costs include not only the cost of supplements, but also delivery through the public health system and program costs such as administration and training. The modelling also estimates 925,250 DALYs averted in that time period.

Service delivery: Given that MMS is not currently implemented in Indonesia, the researchers did not observe the distribution of MMS during field observations in 2021.

2.5 Deworming

Epidemiology: There is no recent national or large-scale data on intestinal helminth (STH) infection in Indonesia. One study in 1996-98 found 70 per cent of pregnant women in one district had an STH infection (Nurdiati et al., 2001). The most common infections were from *Trichiuris trichiura*, hookworm and *Ascaris lumbricoides*. Another small study (N=30

anaemic pregnant women) in 2014 reported 47 per cent tested positive for an STH infection (Pradana et al., 2014). While the current national prevalence cannot be quantified with any accuracy, these studies suggest that STHs are quite prevalent amongst pregnant women in Indonesia.

¹⁰ Note: The IFA arm of the study had half the required iron dose (30mg) to match the iron level in UNIMMAP, but which is suboptimal for the Indonesian setting given the high prevalence of maternal anaemia.

Policy: Maternal deworming is not included in any of the national nutrition strategies and action plans (e.g., NNS), however pregnant women are part of the national target to reduce the prevalence of STH to <10 per cent in every district through the provision of anthelmintic (deworming) for children under 5 years of age, preschool and school-aged children and pregnant women, which is integrated with other national programs (e.g. vitamin A supplementation, school feeding, etc). Ministry of Health Regulation stipulates that all pregnant women who are still anaemic following IFA supplementation should be tested for an STH and treated accordingly¹¹, regardless of prevalence of infection in the area. In areas with a high prevalence (>50 per cent) of STH, all pregnant women should be screened for infection. However, the regulation is difficult to comprehend and there is no clear management flow chart to provide a practical guideline for health workers. Further, the regulation does not align with the WHO guideline to provide prophylaxis for helminth infections to all pregnant women after the first trimester, given the high burden of anaemia in pregnancy.

Service delivery: Implementation of mass drug administration (MDA) for all demographic

2.6 Calcium supplementation

Epidemiology: Overall calcium intake from dietary food among pregnant women in Indonesia is low; only 68 per cent met the estimated average requirement (EAR) in one study (Purnasari et al., 2016a), and the mean calcium intake was 56 per cent of EAR in another study (Hartini et al., 2003). Calcium intake also seems to decrease with the age of the pregnant woman; in Purnasari et al., 2016a, the mean EAR of calcium during pregnancy was 1,168 mg/day for 16–18-year-olds, 1,083 mg/day for 19–29-year-olds, and 1,000 mg/day for 30–49-year-olds. All age groups had mean EARs of calcium lower than the WHO and FAO recommendation of 1200mg/day. Calcium

groups is inconsistent and varies between endemic areas, stunting areas and other areas. Data on distribution/use is not regularly recorded and it is thus difficult to determine the extent of program implementation and adherence to the regulation for pregnant women.

Field observation in 2021 observed that the stock of anthelmintic drugs was inconsistent in health facilities in the two provinces: 49 per cent had neither Albendazole nor Mebendazole; 35 per cent had Albendazole only and 16 per cent had both Mebendazole and Albendazole. Most pregnant women reported they had never been told to take anthelmintic drugs by a health provider and only 7 per cent of health facilities observed prescribed deworming. A general lack of awareness among health providers that pregnant women who remain anaemic after IFA supplementation should receive medication (as per Ministry of Health Regulation No 15/2017) is likely one of the biggest barriers to ensuring pregnant women receive deworming medication. Some midwives interviewed reported that they had never prescribed a deworming medication to a pregnant woman, further highlighting the need for education on this subject.

deficiency in pregnancy may lead to vasoconstriction and retention of sodium and fluid, which are the physiological changes that can lead to the development of pre-eclampsia (Say et al., 2014).

Evidence: The WHO recommends consuming calcium (3x500mg tablets daily) at a separate time from IFA (consumed once daily), due to the bioavailability and interaction between calcium and iron. This has numerous issues in a large scale program, including difficulty remembering the regimen (four pills to be consumed separately per day), side effects from each intervention, palatability and

¹¹ Ministry of Health Regulation No 15/2017 on deworming: single dose albendazole (400mg), single dose mebendazole (500mg) or pyrantel pamoate (10-11mg/kg weight, to max 1 gram), given in second or third trimester. However, no national guideline is available.

acceptability of the large size and powdery texture of calcium supplements (World Health Organization, 2016 and Purnasari et al., 2016b). A small study in Kenya demonstrated higher adherence overall when consuming calcium and IFA at the same time (for practical reasons) and suggested the possible long-term adaptation of the body's iron regulatory mechanism by doing so (Omotayo et al., 2018). However, the adaptation of those findings to the Indonesian context is unclear. There is a significant reduction in the risk of pre-eclampsia only shown from the higher dose of calcium supplementation (>1gram/day) in the Cochrane review (Hofmeyr et al., 2019). Thus, the WHO recommendation is that calcium should be given to all pregnant women regardless of risk and dietary calcium intake, starting at first ANC consultation until the end of pregnancy (World Health Organization, 2016).

Policy: Indonesia's national regulation on calcium lacks clarity and does not align with WHO recommendations. Calcium supplementation is only mentioned in two guidelines¹², recommending that calcium tablets be given to pregnant women living in areas with low calcium intake, especially if at high risk for developing pre-eclampsia (i.e., history of pre-eclampsia, chronic hypertension, kidney failure, autoimmune disease, and multiple pregnancies). However, the national regulation provides no guidance on how to identify women in areas with low calcium intake or whether calcium should be given for low-risk pregnant women. The regulation's dose is in line with the 2016 WHO guideline of 1.5-2g total/day taken in three doses daily. However, supplementation typically starts at 20 weeks gestation and not in early pregnancy or at the first ANC visit (Ministry of Health Republic Indonesia, 2013a).

Supply: There is limited published data on the procurement and distribution of calcium supplements in Indonesia. Field observations in 2021 showed that calcium supplements are ordered by *puskesmas* via the district health

office (or directly with BLUD management), which orders it through the e-catalogue. Stock-outs were observed (lasting several months) in many facilities and prescriptions were given to purchase calcium supplements through private sector pharmacies. The out-of-pocket expense was reported as one of the barriers by pregnant women for procuring and consuming calcium. Field observation noted that most health facilities had blood pressure monitors (98 per cent) and stethoscopes (98 per cent) to measure blood pressure. All health facilities did in fact measure blood pressure during ANC visits, but most did not test for proteinuria (67 per cent).

Service delivery: There is limited published data on the service delivery and compliance of calcium supplementation in Indonesia. Small studies have reported an inconsistent provision of tablets to pregnant women (ranging from 6 to 30 tablets) (Purnasari et al., 2016b) and the 2021 field observations noted a low awareness of the benefits of calcium supplementation and lack of family support as most common reasons for non-compliance.

In 2021 field observations, midwives were aware of the calcium supplementation guideline and reported giving a "higher dose" (in fact, only two tablets of 500mg daily for 30 days) for pregnant women with certain conditions they identified, such as risk of pre-eclampsia, lower back pain, bone pain and dental caries. A "lower dose" (one tablet of 500mg daily for 30 days) was given for all other pregnant women, starting in the second trimester. Both doses are insufficient to reduce the risk of pre-eclampsia and do not align with national and WHO guidelines. Where a stock of calcium tablets was available, most *puskesmas* prescribed calcium for all pregnant women, starting in the first or second trimester. However, only a 500mg tablet taken once daily was prescribed.

