



# **Behavioural Directions for Improving Iron & Folic Acid Tablet Uptake and Consumption in Uttar Pradesh**

**WHITE PAPER**

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## Acronyms and Glossary

ANC	Antenatal Care
ASHA	Accredited Social Health Activist
ANM	Auxiliary Nurse Midwifery
AWC	Aanganwadi Centre
AWW	Aanganwadi Worker
CHC	Community Health Centre
CHO	Community Health Officer
CSBC	Centre for Social and Behaviour Change
DoMH&FW	Department of Medical Health and Family Welfare
FLW	Frontline Worker
FRU	First Referral Unit
GoI	Government of India
GoUP	Government of Uttar Pradesh
IEC	Information, Education and Communication
IFA	Iron and Folic Acid
LHV	Lady Health Visitor
MPHW	Multipurpose Health Worker
NFHS	National Family Health Survey
PHC	Primary Health Centre
PMSMA	Pradhan Mantri Surakshit Matritva Abhiyaan
RCT	Randomised Controlled Trial

RfP Request for Proposals

UP BIU Uttar Pradesh Behavioural Insights Unit

VHND Village Health and Nutrition Days

WRA Women of Reproductive Age

YCCI Yale Centre for Customer Insights

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# SECTION 01: **INTRODUCTION AND OVERVIEW**

## **Introduction and overview**

Anaemia, a blood condition causing symptoms such as fatigue, weakness, dizziness, and shortness of breath, is widespread in India. The consequences of anaemia during pregnancy are significant and can lead to congenital disabilities, poor birth outcomes and postpartum complications (Sankaran *et al.*, 2020).

Anaemia is a significant health problem in the state of Uttar Pradesh (UP). Fifty per cent of women are affected with mild or moderate anaemia, and two per cent with severe anaemia (Press Information Bureau, Government of India Bulletin, 2021).

The most common cause of anaemia is iron deficiency, mainly due to dietary deficiency. Iron and folic acid (IFA) supplements are a safe approach to target pregnant women and children who are most at risk. IFA tablets are a low-cost solution provided through the government system at scale in UP.

The National Family Health Survey (NFHS-round 5) revealed that in UP, for 84 per cent of their last births, mothers received IFA supplements. However, only 22.3 per cent consumed them for the recommended 100 days or more, while the present recommendation is for 180 days or more (International Institute for Population Sciences (IIPS) and ICF, 2021).

NFHS figures reveal that the supplemental nutrition supply-chain and delivery mechanisms (primarily ANCs) have improved over time, increasing the percentage of women receiving 3+ ANC visits and the number of IFA tablets they get. Improvements in the supply side are set to continue, focusing attention on the demand-side behavioural issues of initial uptake and consumption of IFA.

The NFHS data also suggest the need to encourage uptake and adherence at other stages in a woman's life cycle other than merely during the pregnancy period. The NFHS-5 saw an increase in anaemia prevalence from NFHS-4 across various sub-populations: Anaemia prevalence in pregnant women increased by 1.8 percentage points, in women of reproductive age by 3.9 percentage points, and in adolescent women by 5 percentage points. The highest increase was in children (boys and girls) under 5 and was by 8.5 percentage points.

As a result, the suggested three main target groups for IFA supplementation in UP are currently:

- **Children/adolescents:** Anaemia has been linked to poor motor and mental growth in children, leading to long-term impacts as adults.
- **Pregnant women:** Given anaemia doubles the risk of death during pregnancy, many interventions have targeted this vulnerable population.
- **Non-pregnant women:** Non-pregnant women are numerically the largest subgroup of the Indian population suffering from anaemia. However, women encounter the health system more frequently when pregnant, and the system is geared to administer tablets to pregnant women.

In the appendix, we have provided an overview of the government system for the supply, delivery, and adherence-related work for IFA supplements. The Government of Uttar Pradesh has increased the expenditure to supply IFA tablets, has established distribution infrastructure, and has trained frontline health workers and school teachers to deliver IFA tablets to the target groups and to provide encouragement and reminders for adherence. The main platforms to provide IFA tablets to the target groups are the monthly Village Health and Nutrition Days (VHNDs) organised by health workers and the weekly government school-based provision of IFA tablets managed by school teachers. The expansion of the government system to promote IFA tablet adherence in Uttar Pradesh is an opportunity to apply behavioural insights to increase adherence and reduce anaemia at scale.

This document was prepared to help designers, programme implementers and researchers focus on IFA supplementation in UP, and summarises secondary research relevant to IFA uptake and consumption: a literature review by the Yale Center for Customer Insights (YCCI). The YCCI literature review of 24 IFA studies from similar contexts, lays out the key behavioural barriers, motivators and strategies to increase uptake and daily consumption of IFA tablets and suggests a few interventions that have worked in some contexts or present promising intervention directions to improve IFA uptake and adherence.

The evidence review suggests promise for several strategies in Uttar Pradesh. First, addressing social norms has been shown to impact self-reported adherence in another Indian state, and the opportunity exists to test similar strategies at a larger scale in UP and with objective measures of tablet consumption. Secondly, automatic, personalised and positive reminders to take tablets daily may be a highly scalable intervention and potentially more effective when targeted at family members alongside the targeted adolescent or woman. Finally, a knowledge gap exists in the area of school-based distribution. Addressing the barriers that keep teachers from more supportively engaging may be investigated as a way to strengthen programme fidelity and IFA consumption for adolescents.

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## **SECTION 02:**

# **INSIGHTS FROM BEHAVIOURAL LITERATURE**

## Insights from behavioural literature

At first glance, IFA supplements are low-cost to make, stable to transport and store, and easy to consume. There are few side effects for most women, and the most common one (nausea) improves naturally after taking tablets consistently for many people (Dutta *et al.*, 2014).<sup>1</sup> However, persuading women to take high-dose Iron and Folic Acid tablets presents a last-mile challenge to this otherwise “easy” prescription for iron-deficiency anaemia and anaemia related to menstruation and pregnancy.

To investigate the current best practices and evidence on increasing uptake and daily consumption of IFA supplements, YCCI and the UP-BIU partnered on a review of two streams of published literature. The first stream comprises studies which used in-depth interviews or focus groups to **identify behavioural barriers and motivators** to IFA supplementation. The second presents **evidence on behavioural interventions** to improve IFA uptake and compliance. YCCI identified 24 studies, including five RCTs and five quasi-experiments. Table 2.1 shows the criteria for the inclusion of studies in this literature review, and Figure 1 maps the geography of included studies.

While the review pre-identified three key target beneficiary groups for IFA treatment, (1) pregnant women, (2) adolescent girls and (3) non-pregnant women, intervention elements additionally involve other key actors: healthcare workers, peers, spouses, other family members, and community.

The remainder of this section presents a high-level summary of the identified behavioural literature. [Two additional resources are available on the CSBC website](#) to deepen one’s understanding:

- A deck presenting the 24 studies in an easy-to-digest format,
- A clickable list with links to all the same studies for those interested in reading the original research.