A lack of awareness about the benefits of calcium supplementation and clinical

¹² *Buku Saku Pelayanan Kesehatan Ibu di Fasilitas Kesehatan Dasar dan Rujukan (Pedoman bagi Tenaga Kesehatan)* (Ministry of Health Republic Indonesia, 2013a) and *Pedoman Pelayanan Antenatal Terpadu* (Ministry of Health Republic Indonesia, 2020d)

implications of pre-eclampsia in pregnancy was observed by both pregnant women and health workers in the two provinces where field observations were carried out. Pregnant women reported a rate of low consumption of calcium supplements due to having “no symptoms of calcium deficiency”. No information about the importance of calcium supplementation nor

2.7 Other supplementation

Vitamin A: In 2003, the prevalence of vitamin A deficiency (serum retinol $<0.7 \mu\text{mol/l}$) among pregnant women in Indonesia was 17 per cent and the prevalence of night blindness among pregnant women was 1.7 per cent (World Health Organization, 2009).

There is no national regulation available for vitamin A supplementation during pregnancy and the prevalence in 2003 was below the WHO threshold to initiate supplementation in pregnancy (defined as night blindness exceeding 5 per cent or vitamin A deficiency >20 per cent). There is no current prevalence data collected to determine if Indonesia’s context is still below the threshold. Indonesia currently mandates the fortification of cooking oils with vitamin A as a way to improve the micronutrient status of the general population through the consumption of staple foods.

No vitamin A supplementation in pregnancy was observed during the field observations of this landscape analysis.

space to self-record daily consumption is included in the MCH book.

Monitoring & evaluation: The Maternal Cohort form does not record calcium distribution nor consumption and thus data on program coverage is not reported.

Zinc: There is limited evidence of zinc deficiency in pregnant women in Indonesia. One small study in Jakarta (Wibowo et al., 2017) found 81 per cent of pregnant women in the first trimester were zinc deficient ($<660 \mu\text{g/L}$) and 95 per cent had a low daily intake of zinc (below the recommended daily intake of 11mg/day in pregnancy). Another small study reported a 35 per cent prevalence of zinc deficiency of the same demographic group, and 95 per cent had low zinc intake (Bardosono, 2016). No larger scale studies were identified.

The WHO recommends that there is greater feasibility of improving zinc status through food fortification with zinc, rather than zinc supplementation, which has an uncertain benefit. Indonesia currently mandates the fortification of wheat flour with zinc (among other nutrients).

No zinc supplementation during pregnancy was observed during the field observations of this landscape analysis.



Facilitators deliver nutrition messages using an interactive platform on a mother support group session in Banda Aceh City

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3. Postpartum women

3.1 IFA supplementation



A health worker provides nutrition counselling to a mother at a health center in Kupang, East Nusa Tenggara province

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3.2 Deworming and dietary counselling

Evidence: Similarly, the WHO recommends postpartum and lactating women receive regular anthelmintic medication (albendazole or mebendazole) as part of regular deworming campaigns in areas endemic for soil transmitted helminths and where anaemia is a severe public health problem.

3.3 Other supplementation (vitamin A)

Policy: Despite no national data being available on the prevalence of vitamin A deficiency in postpartum women, Indonesia's regulations provide two 200,000iu retinol capsules to postpartum women in health care facilities after birth (Ministry of Health Republic Indonesia, 2016b). One capsule is given immediately after birth and the other is given at least 24 hours and up to 42 days post-delivery. The postpartum VAS program has been operating for nearly 30 years and is distributed by CHWs and health care workers.

Evidence: This program no longer aligns with the WHO recommendation (2011 and 2016) which states that vitamin A supplementation does not improve maternal and perinatal outcomes.

Service delivery: Riskesdas 2010 reported a rate of 52 per cent coverage of any VAS in the

Evidence: The WHO recommends IFA supplementation in postpartum women as a continuation of IFA supplementation during pregnancy, to be given immediately after delivery for six to 12 weeks. The dose should be adjusted when anaemia is present, as applied during anaemia in pregnancy. Postpartum IFA supplementation is recommended in a setting with a moderate prevalence of anaemia in pregnancy (≥ 20 per cent) (World Health Organization, 2016a).

Policy: The recommendation on postpartum IFA supplementation has not been regulated and implemented nationally in Indonesia.

Policy: Indonesia does not currently target postpartum women as part of their deworming campaigns and, therefore, no data was collected on this program during field observations.

Finally, there is no data on dietary counselling in the postpartum period.

postpartum period, ranging between 33 per cent and 66 per cent by province, and lower in rural areas. Riskesdas 2018 showed a slight increase in coverage – 57 per cent – but only 23 per cent received two capsules. The timing of receiving the first vitamin A capsule varied between “immediately after birth” (51 per cent) and “more than 24 hours postpartum” (49 per cent) among those who did receive the supplement.

Health care workers interviewed during field observation in 2021 were generally aware of VAS for postpartum women and to give it on the first and second day postpartum.

Supply: In 2021 field observations, 200,000iu capsules were available in 63 per cent of health facilities observed, but it was unclear if the stock is used for both children and postpartum

women. The supply of VAS is provided by the MoH and calculated at district and provincial levels with a 10 per cent overhead of actual need. Local governments can also purchase vitamin A via the e-catalogue and e-purchasing using their local government budget or with funding from private companies and NGO donations.

Monitoring & evaluation: Postpartum VAS is often underreported as it is not mandatory, especially compared to the distribution of VAS to children which has a well-established reporting system. There is no national program or research study to evaluate the short and long-term effects of postpartum VAS on maternal and infant morbidity and mortality in Indonesia, which may inform the continuation of the postpartum VAS program



A group of pregnant women practice an appropriate meal portion in accordance with their pregnancy trimester

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RECOMMENDATIONS

The following recommendations are based on the findings from the Maternal Nutrition Landscape Analysis and the recommendations were presented and analysed with stakeholders through a series of consultation meetings and workshops. Table 5 in the annexes summarizes the key recommendations that emerged from stakeholder workshops for current and new interventions by beneficiary group. They are categorized as either short, medium, or long-term priorities based on the feasibility of implementation and the potential for impact.

Overall Recommendations for All Maternal Nutrition Interventions

Stakeholders identified a number of recommendations that will apply to all maternal nutrition interventions – across the life cycle – which will improve program reach and overall impact.

Develop and provide a minimum package of interventions for each beneficiary group, aligned with WHO recommendations.

Current national regulations are misaligned with WHO recommendations, resulting in gaps in programming interventions. Further, each intervention is implemented in relative isolation. Defining the minimum package of interventions for each beneficiary group will help ensure clarity for front line workers, and promote comprehensive training, monitoring and behaviour change strategies.

Transform the service delivery of maternal nutrition through strategies to improve demand (i.e., compliance) and service quality, for example, by developing household nutrition approaches alongside multi-sectoral collaboration that supports the transformation of primary care.

Extending the reach of maternal nutrition interventions through the delivery of services at household level will put a renewed focus on demand-side strategies.

Utilize innovations such as community nutrition cadres and private sector resources, and engage with learning from local trials and community-driven initiatives.

Stakeholder consultations identified numerous pilots, community-based projects and trials with

lessons that can apply to many of the maternal nutrition interventions. Building on these initiatives is recommended.

Promote fortified products to increase consumption and awareness for vitamin A fortified cooking oil, iodized salt and iron and zinc fortified wheat flour as part of dietary counselling for all beneficiaries.

Mandatory fortification of staple foods (which became effective in 2021) is an important tool in addressing maternal undernutrition and provides health benefits for the general public. Though food fortification is outside the scope of this maternal nutrition landscape analysis, stakeholders recommend that dietary counselling include the promotion of consuming fortified foods and that the government continues to educate the public about their benefits.

Integrate a gender lens in all maternal nutrition programming, particularly in Social and Behaviour Change Communications (SBCC), capacity building, policy design and data collection.