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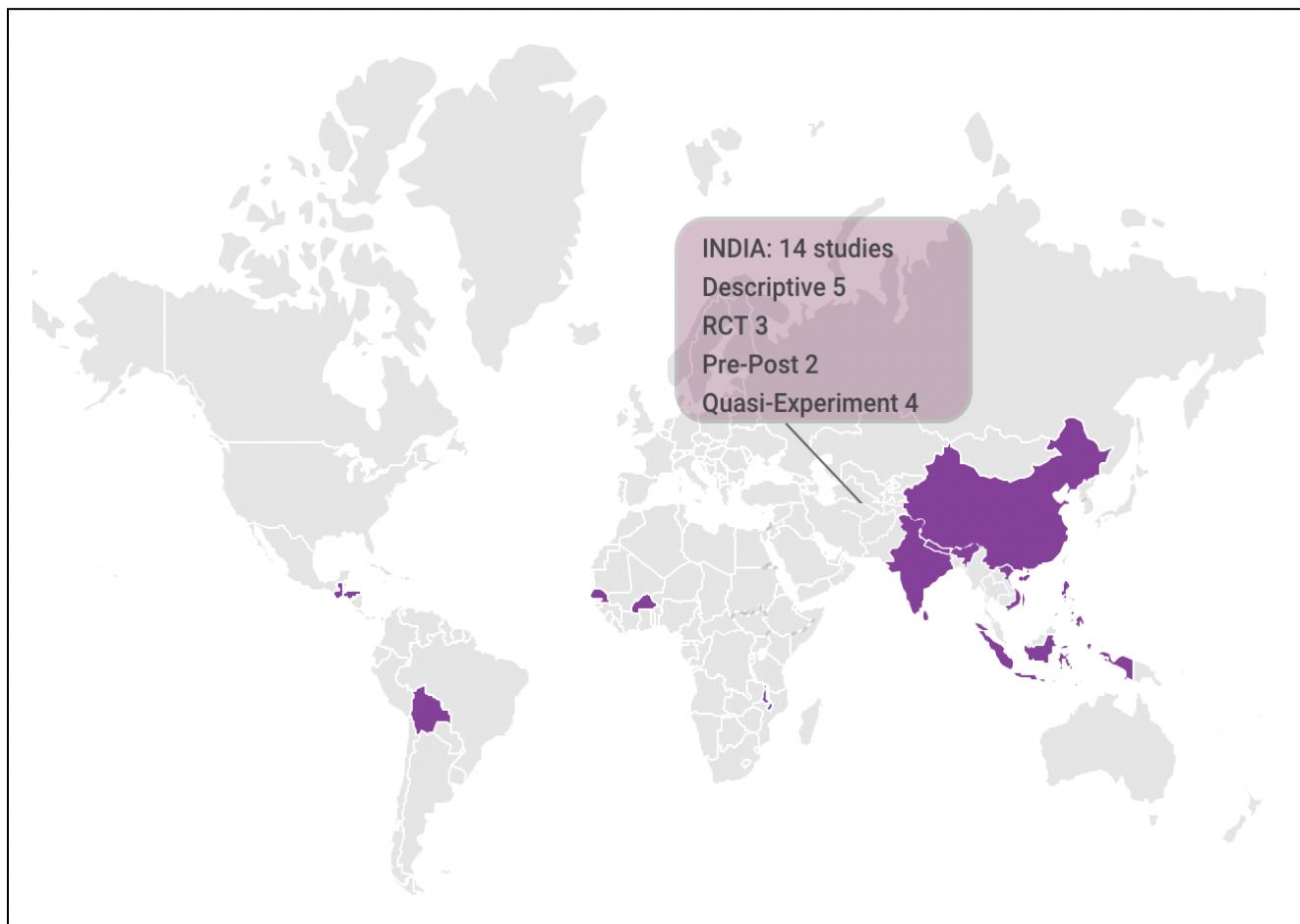
<sup>1</sup> In line with two other studies across nine developing countries, this descriptive study of 239 pregnant women in an urban slum in Surat, found that side effects cause non-compliance in only 2.34 per cent of women.

**TABLE 2.1: INCLUSION CRITERIA OF THE BEHAVIOURAL LITERATURE REVIEW**

CRITERIA	DETAILS
<b>PEER REVIEW</b>	Qualitative peer-reviewed studies informed the barriers and goals. For evidence on interventions, YCCI's focus was on peer-reviewed research that employed an experimental or quasi-experimental design, but pre-post strategies and descriptive studies were also included.
<b>SIGNIFICANCE</b>	Unless noted, YCCI included studies that found statistically significant results using standard analytic methods. Key study limitations are also addressed where applicable.
<b>GEOGRAPHY</b>	YCCI focused on studies conducted in India but also included research from other countries where results were deemed applicable and drew in relevant examples from countries across the globe.

In addition to the 24 studies covered by the behavioural literature review, the barriers in this white paper also draw on the results of NITI BIU's IFA diagnostic research from 2021. Their diagnostic report was based on two weeks of primary research in Bahraich and Shravasti districts in Uttar Pradesh and a secondary review of various reports and over 40 white papers from development practitioners covering different thematic health and behavioural areas (CSBC, NITI Behavioural Insights Unit, 2021).

**FIGURE 2.1: GEOGRAPHIC SPREAD OF THE 24 IFA STUDIES REVIEWED**



### Barrier Beliefs for Initial Uptake

Despite the wide availability of IFA tablets, the literature review found many important barrier beliefs hinder initial uptake. Pregnant women do not “feel” anaemia because its symptoms are conflated with that of pregnancy itself. Moreover, taking IFA tablets conflicts with the individual belief and social norm of not “over-medication” during pregnancy.

**Treatment is unnecessary.** Pregnant women may view the symptoms of anaemia as common challenges that accompany pregnancy and as not requiring treatment. Husbands, mothers, and mothers-in-law of pregnant women may also play a role in reinforcing these beliefs. Among adolescent girls and women, in general, the knowledge gap around anaemia and the necessity for its treatment is a barrier.

There is a low intrinsic motivation to take IFA supplementation, as there is low salience of risks, and the benefits are not clear (Chatterjee, N., & Fernandes, G. 2014) (Galloway, R., 2002) (Sedlander, E., 2020).

**Treatment has adverse side effects.** Many individuals fear side effects of IFA treatment such as overproduction of blood and large babies, and those large babies will lead to difficult or dangerous childbirths (Sedlander, E., 2020).

**IFA pills aren't trustworthy.** There is a belief that IFA tablets provided for free by the government are of lower quality than those purchased in stores, and that these "bad" tablets provided by the government should be discarded rather than taken (Sedlander, E., 2020).

**Programs are inconvenient.** Current systems of pill distribution discourage uptake and consumption. ASHAs and ANCs are not able to identify and register all pregnant women. Camps on Village Health, Sanitation and Nutrition Days, the main distribution channel for IFA pills are organised regularly but see poor participation. Village Health, Sanitation and Nutrition Day workers also only provide a 30-day supply, meaning women have to return monthly to get more. Follow-up visits by ASHAs/Anganwadi Workers are infrequent and do not involve tracking tablet consumption (Sedlander, E., 2020) (CSBC, NITI Behavioural Insights Unit, 2021).

## Barrier Beliefs for Daily Consumption

Initial uptake is only one part of the behaviour required for successful IFA supplementation. Ongoing adherence to the IFA tablet regimen is an important challenge in combating anaemia.