Finally, but perhaps most importantly, stakeholders recommend that policy changes utilize a gender equality lens to ensure women are empowered to seek out essential health and nutrition services so that program implementation does not unwittingly contribute to further gender inequality. Specifically, data

should always be disaggregated by sex and SBCC and capacity building strategies should consider factors of gender inequality that

exacerbate maternal malnutrition and identify how men can also play a role in improving maternal nutrition.

Recommendations for Adolescent Girls and Women of Reproductive Age (WORA)'s Nutrition

Intermittent IFA (WIFA): The current intervention that delivers weekly IFA to adolescent girls in schools requires strengthened coordination between multi-sectoral stakeholders (especially between the health and education sector) and capacity building for the School/Madrasah Health Program (UKS/M) in the areas of planning, budgeting and monitoring.

The blanket approach of delivering weekly IFA to all adolescent girls aged 12-19 years aligns with the WHO recommendation, however, there is no guideline on anaemia management in that age group. This requires developing a guideline on anaemia management, to detect the early clinical signs of anaemia (dizziness or weakness, headache, pale skin and conjunctiva, fast heartbeat, etc) through the School Health Program's routine health checks in Grade 7 and Grade 10 and to refer adolescent girls for anaemia treatment through the public health system.

Stock-outs of IFA for adolescent girls are regular and thus require an improved supply chain and a clear procurement process between the health system (*puskesmas*) and schools. Further, there is inconsistent monitoring of IFA distribution and consumption and stakeholders recommend optimizing and promoting the existing user-friendly reporting system (CERIA) for this program.

The delegation of tasks for the weekly IFA distribution is unclear and requires a Standard Operating Procedure (SOP) be developed for program implementers. There is also an opportunity to utilize the adolescent health cadres for social and behaviour change interventions for the weekly IFA supplementation and broader nutrition programming; stakeholders recommend increasing the quantity and capacity of these champions.

Beneficiary groups: Out-of-school girls, female workers, brides-to-be and women of reproductive age are generally de-prioritized in nutrition programming. Stakeholders recommend developing a national guideline on nutrition programming (including weekly IFA supplementation and deworming) for these beneficiary groups, including identifying a distribution platform to extend weekly IFA supplementation to out-of-school girls.

Deworming: Finally, there is a programming gap in this age group related to the provision of deworming medicines. The deworming campaigns should be implemented for adolescents and women of reproductive age, particularly in areas with a high prevalence of soil transmitted helminths (STH). The program can be integrated with the existing UKS/M, which would require sufficient and clear budget allocation, coupled with advocacy measures undertaken with multi-sectoral stakeholders.

Recommendation for Overall Nutrition for Adolescent girls and menstruating women

Short Term Priorities

Nutrition interventions for adolescent girls are delivered as distinct programs from those for women of reproductive age and therefore require coordination across sectors. Stakeholders recommend:

- Develop a minimum package of nutrition interventions to be delivered to all adolescent girls in schools that includes dietary counselling, anaemia screening, weekly IFA and deworming.
- Strengthen the multi-sectoral coordination of stakeholders and build capacity for the School Health Program to plan, budget and monitor the delivery of the minimum package of interventions.

Medium Term Priorities

Given that nutrition interventions for all women of reproductive age (menstruating women aged 15-49 years) are not well defined, Stakeholders recommend:

- Develop a national guideline for nutrition for all women of reproductive age, including female workers, brides-to-be and out-of-school adolescent girls, which includes a minimum package of nutrition interventions aligned with WHO recommendations.

Recommendations for Pregnant Women's Nutrition

IFA and anaemia prevention: The existing IFA supplementation program for pregnant women is one of the most established maternal nutrition interventions in Indonesia. That being said, there are numerous areas of the program that require attention.

At a policy level, the technical guidelines on anaemia management require review and clarification; and stakeholders recommend developing an anaemia management flow chart for user reference. Further, there is a need to develop new strategies to increase demand-side (compliance) for nutrition interventions for pregnant women, including approaches at the household level to increase consumption and multi-sectoral collaboration to support the transformation of primary care for the early detection, referral and treatment of anaemia.

Given the persistently high rates of anaemia in pregnant women in conjunction with the long-standing IFA supplementation program,

stakeholders also recommend conducting a study on the effectiveness of IFA supplementation and exploring the root causes of the high prevalence of anaemia in Indonesia.

The provision of IFA (or MMS, if transition occurs) requires an improved supply chain with periodic evaluation and continuous monitoring of IFA tablet stock at all distribution points, particularly at the *puskesmas* level. This requires further capacity building of *puskesmas* staff. Stakeholders recommend exploring the feasibility of collaborating with the private sector to ensure an adequate supply and system delivery of IFA tablets, including the potential to raise funds for product procurement. Any private sector partnership requires an assessment of conflict of interest, cost-effectiveness and equity issues.

Dietary supplements and malnutrition management:

Targets and appropriate indicators for reducing malnutrition in pregnancy (including CED, anaemia and obesity) need to be developed. Monitoring of nutrition interventions in pregnancy should be strengthened, first by identifying barriers (human resources, software, guideline clarity) and then by defining the recording and reporting process for all interventions. Regular program evaluations should also be conducted, as should national surveys to obtain data on micronutrient status in pregnancy.

The existing balanced energy food supplement program (biscuits) is costly and has proven ineffective in addressing CED in pregnant women. The Ministry of Health has expressed a desire to transition to local food distribution, which stakeholders support in a phased approach. This will require coordination between government departments and targeting regions with the highest prevalence of malnutrition to model the new program in several districts (pilot) prior to national scale-up. Stakeholders recommend broadening the beneficiary group to consider all malnourished women of reproductive age, integrating the distribution with other social safety net programs and providing health worker training for counselling and monitoring.

Multiple micronutrient supplements: The Ministry of Health and stakeholders also need to consider the benefits of transitioning to multiple micronutrient supplements (MMS) based on the most recent scientific evidence and, after extensive research, the WHO recommendation to implement MMS. MMS operational research findings and cost modelling from Indonesia (and elsewhere) should be socialized by partners, and a decision made with regards to transitioning from IFA to MMS.

Calcium: Calcium supplementation is provided in order to reduce the risks of pre-

eclampsia in pregnancy; however, the intervention is not delivered consistently, nor is it aligned with WHO recommendations. First, the national regulation should be updated to align with those recommendations (i.e., a dose of 1.5-2.0 mg daily provided to all pregnant women) and socialized with health workers through training and communications focussing on the importance of calcium in reducing maternal morbidity and mortality. Second, stakeholders recommend that an adequate stock of calcium supplements is established at health centres. Finally, a monitoring, recording and reporting system for calcium needs to be established, as there is currently very little data on the program.

Deworming: There is a programming gap for this beneficiary group related to the provision of deworming medicines. The deworming campaigns should be implemented for all pregnant women, particularly in areas with a high prevalence of soil transmitted helminths (STH). This requires policy development, adequate budget allocation and advocacy with multi-sectoral stakeholders to roll-out this new intervention for pregnant women.

Counselling and behaviour change: The MCH book is an important reference for both pregnant women and health care providers. However, the distribution, availability and utilization of the book requires improvement. Closer monitoring of supply levels at the *puskesmas* and health centre levels, continued training for health workers and the promotion of the book to pregnant women and their families is recommended.

Stakeholders recommend the design and implementation of a SBCC strategy for improved knowledge of risks and action about nutrition in pregnancy, including anaemia, IFA supplementation, appropriate weight gain during pregnancy/nutrition for overweight pregnant women, stunting prevention, myths in pregnancy and the role of the husband/family. This should include developing interesting and creative IEC

materials in various platforms and extending or strengthening the classes for pregnant women offered at the *posyandu*, ensuring family involvement.

Capacity development: The capacity of health workers to deliver nutrition interventions during pregnancy requires strengthening by increasing the quantity of

health workers and improving the quality of counselling, planning and budgeting, stock management, program monitoring and nutrition screening. This should be done through in-person training (pre-service and in-service), user-friendly videos and facilitative supervision. Stakeholders recommend a strong focus on services provided for anaemic, malnourished and obese women.