Pregnant women are advised by ASHAs and ANCs to take one tablet of IFA daily for 180 days (second and third trimesters). Women who have been diagnosed as severely anaemic are normally prescribed two tablets daily. For women trying to follow this advice, taking the tablets daily at first **produces negative feedback (side effects, main nausea) with no positive feedback**. The 180-day program thus depends on a woman's willpower and capacity to remember and adhere to a medication in the novel, high-load context (physically and cognitively) of pregnancy.

Pregnant women are unaware of the **necessity** for IFA supplementation and their perceptions of prenatal care may be limited to antenatal check-ups for diagnostic tests and lab reports, without considering routine IFA supplementation as constitutive of antenatal care. Knowledge about the dose of iron supplementation may be among the most important determinants of consumption (Dutta *et al*, 2014).

Women's attitudes about self-health are barriers. Women in large families are likely to **neglect their own health needs**, instead prioritising the needs of their children, husbands and in-laws (Chatterjee, N., & Fernandes, G., 2014). They also have **lower autonomy to seek health care for themselves** and have lesser say in financial decision-making in the household, affecting their ability to allocate resources to their own health (Sedlander *et al*, 2020). Thus, there is an urgent need in maternal and child health programmes to emphasise the importance of the mother's health, and anaemia interventions have the potential to become proxies for women's health and empowerment programmes.

A “medicines are curative” mental model **conflicts with the need to consume IFA regularly**. Doctors normally see patients showing symptoms and alleviate their suffering. ASHAs and ANMs, on the other hand, find themselves distributing medicines to a cohort that feels “healthy”, which leads to them feeling sick in the short term. Further, time-starved ASHA/ANMs have little control over daily consumption and therefore deprioritise IFA counselling and follow-up. Finally, though anaemia is highly prevalent, it does not have a monitoring system for concrete *short-term* indicators for administrators/supervisors to track and improve on a regular basis. This leads to the problem being treated as a lower priority.

Additional barriers have been identified in school-based IFA programmes, and the role of risk to teachers features prominently. Teachers and school staff are often unfamiliar with IFA as it is perceived to be within the domain of health workers. **IFA supplements may seem risky to teachers and school staff**. Avoiding risk to the individual teacher/staff, against a backdrop of low perceived anaemia prevalence, heightened perceptions of side-effects, and multiple competing tasks during the school day manifest in deprioritising attention given to IFA for adolescent girls in school. Teachers and staff later rationalise their inaction by deploying an “it may be harmful” narrative (Kotecha *et al*, 2009) (CSBC - NITI Behavioural Insights Unit, IFA Diagnostic Report, 2021).

## Motivators

Individuals have many positive goals and beliefs, and which goal is active can depend upon the person's internal state or external environment. Interventions that emphasise and reinforce relevant positive motivator beliefs may help establish habits around consumption. The YCCI review identified various positive goals that may motivate IFA treatment. Table 2 summarises these motivators by target beneficiary group. These motivators should be considered in the design of interventions both for uptake and consumption.

That IFA makes the patient healthy and smart is an important motivator belief. Pregnant women are motivated by the beliefs that (1) IFA supplements are like "fertilisers" for foetal growth, and (2) IFA supplements help drive brain development and give the child the best chance of being smart. This may also be a motivator belief for the husband and mothers-in-law of the pregnant woman. That IFA makes the person who consumes them healthy and smart also serves as a motivator for adolescent girls. This aspect may also be emphasised in education interventions to improve anaemia awareness and adolescent self-efficacy through life-skills training.

Consuming IFA makes for a good parent. Pregnant women would like to do everything they can for their child, and recognising that IFA tablets are one way to do that is a motivator. When women see their role primarily as child-bearers, they tend to prioritise a newborn's health over their own. They may be more likely to take up supplementation for the unborn baby, even if they are not convinced it has a direct benefit to themselves.

IFA improves the mother's well-being. Women do tend to prioritise the newborn's health over their own. (Chatterjee, N., & Fernandes, G., 2014) Even so, there are possibly several facilitators to taking IFA supplements around the mother's health: feelings of strength, increased appetite, and well-being for both the mother. And depending on her own levels of self-health care and self-efficacy, the mother's health may be a strong motivator belief for the husband and family of the pregnant woman.

The final barrier to consumption is simple forgetfulness around taking tablets daily. For many women, action may not follow their positive attitudes and strong intentions to make taking IFA tablets a daily habit during pregnancy.

**TABLE 2.2: MOTIVATORS BELIEFS, KEY ACTORS AND INTERVENTION ELEMENTS BY TARGET GROUP**

TREATMENT TARGET GROUP	MOTIVATOR BELIEFS (GOALS)	KEY INTERVENTION ACTORS	INTERVENTION ELEMENTS
ADOLESCENT GIRLS	Taking IFA makes me healthy. It makes me smart	Adolescent girls and families	Improved awareness and self-efficacy through life skills training (on nutrition, adolescent health, gender, and family)
		School teachers and peers	Motivate teachers to supervise school-based treatment and to educate and raise norms. Using in-school peers as ambassadors to girls out of school
PREGNANT WOMEN	IFA will make our baby smart and healthy and make our baby grow		Reinforce positive beliefs by making treatment easier/more convenient and developing mechanisms to help develop the habit of adherence
	IFA Improves a mother's well-being	Mother, spouse and family	
NON-PREGNANT WOMEN	Consuming IFA makes a mother a good parent		Using school children to disseminate information back to their families
	IFA improves women's well-being	Women, peers, and family members	Focusing on injunctive norms (expectations that other women are, in fact, taking supplements) and potentially adding descriptive norms (women should take supplements). Using school children to disseminate information back to their families

## Research Practice – Outcome Measurement

A critical empirical challenge when studying behavioural interventions encouraging IFA supplementation is measuring outcomes. In the literature identified in this white paper, outcomes generally fall into three categories: knowledge, attitudes/intentions and behaviour.

**Knowledge outcomes** are perhaps the easiest to measure as questions of fact can be asked directly by an enumerator with little concern that responses will be biased. The most relevant knowledge outcomes in the IFA literature are about the IFA regimen one is to follow, roughly:

- *How many pills are you supposed to take?*
- *How frequently are you supposed to take them?*
- *For how long you are supposed to take them?*

Additional knowledge outcomes relate to one's understanding of anaemia, what the IFA tablets do, and what conditions they address. Knowledge is an essential pre-condition for behaviour change in many circumstances, but it is insufficient.

Researchers assess **attitudes and intentions** in multiple ways. One approach is to ask women about risk perceptions about being anaemic, for themselves and pregnant women's unborn children, using Likert scales. Another is to ask respondents about their intentions to take tablets. This approach is helpful for innovative or previously untested treatments as intentions are important mechanisms that underlie a potential behaviour change.