Recommendation for Overall Nutrition for Pregnant Women

Short Term Priorities

Given that all nutrition interventions for pregnant women are delivered as distinct programs and that targets for the reduction of malnutrition and intervention coverage are not well known, stakeholders recommend:

- Develop a minimum package of nutrition interventions to be delivered to all pregnant women that includes dietary counseling, anaemia screening, IFA, calcium and deworming. In addition, nutrition interventions specific to the needs of certain populations (pregnant women with CED, anaemia, obesity) is required and guidelines and job references need to be developed.
- Develop targets and appropriate indicators for the reduction of malnutrition in pregnancy, including CED, anaemia and obesity.

Given the capacity is insufficient to provide counselling, for planning and budgeting, managing stock and monitoring program delivery stakeholders recommend:

- Increase the quantity and capacity of health workers through pre-service and in-service training, especially around counselling, planning and budgeting, stock management, program monitoring and screening of malnourished pregnant women (anaemia, CED, obesity), for example, through in-person training, training videos and facilitative supervision.
- Strengthen the distribution and uptake of MCH books.

Given the demand for nutrition interventions during pregnancy is low overall, stakeholders recommend:

- Develop a social behaviour change and communications (SBCC) strategy to improve the knowledge of risks and actions to be taken for the prevention and management of anaemia, stunting, maternal morbidity and mortality. The strategy should address a package of nutrition interventions including IFA, calcium, deworming, as well as myths in pregnancy, gender equity, the role of the husband and other family members.
- Develop interesting and creative IEC materials to roll out the SBCC strategy, using various platforms, and extend/strengthen pregnancy classes and ensure family involvement.

Medium Term Priorities

Given that nutrition program data is inadequate to allow for timely program decision-making and to assess program impact, stakeholders recommend:

- Strengthen program monitoring for all nutrition interventions during pregnancy, first by identifying barriers (e.g., human resources, software, guidelines) and then developing a data collection process. Once implemented, conduct routine program evaluations.

Long Term Priorities

Given the role of the private sector in maternal nutrition in Indonesia, stakeholders recommend:

- Collaborate and raise funds from the private sector, including for the procurement of products (e.g., supplements, food inputs, lab equipment, etc.)

Given the need for current data on nutrition status during pregnancy, stakeholders recommend:

- Conduct national survey to obtain data on micronutrient status (iron, calcium, vitamin A, zinc) in pregnancy. Further assessment is required before stakeholders can recommend other/new micronutrient supplementation programming.

Recommendations for Postpartum Women's Nutrition

Vitamin A: Nutrition interventions for postpartum women are often overlooked within the umbrella of maternal nutrition. While some interventions are delivered to this beneficiary group, they do not align with WHO recommendations. For example, two doses of vitamin A is currently provided to postpartum women, however WHO does not recommend this intervention as there is no evidence of effectiveness on maternal or newborn morbidity or mortality. Stakeholders therefore recommend critically reviewing the technical guideline on vitamin A supplementation for postpartum women, based on global evidence, and assessing the effectiveness (cost and health impact) of this intervention. On the other hand, critical interventions for postpartum women are currently not regulated and/or well promoted in Indonesia.

These include IFA supplementation, deworming and quality dietary counselling.

IFA supplementation: Stakeholders recommend developing a policy for IFA supplementation for all postpartum women, ensuring adequate IFA stock that is calculated separately from the stock for pregnant women and strengthening monitoring, recording and reporting for this intervention. Counselling on the benefits of IFA supplementation in postpartum along with the risks of anaemia and involving husbands and family members in that counselling are also recommended.

Deworming: Similarly, a policy on providing deworming medicines to post-partum women is recommended. Implementing this policy will require adequate budget allocation and advocacy with multi-sectoral stakeholders. It is recommended that the intervention target

high-burden areas (high prevalence of STH) as a first priority.

Human and financial resources for postpartum nutrition: Overall recommendations about nutrition programming for postpartum women also address health worker capacity, social and behaviour change, supply management and financial allocations. Stakeholders recommend prioritizing the budget for health operational funding (BOK) for three to four postpartum visits, to allow adequate time for counselling and monitoring. Capacity building for health workers to improve the quality and quantity of nutrition counselling for postpartum women is also

recommended, as is delivering postpartum counselling through home visits to allow for family involvement. There is existing knowledge among health workers on nutrition counselling, especially those who provide IYCF counselling. Stakeholders recommend conducting a knowledge transfer of those skills for counselling in the postpartum period. Utilizing social media for innovative outreach is also worth exploring. Finally, adequate stock of all supplements and products (IFA, deworming medicine and vitamin A supplements, if continued) should be ensured at all delivery points/facilities.

Recommendation for Overall Nutrition for Postpartum Women

Short Term Priorities

Given the misalignment of national policy and WHO recommendations for nutrition during the postpartum period, and a lack of prioritization for nutrition interventions during this crucial period, stakeholders recommend:

- Develop a minimum package of nutrition interventions to be delivered to all postpartum women that includes IFA supplementation, deworming and dietary counselling.
- Implement capacity building for health workers to improve the quality and quantity of nutrition counselling for postpartum women, including home visits with family involvement.
- Prioritize a budget allocation for health operational funding (BOK) for 3-4 postpartum visits.

Medium Term Priorities

Given the existing capacity for nutrition counselling and supply management within the health system, stakeholders recommend:

- Conduct knowledge transfer among health workers, especially those with high knowledge and skills for infant and young child feeding (IYCF) counselling.
- Ensure adequate stock of supplies needed for the minimum package of nutrition interventions (IFA, anthelmintic medicines) at all delivery points/facilities.

Recommendations on the Areas for Further Assessment and Research

Further investigations are needed to explore potential new interventions, innovations and evaluate existing strategies that no longer align with WHO recommendations. Stakeholders recommend the following:

1. Data collection of micronutrient status during pregnancy, postpartum and all women of reproductive age to inform evidence-based strategy and decision-making for maternal nutrition.
2. The low acceptance and adherence to IFA supplementation requires the evaluation of new strategies. This may include considering other forms of elemental iron supplementation shown to have fewer side effects (e.g., iron sulphate with mucoprotease).
3. The transition from biscuit supplementation to local foods should be closely monitored and thoroughly evaluated, especially with regards to community acceptance and adequacy of additional micronutrients provided by local food, before deciding whether to scale-up. This requires strong coordination between the donor funding agencies, MoH, local government and academics.
4. Assess the (cost-)effectiveness of the vitamin A supplementation during the postpartum program which does not align with WHO recommendations.
5. There is limited epidemiological data showing the levels of calcium deficiency in pregnant women in Indonesia; such research could help support the continuation of the calcium supplementation program.
6. The prevalence of helminth infection among pregnant women, women of reproductive age and adolescent girls is unknown, but assumed to be a public health concern. An assessment of the prevalence of STH in those groups will further support the expansion of the deworming program and an evaluation of the current deworming program will identify where improvements can be made, especially around delivery, monitoring and reporting.