**Behaviour** is assessed through direct observation, self-reports, and blood samples. The arguable gold standard for pill consumption since Thomas *et al.* (2003) is to provide IFA tablet blister packs to individuals in the treatment arm of a study and return after a specific number of days to count the number of pills remaining. This approach requires knowledge of how much the individual is supposed to take, a standardised number of tablets in blister packets, and confirmation that the recipient does not have another source of IFA tablets (Bilimale *et al.*, 2010). This consistency may be difficult in many field settings where governments provide tablets free of cost and in different quantities at different times. Chong *et al.* (2016)

presented an alternative strategy appropriate for an intervention encouraging uptake or consumption. They made pills available for all adolescents in a village through nurses who tracked which individuals came to receive and take tablets on a daily basis. Bilimale *et al.* (2010) used a direct observer's calendar, where for each day, the observer used a single or a double tick mark to record single and double doses, respectively, or a cross for no tablets taken by the individual. This may also be a suitable method for illiterate populations. Risonar *et al.* (2009) used a similar monitoring notebook filled in by the village health worker. While direct observer interventions inherently preclude the possibility of blinding observers to treatment status, some bias may be mitigated by blinding observers to participants' anaemia status.

Instead of objective measures of consumption, many rigorous studies use a combination of survey questions and haemoglobin measurements to uncover behaviour. Surveys directly ask women questions such as:

- *Did you take an IFA tablet yesterday?*
- *How many days out of the last seven did you take an IFA Tablet?*

The disadvantage of self-reported tablet consumption on its own is that the elements of persuasion in most interventions may introduce a self-presentation bias. Women will learn from the treatment that outsiders think they "should" take tablets and might report that they "are" taking pills when they are not, to appear either like a good parent or a smart person to the enumerator. This deviation from the truth would overestimate programme impact, even in a randomised controlled trial.

Combining haemoglobin measurement and self-reports is thought to help detect a genuine improvement in uptake or consumption because of the opportunity for cross-validation. However, this approach is still open to the risk that women have taken more tablets but not consistently enough to increase haemoglobin. One might misjudge an intervention as ineffective at increasing tablet consumption based on it not increasing consumption enough to improve haemoglobin in the timespan studied. This inference could happen even when women honestly report taking tablets. A pivotal point to remember is that if preventing or reducing anaemia is the ultimate goal - haemoglobin is the most appropriate indicator to collect. The

disadvantages include cost and the need for specialised enumerators who have been trained to safely handle blood.

## Evidence on Interventions to Address Barriers and Harness Motivators

To overcome barrier beliefs to initial uptake, intervention strategies such as (1) developing social norms around the need for treatment, (2) improving education and awareness around the benefits (*goals*) of treatments and minimal posed risks, and (3) program design elements improving coverage of IFA programmes, have been implemented in similar developing contexts, and some of these have shown to increase uptake of IFA.

The key barrier belief of IFA being unnecessary may be mitigated through social norm change. Without a salience of the risks of not taking IFA and/or knowledge of its benefits, women may regard IFA as unnecessary. Educational activities could improve knowledge and make these risks and benefits salient. Further, there is evidence that combining education with **social norm change strategies through peers and immediate family** positively impacts the intention to take IFA.

A cluster randomised controlled trial in Odisha, India, by Rimal *et al.* (2021) studied a set of education and communication interventions to improve social norms. It comprised ten educational modules, including anaemia control, IFA supplementation, diet diversity, social norms, malaria, water and sanitary hygiene, and deworming. Each module involved interactive activities and games structured around prevailing norms. The intervention sought to change three kinds of social norms: descriptive norms (perceptions about how many others take IFA), injunctive norms (social pressures people feel to take IFA) and collective norms (actual levels of IFA consumption). The study finds that **changes in descriptive and collective norms (but not injunctive norms) were associated with changes in self-reported IFA consumption** (Rimal *et al.*, 2021). The intervention elements included ten one-hour educational modules, Haemoglobin testing, three forms (normative framings) of testing feedback, and communication videos targeting social norms. Sedlander *et al.* (2021) suggest that in populations where the behaviour of interest is *low*, focusing on injunctive norms and potentially adding descriptive norms messaging after behaviours have changed is the logical order of operations. Future research might seek to measure IFA uptake and anaemia outcomes in order to identify if a

social norms intervention also changes actual behaviour or if there is an intention-behaviour gap.

School children may be mobilised to educate and influence norms within their own families. A pre-post study in China found that an intervention where trained school children distributed IEC materials about iron fortification to their own families (in combination with the training of community health workers and store employees for social marketing) led to a large increase in women purchasing fortified soy sauce after the intervention (Wang *et al.* 2009).

Further, a pre-post study of 371 pregnant women in Senegal suggests that community-based strategies, including education interventions informed by a positive deviance inquiry, could impact prenatal iron supplement intake. The positive deviance approach used here was in the form of a redesigned educational programme incorporating existing best practices from peer role models. Positive deviants were other women in the community who had learnt to employ beneficial practices to have better health than their neighbours, despite similar levels of impoverishment (Ndiaye *et al.*, 2019).

Interventions to address the barriers to daily compliance focus on improving health-seeking behaviour and increasing counselling or making IFA tablet consumption a daily habit.

Correlational evidence exists that those who register pregnancies early with a medical facility are more compliant with IFA regimens than those who registered later in their pregnancy. The mechanism of action is by increasing the number of antenatal visits and imparting knowledge about the dose and duration of iron supplementation pills.

Further, empowering local health workers with tools such as mobile health applications, improves the identification and coverage of IFA for pregnant women through clustering and spot mapping, leading to early counselling and referral of the pregnant women for prenatal check-ups and the early start of IFA supplementation (Risonar *et al.*, 2009).

Poor health-seeking may also be addressed through (1) conducting school-based IFA administration allowing for the deployment of a direct observer, and (2)

interventions to register pregnancies in a timely manner, and thus bring pregnant women into the fold of the health system sooner, so that they are counselled and followed up, and (3) mobile applications that may help the frontline worker better accomplish early registration of pregnancies that might then improve coverage of IFA and other antenatal programs for pregnant women. This may also be affected through the expansion of IFA counselling to include peers, husbands, children, and mothers-in-law.

Increasing direct observation combined with education is a high-rigour area of evidence. A common way of directly supervising IFA supplementation is through school-based programs. Supervised, weekly IFA supplementation to adolescent girls through institutions (schools) was an effective intervention to reduce anaemia and was scalable within the system (Kotecha *et al.*, 2009).

In an RCT in Nepal, while a monthly pill count monitoring by itself did not have an effect on anaemia levels, the pill count combined with an education programme had a greater positive effect on adherence than education alone. (Adhikari, K. *et al.*, 2009) A quasi-experiment in Indonesia of an education intervention with home visits using a pictorial handbook increased IFA compliance and haemoglobin levels (Nahrisah *et al.*, 2020).

Forgetfulness could be addressed by innovative program design elements, including direct observation of pill intake. A randomised controlled trial of 400 pregnant women in rural North India found that direct monitoring of pill uptake by ASHAs drives consumption, even when only the first dose was monitored (Ahamed *et al.* 2019). Further, a (non-randomised) controlled trial of 140 pregnant women in Belgaum, India, finds positive effects from direct observation from neighbours / other women from the same village as volunteer observers (Bilimale *et al.*, 2010). Such interventions would require careful consideration of their scalability and feasibility to avoid potential challenges to women's autonomy.

Reminders are another intervention aimed at reducing forgetfulness and building an IFA daily habit. Home-based reminders could be direct interpersonal communication such as automated voice calls, endorsing the active participation of family members as well as home-based reminder materials, with encouraging messages and pictures for visual reinforcement.