An adolescent girl receives counseling on iron-folic acid supplementation at her home in Central Java Province during COVID-19 pandemic

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ANNEXES

I. Methodology: Further details

Table 3. PICOS: Systematic search strategy

PICOS	Keywords
Population	<ol style="list-style-type: none"> 1. women OR female* OR girl* 2. Adolescen* OR teenager OR reproductive age OR maternal OR mother* OR antenatal OR pregnan* 3. Maternal Health/ or Maternal Health Services/ or Prenatal Care/ or Women Health/
Intervention	<ol style="list-style-type: none"> 1. Vitamin A OR vitamin OR mineral OR IFA OR Iron OR Iron-folate OR Iron-folic acid OR Folic Acid OR food supplement* OR food fortifi* OR micronutrient* OR supplementary feeding OR protein-energy supplementation 2. Nutrition counselling OR nutrition intervention OR nutrition programme OR nutrition program OR nutrition-specific intervention OR nutrition education OR dietary counselling OR lifestyle intervention OR prenatal care 3. Folic Acid/ or Anemia/ or Anemia, Iron Deficiency/ or Counselling/ or Maternal Nutritional Physiological Phenomena/ or Prenatal Nutritional Physiological Phenomena/ 4. Zinc/ OR Zinc 5. Maternal deworming OR anthelmintic OR albendazole OR worm infection 6. Caffeine/ OR caffeine intake OR restricting caffeine
Control	none required
Outcome	<ol style="list-style-type: none"> 1. Malnutrition/ 2. Undernutrition OR underweight OR obese OR Anemia OR anemi* OR iron deficien* 3. Energy malnutrition OR thin OR malnourished OR pregnancy outcome* OR undernutrition OR underweight OR obese 4. postpartum haemorrhage OR maternal mortality OR maternal deaths OR gestational diabetes OR caesarean delivery OR macrosomia 5. still birth* OR miscarriage* OR fetal loss OR Low birth weight OR LBW OR stunt* OR newborn death* OR neonatal death* OR premature OR Preterm birth OR IUGR OR IUFD OR Intrauterine growth restriction OR Intrauterine fetal death* OR small-for-gestational OR SGA OR large-for-gestational OR LGA
Study	research* OR study OR studi* OR program* OR Use OR report* OR approach* OR reduct* OR "program evaluation" OR intervent* OR evidence* OR polic* OR trial* OR experiment* OR barrier* OR challenge* OR bottleneck* OR coverage* OR outcome* OR target* OR program success OR legislation
Location	<ol style="list-style-type: none"> 1. Indonesia 2. Indonesia/

Table 4. Grey literature search strategy

PICOS	Keywords	
Population	(ibu OR “usia reproduksi” OR remaja)	Mother OR Women in Reproductive age OR female adolescents
Intervention	1. (besi OR “zat besi” OR iron OR Fe OR folat OR “asam folat” OR IFA) 2. (suplemen OR “makanan tambahan” OR PMT OR fortifikasi OR mikronutrien) 3. (“vitamin A” OR vitamin) 4. Kalsium 5. Seng 6. Obat cacing 7. Kafein	1. Maternal dietary supplementation <ul style="list-style-type: none"> • IFA • Supplementary feeding • Postpartum vitamin A supplementation 2. Adolescence health and preconception nutrition <ul style="list-style-type: none"> • Iron supplementation for female adolescence 3. Calcium 4. Zinc 5. Maternal deworming 6. Caffeine
Control	none required	none required
Outcome	Anemia Kekurangan Energi Kronis OR KEK OR “defisiensi gizi makro” defisiensi gizi mikro	Anemia CED Micronutrient deficiency
Study	penelitian OR observasi OR implementasi OR evaluasi OR “uji klinik” OR penelitian OR Peraturan OR legislasi OR permenkes	Research OR observation or implementation OR evaluation OR clinical trial OR research OR Policy OR legislation OR Permenkes
Site	(site:go.id OR site:or.id OR site:ac.id)	(site:go.id OR site:or.id OR site:ac.id)
Years	2015 – 2021	2015 – 2021
Search strategy (ibu OR “usia reproduksi” OR remaja) (besi OR “zat besi” OR iron OR Fe OR folat OR “asam folat” OR IFA)(program OR intervensi) (site:go.id OR site:or.id OR site:ac.id) (ibu OR “usia reproduksi” OR remaja) (suplemen OR “makanan tambahan” OR PMT OR fortifikasi OR mikronutrien) (program OR intervensi) (site:go.id OR site:or.id OR site:ac.id) (ibu OR “usia reproduksi” OR remaja) (“vitamin A” OR vitamin) (program OR intervensi) (site:go.id OR site:or.id OR site:ac.id) (ibu OR “usia reproduksi” OR remaja)(Kalsium)(site:go.id OR site:or.id OR site:ac.id) (ibu OR “usia reproduksi” OR remaja)(Seng)(site:go.id OR site:or.id OR site:ac.id)		

(ibu OR “usia reproduksi” OR remaja)(Kalsium)(site:go.id OR site:or.id OR site:ac.id)

(ibu OR “usia reproduksi” OR remaja)(Obat cacing)(site:go.id OR site:or.id OR site:ac.id)

(ibu OR “usia reproduksi” OR remaja)(Kafein)(site:go.id OR site:or.id OR site:ac.id)

(ibu OR “usia reproduksi” OR remaja)(Kekurangan Energi Kronis OR KEK OR “defisiensi gizi makro”)(defisiensi gizi mikro) (site:go.id OR site:or.id OR site:ac.id)

program gizi ibu hamil di Indonesia (site:go.id OR site:or.id OR site:ac.id)

program gizi ibu nifas di Indonesia (site:go.id OR site:or.id OR site:ac.id)

program gizi ibu menyusui di Indonesia (site:go.id OR site:or.id OR site:ac.id)

program gizi remaja putri di Indonesia (site:go.id OR site:or.id OR site:ac.id)

Hand searching

1. Website Kemenkes RI (<https://www.kemkes.go.id>)
2. Website WHO (<https://www.who.int>)
3. Website UNICEF (<https://www.unicef.org>)
4. Website POGI (<https://pogi.or.id>)
5. Website IBI (<https://ibi.or.id>)
6. Website peraturan.go.id
7. Website jdihn.go.id

All published research and reports from databases were exported to [Covidence](#). Two investigators performed an initial screening, categorized interventions or reports and selected final studies or reports for full-text review.

The inclusion criteria used to decide a full review on peer-reviewed articles and grey literature are as follow: **1)** research or government reports, policies, programs, legislation, data, or guidelines of any key nutrition interventions as mentioned above (hereafter referred to as ‘nutrition-specific intervention’); or **2)** research or government reports, policies, programs, legislation, data, or guidelines that have some elements pertaining to maternal nutrition as above mentioned (hereafter referred to as ‘nutrition-sensitive intervention’); **3)** full-text document is available in English or Bahasa Indonesia; and **4)** it provides either a description, barriers or enablers of the implementation of nutrition interventions.

Four investigators discussed the final literature to be included in the desk review. Data were

extracted using Excel spreadsheets – separately for research and government reports (including policies) – and covered information pertaining to the population targeting and coverage of the interventions or programs, as well the documented impacts on health indicators or clinical outcomes, where applicable, and aligned with the WHO 2016 recommendation on antenatal care for a positive pregnancy experience (World Health Organization, 2016b). Further, barriers at the individual, community and health systems levels were also assessed to identify gaps and opportunities for program improvement or scale-up. The extracted data also included information on the author/organization, type of article, year of study, title of articles, interventions/program and methods.

From the desk review, we identified 182 publications from an Ovid MEDLINE and Ovid Embase search; 290 publications were identified from grey literature and hand searching (*see Figure 4*). Of these numbers, 178 publications were included in this desk review.