A randomised controlled trial of 130 pregnant women in a low-income setting in Mumbai suggests **automated voice calls** (along with short audio messages, three times per week for a period of three months, encouraging them to take iron supplements) may be effective in improving adherence. While the result lacks statistical power and may not necessarily generalise to a non-urban context, technologically assisted reminders are a promising direction for further research. (Pai, N., 2013). The intervention design differed from earlier interventions in that it used several principles from synthesised theories of behavioural change identified specifically in the context of iron supplementation among low-income women in India: Reminders may be effective when they (1) are personally relevant (2) use positive affective appeals (3) address salient beliefs (4) and provide achievable calls to action.

The intervention was **personally relevant** in novel ways: each message was recorded in the voice of the doctor that the woman met at enrollment and included a personal introduction at the beginning of each call. The doctor conducted the baseline interview and counselled the women on the importance of IFA supplements. Further, at this face-to-face visit, the automated voice call phone number was saved on the woman's phone with the name of the doctor. This personalisation could increase trust and obligation and reduce the chance of dismissing the call.

Positive beliefs help motivate IFA treatment. For instance, in this intervention. **Positive affective appeals** sought to make the listener more likely to look forward to and engage with the content, as well as in general, view IFA with a positive association. The intervention looked to **evoke positive emotions in the listener, using a gentle nurturing tone noting aspects of the child's physiological development** ("your child is starting to develop a nose") or sensory perception ("your child may be able to sense the sounds around you").

The messages did not attempt to introduce the patient to brand new concepts but sought to **address salient beliefs**: reinforcing concepts the women they had already been exposed to – and hopefully, already accepted – during personal counselling. The message closed with a **specific, immediate call to action**: to take the prescribed iron supplements. Ingesting medication is a low-effort, quick-to-perform action, and the gratification for investing in one's health and the health of the child is instant. This was a behaviour entirely within the women's control, as the study area had a

reliable supply of medication from an urban hospital.

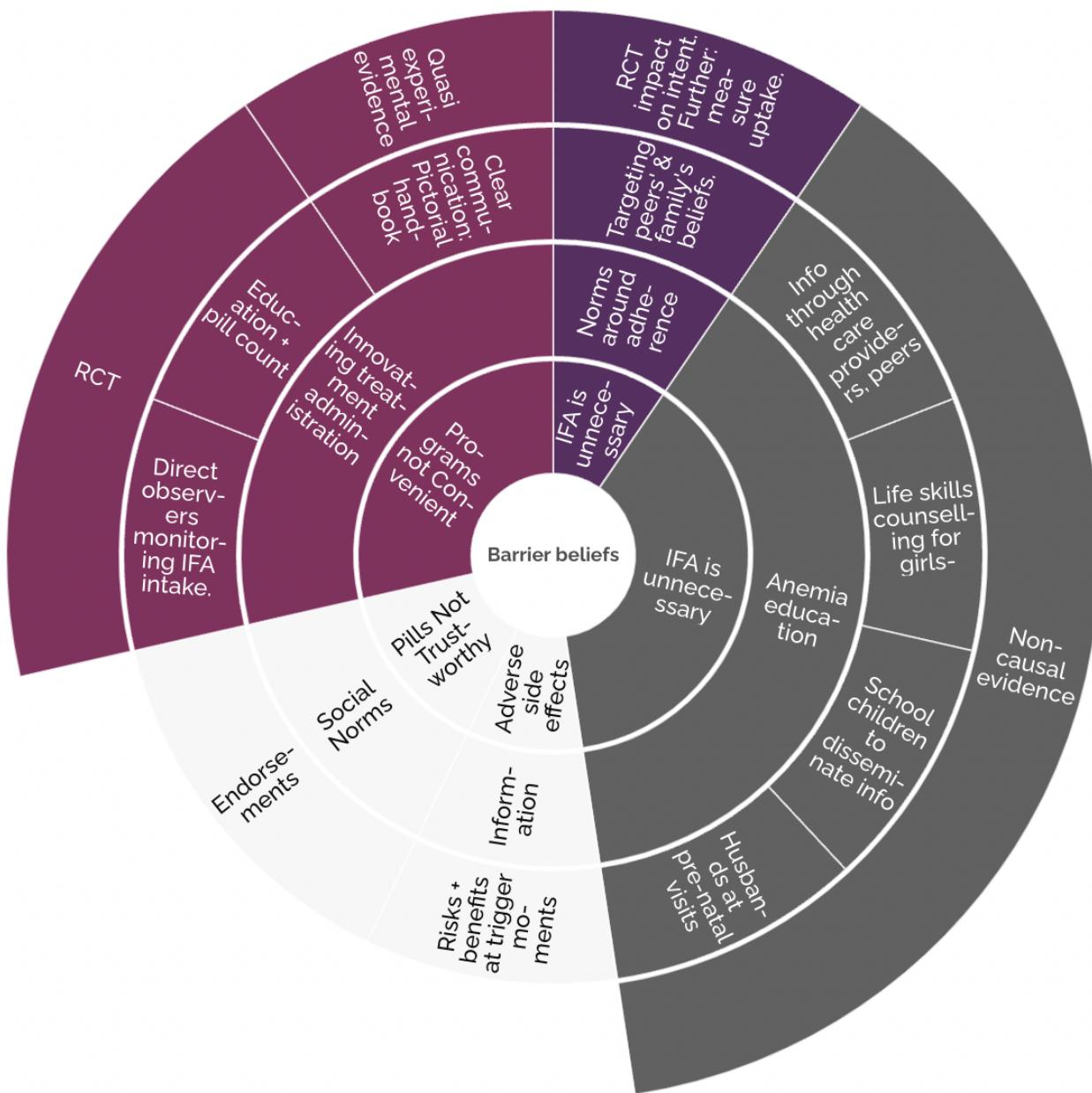
In summary, there **are at least six** kinds of interventions to address barriers and harness motivators for daily adherence:

1. Addressing descriptive and collective norms about uptake and consumption.
2. Innovating within education programmes to include novel influencers such as children or positive deviants.
3. Registering pregnancies early/earlier to give information about IFA and give free tablets earlier in pregnancy.
4. Making habit formation easier through increased monitoring or social consumption (in schools) and coupling monitoring with education programmes.
5. Reinforcing positive motivator beliefs through personalised and positive reminders that help develop the habit of adherence.
6. Including husbands, mothers-in-law and other intrahousehold influencers and gatekeepers in the above interventions.

## Directions for Design and Research

Figure 2.1 summarises the beliefs that hinder the initial uptake of IFA supplementation and the interventions and evidence related to them. The figure is to be read from the inside to the outside. The innermost ring lays out the barrier beliefs. The next immediate ring details the type(s) of intervention strategies potentially addressing each barrier. The specific interventions for each strategy follow in the next concentric ring. The outermost ring gives the type/strength of existing evidence for each intervention, highlighting gaps.

**FIGURE 2.1: IFA BARRIER BELIEFS, RELATED INTERVENTIONS AND TYPE OF EXISTING EVIDENCE**



High-rigour quasi-experimental and experimental evidence already exists on strategies to make programmes more convenient and targeting peers' and family's beliefs to change social norms. **These are strategies that can be considered for application in UP if they fit or could fit into government or large-scale non-government programmes there.** Further open research questions on these

high-evidence interventions include the following:

- To establish treatment as a social norm, research might seek to identify ways to make treatment more visible. For example, testing messaging around increased adherence rates may help drive individuals to seek treatment. This is a further line of inquiry building on the Odisha social norms study by Rimal *et al.* (2021), which tested three social norms approaches to communicating haemoglobin test results.
- Current research in India has linked social norms to intention to take IFA (or self-reported IFA uptake), but additional research might seek to measure actual uptake (and haemoglobin levels) in UP to establish that the approach can be replicated there and that is also addressed the potential intention-action gap.