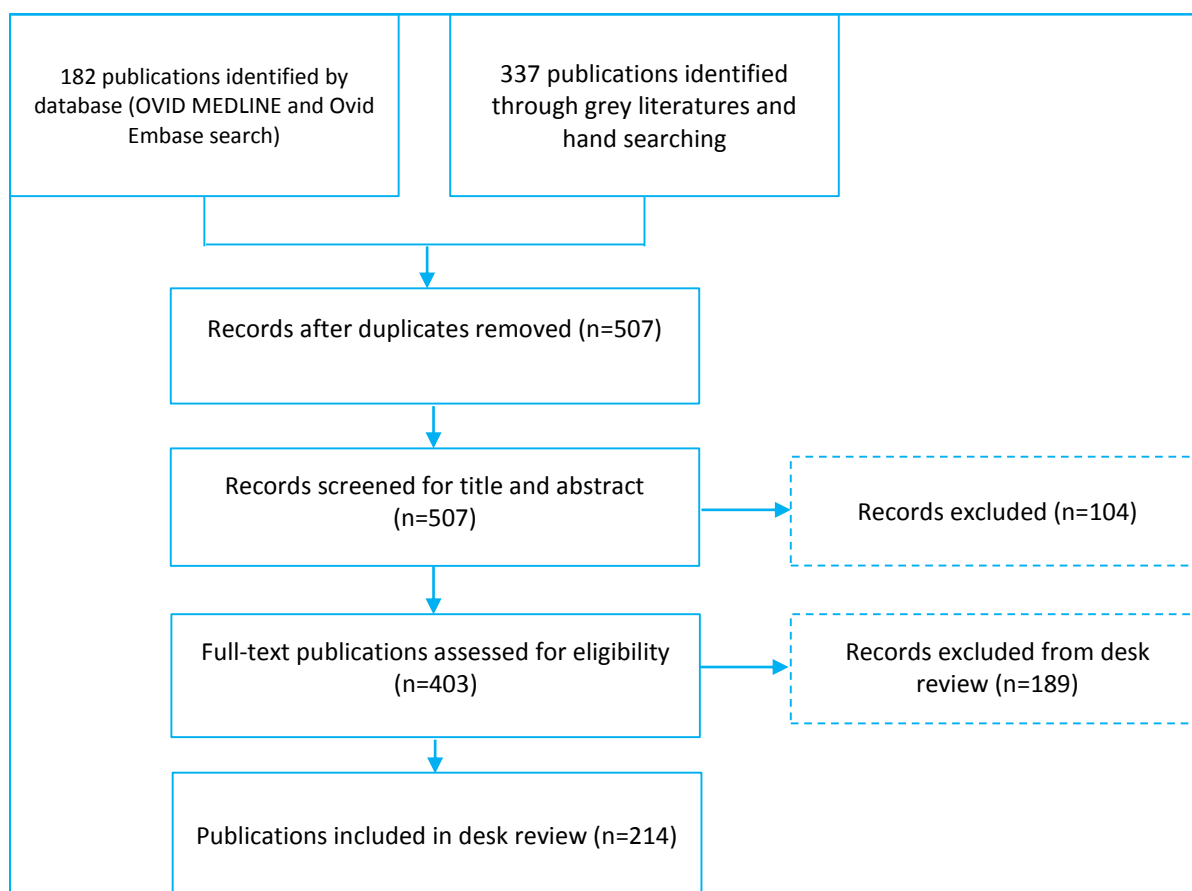


Figure 5. Flow chart of selection of eligible literature

Instrument development, quality control and training

The initial drafts of field observation instruments were piloted with relevant participants in Yogyakarta province and Kulon Progo districts. Feedback and insights from the pilot were used to fine-tune the final instruments. The final version of the instruments is attached to this report.

A one-day training on the principles of qualitative research, field observation and interviewing was undertaken for all members of the UGM research team, field coordinator and

interviewers. Coordination meetings were conducted at least once a week during the data collection.

For the first week of interviews for each district, two to three sampled recordings were checked by the UGM team to ensure the depth of information obtained. Several participants were contacted to validate the contents of the information. To achieve trustworthiness, transcription summaries were sent to the participants to acquire further feedback.

Data analysis

Interview and discussion recordings were transcribed verbatim by research assistants. Transcriptions were read by at least two research team members. Transcriptions were

grouped according to the types of participants:

- 1) national stakeholders; 2) provincial and district stakeholders; 3) professional organizations; 4) midwives; 5) nutrition staff; 6) pregnant women; and 7) community health

workers (CHWs). Analyses were performed using the 2016 WHO guidelines on antenatal care for positive pregnancy experience as the key themes.

As a first step, the findings for each theme were compared between groups of participants. The themes were then compared between geographic areas. A matrix was developed as a template to summarize the key findings. All team members conferred weekly to discuss the findings and agree on the interpretations.

From each *puskesmas*, one midwife and one staff member responsible for nutrition programs (with or without a nutrition qualification) were selected. Focus group discussions with pregnant women and CHWs were conducted in two selected *puskesmas* in each district. Pregnant women who received

antenatal care services in one private OB-GYN practice and two to three private midwife clinics were also included in separate discussion sessions.

Key national, provincial and district stakeholders with key roles in planning and implementing the maternal nutrition-related program were interviewed including the Ministry of Health (MoH), Bappenas, BKKBN (National Population and Family Planning Board), the family health division of provincial and district health offices, district women empowerment offices, child protection offices, district planning divisions, as well as midwives, OB-GYNs and professional nutritionist organizations. The details of participants interviewed are provided in Table 5.

Table 5. List of participants at national and sub-national levels

Stakeholders	Number of participants
National stakeholder	
Ministry of health	11
Other ministries	10
Provincial stakeholder	
Provincial health office	4
Professional organization	4
Provincial national family planning office	2
District stakeholder	
District health office	11
Midwives	26
Nutrition officer	25
District planning office	3
Women empowerment office	4
Professional organization	3
Community	
CHWs	24
Pregnant women	42

Field observations were conducted at service delivery points, including: (1) primary health centres (*puskesmas*); (2) private midwives' practice/clinics; and (3) private OB-GYN practice/clinics. The justifications for the

chosen delivery points include the proximity of the post/clinics to the community.

The field observation aimed to capture the process of service delivery, i.e., for maternal nutrition programs and services. We also observed service provision against standard

service guidelines, such as: (1) Ministry of Health (MoH) Regulation No. 4/2019 on technical standards to meet basic health services; (2) MoH regulation No. 97/2014 on health services during pre-pregnancy, pregnancy, delivery and postpartum periods; (3) the MoH Regulation No. 21/2015 on standards on vitamin A supplementation for children aged under-five years and postpartum women; and (4) the MoH regulation on antenatal care, delivery, postpartum and newborn health services during the COVID-19 pandemic.

By conducting the direct field observation, we aimed to also capture services including the provision of IFA supplementation, the provision of nutrition counselling and essential counselling skills of the service providers as well as anthropometric assessment and interpretation. The fully adapted observation draft checklists are available in the field observation checklist (below). Information collected from the field observation was inputted to and analysed directly using the 'REDCap' database.

II. Information related to maternal nutrition in MCH book

CONTROL IRON-FOLIC ACID (IFA) TABLET SUPPLEMENTATION

Monitoring Card of IFA Supplementation in Pregnant Women

Name : _____ Age : _____ Years Old

Month 1	Month 2	Month 3
Month:	Month:	Month:
Month:	Month:	Month:
Month:	Month:	Month:
Month:	Month:	Month:

Checklist (✓) in the box if done taking a IFA Supplementation

5

Figure 6. Monitoring card for IFA supplementation

Pregnant Women

Antenatal Care (ANC)

Go to the doctor or midwife as soon as possible if menstruation came later than usual. Do antenatal care at least 6 contacts during pregnancy with examinations by doctor at least 2 times on 1st and 3rd trimester:

- Twice on 1st trimester (up to 12 weeks of pregnancy)
- Once on 2nd trimester (12-24 weeks of pregnancy)
- 3 times on 3rd trimester (24-40 weeks of pregnancy)

Ensure the pregnant women earn Antenatal Care (ANC) as follows:

1. Measure weight and height
 - Height is important to determine nutritional status
 - An increasing of the weight as much as 9 kg or 1 kg per month in minimum
2. Measure blood pressure
 - Blood pressure >140/90 mmHg (hypertension)
3. Nutritional status (measure upper arm circumference)
 - Upper arm circumference <23.5 cm, at risk for chronic energy deficiency
4. Measure the height of fundus Uterus / height of uterus
5. Determine fetus presentation and its fetal heart rate
 - To see fetal position abnormalities or other issues
6. Screening of tetanus immunization status and give immunization if needed


1 time	Minimum Interval Administration	Protection Duration
T1		The first age in having primary immunization
T2	One month after T1	3 years
T3	Six months after T2	5 years
T4	Twelve months after T3	10 years
T5	Twelve months after T4	>10 years
7. Give blood booster tablet
 - Ensure the pregnant women consume 90 tablet in minimum during pregnancy
8. Test/ab check
 - Test/ab check
9. Case management/handling
 - If issues found, treat immediately or refer to other health staff/facility
10. Interview/counseling
 - Check at the same time as Antenatal Care (ANC)

16

Figure 7. Recommendations on ANC visits

PREGNANCY CLASS

PARTICIPATE IN MATERNAL CLASS (KELAS IBU HAMIL)



By attending classes for pregnant women, information about pregnancy, childbirth, postpartum care, newborn care, nutritional needs and fulfillment and health services received will be obtained. Mothers must attend classes for pregnant women and at least once followed by husbands.