Additional correlational and pre-post studies suggest some **promising directions for causal research** on social norms and/or education.

- Husbands being present at prenatal medical visits may improve norms around IFA uptake and adherence (Chourasia, A., 2013).
- Community education interventions using a positive deviance approach and incorporating best practices from peer role models in the community (Ndiaye, M., 2009).
- Social norms for IFA supplementation among *non-pregnant, reproductive-age women* remain to be studied causally. There is correlational evidence that beliefs that other community members think young women should take IFA even when not pregnant is associated with intentions to take IFA (Sedlander *et al.* 2021).
- Combining monthly life-skills training with weekly school-based IFA supplementation programmes was found to be critical in reducing the prevalence of anaemia in adolescent girls (Vir *et al.* 2008).
- Using school children as agents of social norms change and education may influence parents and family (Wang 2009).

**Fundamental evaluation research** is needed on social norms interventions specifically targeting the trustworthiness of IFA pills, which has emerged as a barrier

belief in qualitative evidence. In addition to what a message says, behavioural science suggests that who delivers the message is important to how it is received. Identifying trusted individuals (healthcare professionals, certain celebrities, political officials) who might endorse IFA treatment may help overcome barriers beliefs about the treatment.

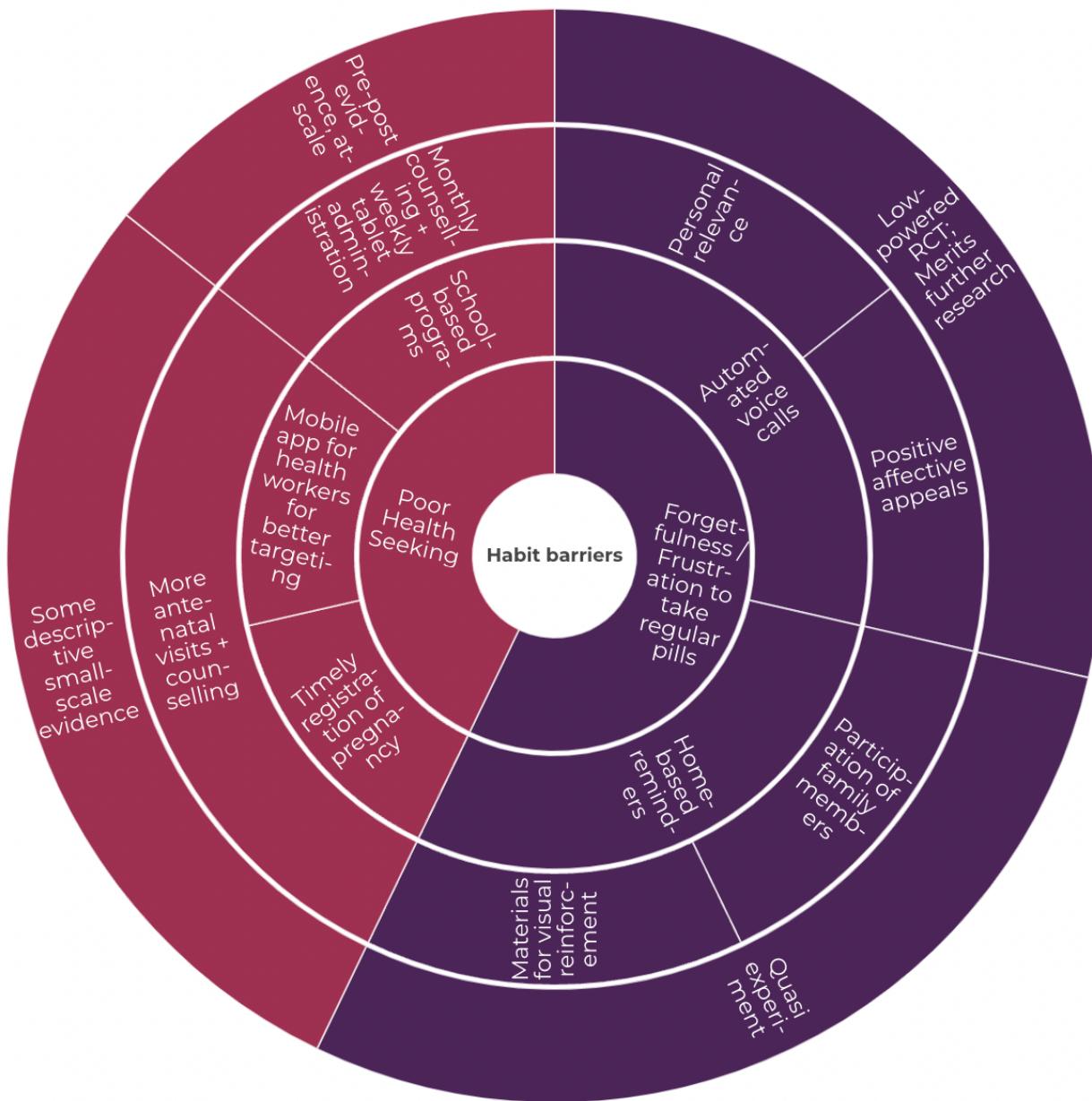
Another set of barriers around which there is limited evidence is barriers faced by the teachers administering school-based IFA: what kinds of training and other interventions can address the perceptions of anaemia risk and IFA benefit among teachers and improve program fidelity.

Figure 2.2 details some of the barriers, related interventions and evidence around establishing habits around IFA adherence, via **reminders**. The figure is also to be read beginning from the innermost ring listing the barriers, to the outer rings listing interventions and the evidence on them.

**Reminders to overcome forgetfulness** are an active area of research and high-rigour studies on their effectiveness exist. Further research might explore how to make these reminder tools more effective:

- While technology could simplify the use of reminders through calls/texts/emails, further research might explore how to employ **personalisation** to make these tools more effective and mitigate the risk of individuals becoming desensitised to tools such as automated calls. While existing research indicates several effective behavioural principles in reminder design (positive affective appeals, addressing salient beliefs and personal relevance, etc.), evidence is limited on the relative effects of various design elements.
- One way of making reminders more effective could be by combining it with the **participation of key actors** other than the target beneficiary. Most reminder tools focus on reminding pregnant women, but additional research could explore how reminder tools aimed at actors such as community health workers, husbands, mothers-in-law and other family members may also help drive adherence.

**FIGURE 2.2: EVIDENCE ON ESTABLISHING IFA CONSUMPTION HABITS VIA REMINDERS TO REINFORCE POSITIVE BELIEFS**



Additionally, there is correlational and pre-post evidence on promising interventions that could be adapted to UP and **tested causally**:

- While research on ante-natal visits points to early registration being linked with better uptake and adherence, it has not yet been shown that this

happens *because of* the counselling, rather than being a screening mechanism to find the “compliant types.” This presents an opportunity to generate more rigorous evidence on the importance of early registration for IFA uptake and consumption in UP.

- Home-based materials, involving the active participation of family members, and encouraging messages and pictures for visual reinforcement, may be effective strategies to improve the anaemia status of pregnant women (Shivalli *et al.*, 2018).

Fundamental design and evaluation research is needed to address barriers faced by other program actors. For example, intervention research on how to improve program fidelity when teachers run weekly supplementation programmes in schools has yet to be done in India.

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## **SECTION 04:**

# **APPENDIX: OVERVIEW OF THE GOVERNMENT SYSTEM FOR IFA SUPPLEMENTS**

## **Appendix: Overview of the Government System for IFA Supplements**

### **Government Initiatives to Reduce Anaemia**

The Government of India has prioritised the reduction of anaemia through several programmes and initiatives, including the free distribution of IFA tablets. Table A1 gives a summary of the leading programmes to address anaemia.

### **IFA Distribution System in UP**

Figure A1 shows the supply side of IFA tablet distribution in Uttar Pradesh. The GoUP's provision, supply, and promotion of IFA supplements are overseen by its DoMH&FW, supported by the National Health Mission in the state. UP Medical Supplies Corporation Limited, chaired by the Additional Chief Secretary (DoMH&FW, GoUP), carries the mandate for procurement and distribution of IFA supplements to district warehouses.<sup>2</sup>

Government functionaries collect the IFA tablets from the district warehouses for distribution to the different cohorts by the appropriate frontline worker (FLW). Table A2 below lists the cohorts and gives details of the distribution, Figures A2 and A3 show the user journey, and Table A3 provides details of the FLW responsibilities.

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<sup>2</sup><http://upmsc.in/>

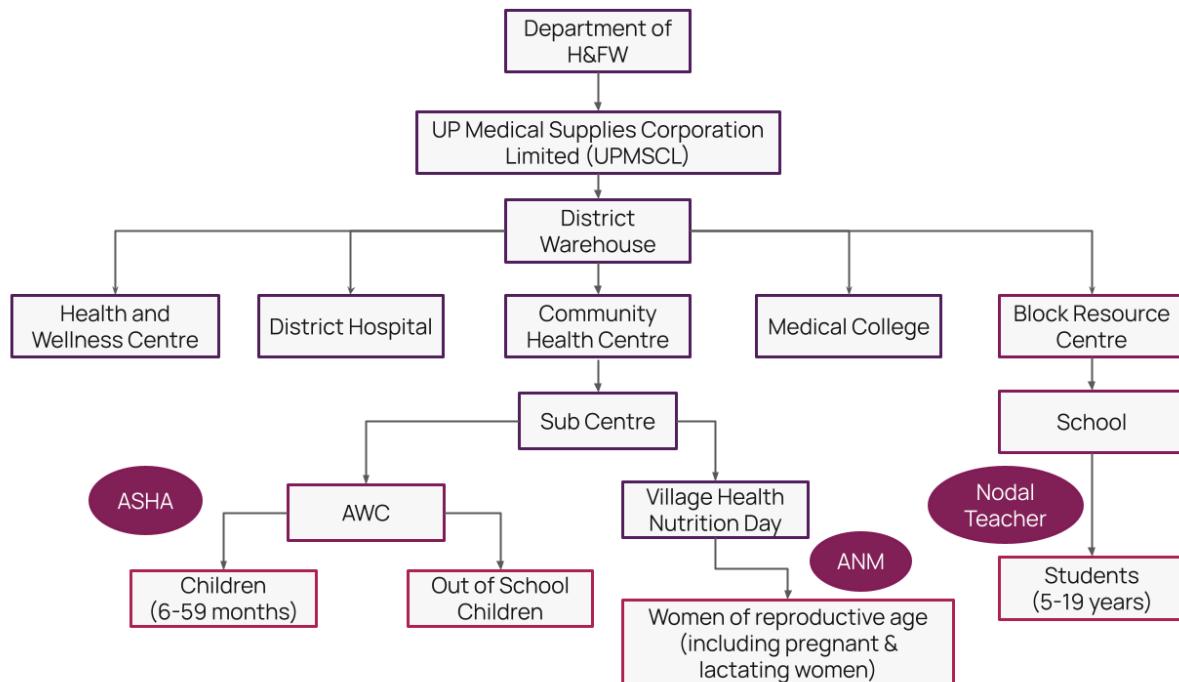
**TABLE A1: KEY GOI SCHEMES TO ADDRESS ANAEMIA**

INITIATIVE	YEAR	IFA SUPPLEMENTATION COMPONENT
<b>ANAEMLIA MUKT BHARAT</b>	2018	<ul style="list-style-type: none"> <li>• School-going adolescents are provided weekly IFA (Blue) tablets by school teachers</li> <li>• Out-of-school adolescent girls are provided IFA (Blue) tablets through quarterly Adolescent Health Day component of Rashtriya Kishore Swasthya Karyakram at Aanganwadi Centres (AWCs)</li> <li>• Women of reproductive age (WRA) who are not pregnant or lactating are provided weekly IFA (Red) tablets through the VHND platform. ASHA mobilises the target beneficiaries to attend the VHNDs for counselling by ANM on the importance of IFA supplementation. Anaemic WRAs are provided treatment and advice on supplementation</li> <li>• Pregnant women are provided IFA tablets through antenatal care (ANC) contacts/VHND/Pradhan Mantri Surakshit Matritva Abhiyaan (PMSMA)</li> <li>• Lactating women are provided IFA tablets via the VHND platform when they bring their children for immunisation</li> </ul>
<b>PMSMA</b>	2016	Supplements are provided to women attending the PMSMA clinics via single window system
<b>NATIONAL IRON+ INITIATIVE</b>	2013	Weekly supplementation for adolescents and WRA ensured
<b>WEEKLY IFA SUPPLEMENTATION</b>	2012	Adolescents are administered supplements under supervision following a fixed day approach
<b>SCHEME FOR ADOLESCENT GIRLS (SABLA)</b>	2010	Focuses on all out-of-school adolescent girls to provide 100 IFA tablets to each beneficiary through supervised consumption
<b>VHND</b>	2007	Organised once every month at the AWCS in the village to ensure distribution of IFA tablets among other services

**SUPPLEMENTATION  
INTERVENTIONS BY  
MINISTRY OF HEALTH  
AND FAMILY  
WELFARE, GOI**

Adolescents are given weekly dose of supplements, and pregnant and lactating women are provided supplements daily for 100 days during pregnancy followed by the same dose for 100 days in the postpartum period

**FIGURE A1: IFA DISTRIBUTION SYSTEM IN UTTAR PRADESH**



**TABLE A2: COHORT-WISE DISTRIBUTION SYSTEM**

<b>COHORT</b>	<b>DISTRIBUTION SYSTEM</b>
<b>IN-SCHOOL ADOLESCENTS<sup>3</sup></b>	<ul style="list-style-type: none"> <li>● Supplies are handed over to the Education for All Project Board at the block level that manages the actual distribution to schools</li> <li>● A nodal teacher is made responsible for administering IFA to school-going adolescents</li> </ul>
<b>OUT-OF-SCHOOL ADOLESCENTS</b>	<ul style="list-style-type: none"> <li>● Through the AWCs with some assistance from the ASHAs<sup>4</sup></li> </ul>
<b>PREGNANT AND LACTATING WOMEN</b>	<ul style="list-style-type: none"> <li>● Through routine ANC services provided by the ANMs at designated VHNDs<sup>5 6</sup></li> <li>● Other FLWs (ASHAs and AWWs) are responsible for follow-up and ensuring distribution to those women who are unable to attend the VHNDs</li> </ul>

<sup>3</sup> <https://anemiamuktibharat.info/resources/>

<sup>4</sup> Rai, R. (2022). Iron-and-folic-acid supplementation among adolescents (aged 10–19 years) in two North Indian States, 2015–2016: A sex-stratified analysis. *Public Health Nutrition*, 25(3), 617–622. doi:10.1017/S136898002000508X [Link]

<sup>5</sup> Sankaran D, Sharma P, Lazarus L *et al.* Visualizing participant experiences in maternal and child nutrition studies using timeline mapping. *Gates Open Res* 2020.