Ask the health worker for the schedule and place for this session.

17

Figure 8. Suggestion to attend Kelas Ibu Hamil (mother support group)

PREGNANT WOMEN

DAILY CARE FOR PREGNANT WOMEN

1. Eat a variety of foods proportionally with a balanced nutritional pattern and 1 serving more than before pregnancy
 - Drink one tablet BBT (blood booster tablet) each day during pregnancy
2. Get enough rest:
 - Night sleep minimum 6-7 hours
 - Try to sleep during the day or lie down on back 1-2 hours
3. Keep yourself clean:
 - Wash hands with soap and use clean running water
 - Take a shower and brush your teeth 2 times a day
 - Wash hair every 2 days
 - Keep the breast and pubic area clean
 - Change clothes and underwear every day
 - Check teeth
4. Together with your husband, stimulate the fetus by talking to the fetus often, and often touching the mother's stomach
5. Husband and wife intercourse during pregnancy is permissible, as long as the pregnancy is healthy

WHAT MOTHERS SHOULD AVOID DURING PREGNANCY

Do heavy work	Sleep on your back > 10 minutes during late pregnancy to avoid oxygen deprivation to the fetus
Smoking or exposure to secondhand smoke	Pregnant women take medicine without a doctor's prescription
Drink soft drinks, alcohol, and herbs	Excessive stress

Ask the Midwife/Nurse/Doctor for further explanation regarding pregnancy

18

Figure 9. Daily care during pregnancy

IV. Distribution of human resources for nutrition by provinces

Table 6. Distribution of human resources for nutrition by province in Indonesia

No.	Province	No of unit	Nutritionist	Dietician	Nutrition assistants	Total number per province
1	Aceh	466	900	6	111	1017
2	Sumatera Utara	880	1018	36	216	1270
3	Sumatera Barat	455	729	12	200	941
4	Riau	431	472	6	113	591
5	Jambi	614	405	5	32	442
6	Sumatera Selatan	494	637	39	155	831
7	Bengkulu	402	348	19	100	467
8	Lampung	613	527	12	86	625
9	Kepulauan Bangka Belitung	305	221	5	10	236
10	Kepulauan Riau	192	171	3	46	220
11	DKI Jakarta	4262	973	129	262	1364
12	Jawa Barat	5352	1906	123	761	2790
13	Jawa Tengah	4821	2293	130	514	2937
14	DI Yogyakarta	790	478	25	146	649
15	Jawa Timur	5625	2571	145	689	3405
16	Banten	720	476	24	66	566
17	Bali	580	537	7	126	670
18	Nusa Tenggara Barat	323	688	24	56	768
19	Nusa Tenggara Timur	496	849	27	114	990
20	Kalimantan Barat	379	577	6	74	657
21	Kalimantan Tengah	275	454	2	37	493
22	Kalimantan Selatan	396	826	9	71	906
23	Kalimantan Timur	314	336	8	31	375
24	Kalimantan Utara	115	104	1	25	130
25	Sulawesi Utara	292	497	6	82	585
26	Sulawesi Tengah	287	440	15	47	502
27	Sulawesi Selatan	1056	1241	30	144	1415
28	Sulawesi Tenggara	357	707	22	110	839
29	Gorontalo	158	420	4	11	435
30	Sulawesi Barat	164	249	2	6	257
31	Maluku	292	536	9	67	612
32	Maluku Utara	189	317	4	19	340
33	Papua Barat	227	185	2	19	206
34	Papua	495	351	8	101	460

Source: (http://bppsdmk.kemkes.go.id/info_sdmk/info/index?rumpun=108). Data updated on 31 December 2020.

V. Coverage of antenatal service by socioeconomic status

Table 7. Coverage of antenatal service by socioeconomic status (2017)

Socioeconomic characteristics	Antenatal Care (ANC)			
	ANC 1 (K1) (%)	ANC4+ (K4) (%)	ANC 4+ with complete ANC components (%)	ANC 4+ with complete ANC components + consumed iron supplement for at least 90 days (%)
Wealth quintile				
Poorest	91.7	78.4	15.1	8.6
Poor	97.7	88.9	21.0	12.7
Middle	98.7	92.9	27.2	17.5
Rich	98.9	95.2	31.7	20.2
Richest	99.5	97.2	33.4	25.0
Age group				
15-25 years	97.2	89.7	23.7	15.2
26-35 years	97.6	91.5	26.1	17.3
36-42 years	96.8	88.4	26.2	16.7
42-49 years	94.0	91.1	36.6	23.0
Women's marital status				
Not married	91.2	78.2	17.9	10.2
Married	97.8	90.9	25.8	16.9
Parity				
1 child	95.3	85.8	22.6	14.6
2 or more children	98.2	92.6	26.9	17.6
Women's education				
None	66.2	49.7	6.7	5.0
Primary	94.9	84.5	19.2	11.2
Secondary	98.3	92.2	26.8	17.7
Post-secondary	99.1	95.7	31.7	21.9
Women's occupation				
None	97.3	89.9	25.4	16.0
Agriculture	91.3	79.2	14.1	7.7
Blue-collar	97.9	92.0	26.1	17.4
White-collar	99.6	96.9	32.6	24.1
Residency				
Rural	96.2	87.5	22.1	13.4
Urban	98.4	93.6	29.3	20.1
Region of residence				
Java-Bali	98.6	94.2	31.8	22.6
Sumatera	96.0	84.9	10.4	5.3
Kalimantan	97.2	90.0	28.6	18.0
Sulawesi	97.4	87.3	21.4	6.9
Eastern Indonesia	92.0	83.1	26.5	15.9
Indonesia	97.3	90.5	25.6	16.7

Source: Analysis of Indonesia, DHS 2017

VI. Stakeholder recommendations from workshops 1 and 2, by priority and beneficiary

Table 8. Summary of stakeholder recommendations on maternal nutrition programs in Indonesia

Objective: Strengthen the delivery of maternal nutrition interventions to improve the overall health and nutrition of adolescent girls, women of reproductive age, pregnant women and postpartum women in Indonesia			
CURRENT INTERVENTIONS			
Beneficiary	Proposed Strategies		
	Short-term (within 12-18 months)	Medium-term (within 3 years)	Long-term (within 5 years)
Adolescents and women of reproductive age (WORA)	<p><u>WIFS and anaemia management:</u></p> <ul style="list-style-type: none"> <i>Governance and capacity:</i> Strengthen the multi-sectoral stakeholder coordination, involving capacity building for School Health Program for program planning, budgeting and monitoring <i>Governance:</i> Develop a guideline on anaemia management to complement the implementation of the preventive WIFS ("blanket approach" program), by referring adolescent girls with clinical symptoms of anaemia for anaemia treatment <i>Supply:</i> Ensure adequate stock of IFA for adolescents and WORA through improved supply chain and clear procurement process <i>M&E:</i> Introduce the existing user-friendly reporting system (CERIA) for WIFS 	<p><u>WIFS and anaemia management:</u></p> <ul style="list-style-type: none"> <i>Policy:</i> Develop a SOP for program implementers <i>Policy:</i> Identify distribution platform to extend WIFS program to out-of-school adolescent girls and WORA <p><u>Overall nutrition program:</u></p> <ul style="list-style-type: none"> <i>Policy:</i> Develop national guideline on nutrition program (such as IFA supplementation) for WORA, female workers and brides-to-be 	