<https://doi.org/10.12688/gatesopenres.13055.2>

<sup>6</sup> VHNDs are an inter-sectoral convergence platform at the village level, where the community can access a package of services, including registration of pregnant women, ANC services, immunization for all eligible children, growth monitoring, supplementary food provision, and health education.

**FIGURE A2: USER JOURNEY FOR PREGNANT AND LACTATING WOMEN**

	<b>1 AWARE OF THE PROBLEM AND SOLUTION</b>	<b>2 CONSIDER AND COMPARE OPTIONS</b>	<b>3 SOLUTION PROVIDED WITHOUT COST</b>	<b>4 TRY OUT THE SOLUTION</b>	<b>5 REMINDED FOR ADHERENCE</b>	<b>6 ADHERENCE TO THE 180 DAY COURSE</b>
<b>SYSTEM TOUCH POINT</b>	ANMs and ASHAs inform women at VHNDs and on home visits	Routine ANC services provided by the ANMs at VHNDs to promote IFA tablets	For moderate cases: provided IFA tablets to consume twice a day for 180 days. Severe cases of anaemia are referred to PHC/CHC/ First Referral Unit (FRU)/ District Hospital	Women start taking the tablets.	ANM and ASHA at VHNDs and home visits, and Anganwadi Worker at AWC.	A low proportion of women adhere to the entire course.
<b>DATA<sup>7 8</sup></b>	45.9% (NFHS-5)	-	89.90 (HMIS)	-	22.3% NFHS-5	9.7% (NFHS-5)
<b>NOTES ON THE DATA</b>	Pregnant women age 15-49 years who are anaemic	-	Percentage of pregnant women given IFA tablets	-	Mothers who consumed IFA for 100 days and more.	Mothers who consumed IFA for 180 days and more.

<sup>7</sup> NFHS-5: [Uttar Pradesh.pdf \(rchiips.org\)](#)

<sup>8</sup> HMIS: <https://anemiamukt Bharat.info/view-your-data-monthly/>

### FIGURE A3: USER JOURNEY FOR IN-SCHOOL ADOLESCENTS

	<b>1 AWARE OF THE PROBLEM AND SOLUTION</b>	<b>2 CONSIDER AND COMPARE OPTIONS</b>	<b>3 SOLUTION PROVIDED WITHOUT COST</b>	<b>4 TRY OUT THE SOLUTION</b>	<b>5 REMINDED FOR ADHERENCE</b>	<b>6 ADHERENCE FOR WEEKLY UPDATE</b>
<b>SYSTEM TOUCH POINT</b>	Line listing of all anaemic cases to be maintained in the school registers for IFA tablets.	Parents may refuse uptake	IFA tablets provided in the school for intake.  Severe cases are referred to the medical officer at FRU/District Hospital	Uptake the tablets in the school.	Follow-up by ANM/LHV/M PHW.	Note: schools don't run all year, so tablet availability will not be regular.
<b>DATA<sup>9 10</sup></b>	66.4 (NFHS-5)	-	20.1 (HMIS)	-	-	-
<b>NOTES ON THE DATA</b>	Children aged 6-59 months who are anaemic	-	Percentage of children in class 6-12 provided with IFA tablets in schools.	-	-	-

Note, for out-of-school adolescents, the IFA tablets may be provided through the AWW.

<sup>9</sup> NFHS-5: [Uttar Pradesh.pdf \(rchiips.org\)](https://rchiips.org/NFHS-5/Uttar_Pradesh.pdf)

<sup>10</sup> HMIS: <https://anemiamuktbhara.info/view-your-data-monthly/>

**TABLE A3: KEY ROLES AND RESPONSIBILITIES OF FLWS**

<b>AGENT</b>	<b>KEY ROLES AND RESPONSIBILITIES RELATED TO IFA</b>
<b>ANM</b>	<ul style="list-style-type: none"> <li>• Track demand for IFA supplements by maintaining stock register;</li> <li>• Apprise Medical Officer-in Charge and pharmacist of requirements via phone calls, in-person meetings, messages, etc.;</li> <li>• Collect demanded stock from concerning facility and store in their property before distribution;</li> <li>• In case of absence, request another ANM to collect stock;</li> <li>• Request ASHAs to make home visits to distribute supplements to those who are unable to attend VHNDs;</li> <li>• Fill 'Anmol' and 'e-Kavach' dashboards with information of beneficiaries.</li> </ul>
<b>ASHA</b>	<ul style="list-style-type: none"> <li>• Collect IFA supplements from ANMs/Community Health Officers (CHOs);</li> <li>• Ensure door-to-door delivery of supplements;</li> <li>• Health check-ups of pregnant women to diagnose anaemia;</li> <li>• Health check-ups of children to diagnose anaemia;</li> <li>• Maintain a record of their tasks in ASHA diary;</li> <li>• Motivate for consumption of and adherence to IFA supplements.</li> </ul>
<b>AWW</b>	<ul style="list-style-type: none"> <li>• Motivate uptake and regular consumption of IFA supplements and ensure their intake at AWC;</li> <li>• Collect IFA supplements from ASHA/ANM;</li> <li>• Maintain stock register and present it for inspection when demanded;</li> <li>• Prepare and raise self-estimated demand for supplements to ANMs/CHOs/Supervisor via phone calls, messages or by visiting the Community Health Centres (CHCs) on VHNDs;</li> <li>• When informed by Supervisor about availability of demanded supplements, visit CHCs for collection and subsequent storage;</li> <li>• Ensure door-to-door delivery of supplements for out-of-school adolescents as well as pregnant and lactating women;</li> <li>• Follow a schedule for distribution like on Annaprashan Diwas, Vajan Diwas, VHND, immunisation day, etc.</li> <li>• Maintain distribution register;</li> <li>• Provide supplements to girls attending private schools, if identified as anaemic;</li> <li>• Obtain training from Supervisor on aspects like motivating beneficiaries, record keeping, monitoring, etc.</li> <li>• Upload data on Poshan tracker via mobile application.</li> </ul>

**SCHOOL  
TEACHER**

- Consume IFA tablets in front of students to motivate them to consume their weekly tablets;
- Provide supplements once a week to students;
- Ensure that supplements are consumed by adolescents in their presence;
- Update register, marking adolescents who have received IFA supplementation.



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