Adolescents and women of reproductive age (WORA)	<p><u>Overall nutrition program:</u></p> <ul style="list-style-type: none"> • <i>Governance:</i> Define and provide a minimum package of interventions for adolescent girls and women of reproductive age, aligned with WHO recommendations. • <i>SBCC and capacity:</i> Increase the quantity and capacity of adolescent health cadres/champions for WIFS program and broader nutrition programming with a gender equity lens 		
Pregnancy	<p><u>IFA and anaemia Management</u></p> <ul style="list-style-type: none"> • <i>Policy:</i> Revise and advocate technical guidelines on anaemia management (flow chart) and maternal deworming • <i>Governance:</i> Develop new strategies to increase demand (compliance), for example, by developing approaches at household/individual level and multi-collaboration to support the transformation of primary care • <i>Supply:</i> Ensure adequate equipment and materials for Hb testing at <i>puskesmas</i> 	<p><u>IFA and anaemia management</u></p> <ul style="list-style-type: none"> • <i>Supply:</i> Improve the supply chain through periodic monitoring and evaluation of IFA tablet stock • <i>Supply:</i> Explore the feasibility of building partnerships/collaboration with the private sector to ensure adequate supply and system delivery of IFA tablets • <i>Evidence and data:</i> Conduct study on the effectiveness (particularly cost-effectiveness) of IFA supplementation • <i>Policy:</i> Consider the benefits of MMS based on recent scientific evidence; socialize MMS 	<p><u>Overall nutrition in pregnancy/ANC</u></p> <ul style="list-style-type: none"> • <i>Financial:</i> Collaborate and raise funds from the private sector (including for procurement of products) <p><i>Evidence and data:</i> Conduct national surveys to obtain data on micronutrient status (calcium, vitamin A, zinc) in pregnancy. Further assessment required before recommendation/implementation of other micronutrient supplementation (e.g., vitamin A, zinc, vitamin D).</p>

Pregnancy	<ul style="list-style-type: none"> • <i>M&E</i>: investigate the root cause of the persistent high prevalence of anaemia despite the long-standing IFA supplementation program (data disaggregated by sex, age and region) <p><u>Dietary interventions (including for CED and obesity)</u></p> <ul style="list-style-type: none"> • <i>Policy</i>: Gradual roll-out of re-designed balanced energy food supplement (biscuit) program (see “New interventions” below) <p><u>Calcium supplementation</u></p> <ul style="list-style-type: none"> • <i>Policy</i>: Update and socialize the technical guideline on calcium supplementation • <i>Capacity</i>: Training of health workers; communication strategy about the importance of calcium in reducing maternal morbidity and mortality • <i>Supply</i>: Ensure adequate stock at health centres <p><u>Food fortification with micronutrients</u></p> <ul style="list-style-type: none"> • <i>Advocacy</i>: Promote micronutrient-fortified food products to improve consumption among pregnant women (and all WORA) 	<p>operational research findings from partners; and decision made whether to transition from IFA to MMS involving relevant stakeholders</p> <p><u>Dietary interventions (including for CED and obesity)</u></p> <ul style="list-style-type: none"> • <i>Capacity</i>: Strengthen counselling and clinical measurement for CED and obese pregnant women <p><u>Calcium supplementation</u></p> <ul style="list-style-type: none"> • <i>M&E</i>: Develop monitoring, recording and reporting system <p><u>Overall nutrition in pregnancy/ANC</u></p> <ul style="list-style-type: none"> • <i>M&E</i>: Strengthen program monitoring - identify barriers (human resources, software, guidelines) and determine data collection process – and conduct program evaluations • 	<ul style="list-style-type: none"> •
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Pregnancy	<p><u>Overall nutrition in pregnancy/ANC</u></p> <ul style="list-style-type: none"> • <i>Governance</i>: Define and provide minimum package of interventions for pregnant women, aligned with WHO recommendations • <i>Governance</i>: Develop targets and appropriate indicators for reduction of malnutrition in pregnancy including CED, anaemia and obesity • <i>Governance</i>: Strengthen coordination across institutions to improve program's coverage and impact • <i>Capacity</i>: Increase the quantity and capacity of health workers through pre-service and in-service training, especially around counselling, planning and budgeting, stock management, program monitoring and screening of malnourished pregnant women (anaemia, CED, obesity): in-person training, user-friendly training videos and facilitative supervision • <i>Products</i>: Strengthen distribution of MCH books and uptake • <i>Demand</i>: Utilizing a gender equity lens, develop and 		
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Pregnancy	<ul style="list-style-type: none"> implement an SBCC strategy for improved knowledge of risks and actions (re: anaemia, IFA, stunting, myths in pregnancy, and the role of the husband/family), including developing interesting and creative IEC materials for various platforms (media, such as printed or digital posters, social media, etc.). Extend/strengthen classes for pregnant women and ensure family involvement. 		
Postpartum	<p><u>Overall nutrition in postpartum</u></p> <ul style="list-style-type: none"> <i>Governance:</i> Define and provide a minimum package of interventions for postpartum women, aligned with WHO recommendations. <i>SBCC and capacity:</i> Through a gender equity lens, implement capacity building for health workers to improve the quality and quantity of nutrition counselling for postpartum women, including through home visits and with family involvement <i>Financial:</i> Prioritize budget for health operational funding (BOK) for 3-4 postpartum visits 	<p><u>Overall nutrition in postpartum</u></p> <ul style="list-style-type: none"> <i>Capacity:</i> Conduct knowledge transfer among health workers, especially those with high knowledge and skills for IYCF counselling <i>Supply:</i> Ensure adequate stock of supplements (IFA, VAS, anthelmintic) at all delivery points/facilities 	<p><u>Vitamin A supplementation</u></p> <ul style="list-style-type: none"> <i>Policy:</i> Review the technical guideline on Vitamin A supplementation for post-partum women based on evidence and assess the effectiveness (including its cost-effectiveness) of the current program

NEW INTERVENTIONS			
Beneficiary	Proposed Strategies		
	Short term (within 12-18 months)	Medium Term (within 3 years)	Long Term (within 5 years)
Adolescents and WORA	<p><u>Deworming</u></p> <ul style="list-style-type: none"> Policy development, integrate with School Health Program, budget allocation, advocacy to multi-sectoral stakeholders and target high-burden areas <p><u>IFA and anaemia management</u></p> <ul style="list-style-type: none"> Extend IFA distribution to include WORA (female workers and bride-to-be) 		
Pregnancy	<p><u>Deworming</u></p> <ul style="list-style-type: none"> Policy development, budget allocation, advocacy to multi-sectoral stakeholders and target high burden areas <p><u>Balanced energy food supplementation using local foods</u></p> <ul style="list-style-type: none"> Coordination between government departments, target regions with highest prevalence, broaden beneficiary groups and modelling in several districts Health worker training and integrate distribution with other programs 		

Postpartum	<p><u>Deworming</u></p> <ul style="list-style-type: none"> • Policy development, budget allocation, advocacy to multi-sectoral stakeholders and target high-burden areas 	<p><u>IFA</u></p> <ul style="list-style-type: none"> • Policy development for IFA supplementation for all postpartum women, ensure adequate IFA stocks calculated separately from pregnant mothers' stock, strengthen monitoring, recording and reporting • Counselling involving husband and family members 	
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