Improving Anemia Management in Mansa District, Punjab, India

Introduction

Iron deficiency anemia in pregnancy can be successfully managed by simple interventions. It can be prevented and alleviated by eating foods high in iron and taking oral iron supplements. More serious cases can be treated by iron sucrose injections or blood transfusions. But while the treatments are simple, ensuring that all pregnant women receive the right and complete course of care at the right time is complex, requiring coordinated actions of multiple levels of a health system. In an ideal system, few women would develop anemia in pregnancy, and those who did would be tested and treated as early as possible. Moderate anemia would become mild anemia, and severe anemia would be prevented. But in the State of Punjab, as in many parts of India, this was not happening. Here, not enough was being done to prevent women from becoming anemic or to prevent anemic women from getting worse. Too many women were treated late in their pregnancies after becoming seriously anemic, and women being treated for anemia were not receiving all the care they should. Systems were not in place to track patients to ensure that they received the care they needed to get better. When it came to anemia in pregnancy, the system was not succeeding.

The USAID Applying Science to Strengthen and Improve Systems (ASSIST) Project began working with health facilities in Mansa District, Punjab to improve anemia prevention and management in July 2014. By identifying gaps in anemia care and coordinating their response, the facilities involved in this intervention were able to achieve positive results. This short report highlights the need for a strong, well-coordinated health system to reduce the burden of anemia in pregnancy, describes how such a system was built in Mansa District, and presents the results of this new system.

Anemia in India and Punjab

Iron deficiency anemia affects pregnant women in particular because there are many demands on the iron stores in their system: increasing maternal blood volume, hemoglobin formation for the growing fetus, and placental development. Anemia in pregnancy has been recognized globally as a major public health problem, contributing to more than 115,000 maternal and 591,000 perinatal deaths globally every year (Ezzati et al. 2004). It is also an important contributor to maternal morbidity, increasing the likelihood that a baby is born at a low birth weight, which in turn contributes to increased infant mortality and morbidity.

India has one of the highest prevalence rates of anemia in the world. The World Health Organization (WHO) estimates that 65-75 percent of pregnant women in India are anemic, compared to 14 percent in developed and 51 percent in developing countries (DeMayer & Tegman 1998; WHO 2004). It is estimated that anemia is directly

<table>
<thead>
<tr>
<th>Iron deficiency anemia in pregnancy (Hg levels)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No anemia</td>
</tr>
<tr>
<td>Mild anemia</td>
</tr>
<tr>
<td>Moderate anemia</td>
</tr>
<tr>
<td>Severe anemia</td>
</tr>
</tbody>
</table>

Source: NRHM 2013
Nutritional anemia is a major public health problem in Punjab and is primarily due to iron deficiency. The District Level Household and Facility Survey (DLHS) 4 (2012-13) data suggests that in Punjab, anemia is widely prevalent among all age groups and is particularly high among pregnant women (58%) (DLHS 4 (2012-2013)). In addition, 43% of adolescents (15–19 years) are anemic, and nearly 5% of pregnant women and 3% of adolescents (15–19 years) have severe anemia – and program data from health facilities indicates that these figures may be underestimates. This means that reducing anemia among pregnant women in Punjab is a daunting challenge because many women and girls are anemic even before they become pregnant.

How a well-functioning system can address anemia

Typically, iron deficiency anemia can be managed successfully. Treatments vary depending on the cause and severity, ranging from oral iron supplements for prevention of mild or moderate cases to injectable iron supplements for moderate cases to blood transfusions and other treatments for the most severe cases. However, while the treatments themselves are straightforward, there are serious challenges to ensuring that: 1) preventative measures reach all women of child-bearing age, 2) all pregnant women are tested and diagnosed as early as possible, 3) anemic women receive the right treatment after diagnosis, and 4) women complete their course of treatment over time. It is far better to treat a woman with mild anemia early in her pregnancy or prevent her from developing anemia in the first place using oral supplements than it is to treat her for severe anemia using blood transfusions late in her pregnancy. To achieve appropriate care, each level of the health system must work to manage anemia as best it can and must coordinate with other levels of the health system, relying on the primary levels of care to prevent as many cases as possible and to refer any cases that they cannot manage to higher, more specialized levels of care (see Figure 1).

Figure 1. Management of anemia in pregnancy at all levels of the health system
However, this ideal system often does not happen in reality. In Punjab, there are major gaps in anemia management. Women frequently register for antenatal care (ANC) late in their pregnancy (only 59% of women register during the first trimester and many of these are late in the first trimester); thus, missing the chance for early detection. Only 20% of women in Punjab receive full antenatal care (four ANC visits, including one in the first trimester; tetanus toxoid injection; and iron and folic acid supplementation); in Mansa District, this figure is even lower (11.5%) (DLHS 4 (2012-2013)).

Even worse, hemoglobin (Hb) testing is often absent from the ANC appointments that do occur. As a result, while we assume that around 5.3% of pregnant women in Punjab are severely anemic based on DLHS estimates. Punjab Health Management Information Systems (HMIS) statistics indicate that only 0.8% of pregnant women are diagnosed with severe anemia. This means that as many as four to five percent of pregnant women in Punjab are severely anemic, but have not been identified as such and are consequently going untreated. We also know that even those who are identified as anemic are not receiving sufficient treatment. For example, pregnant women who are diagnosed with moderate anemia should be prescribed a double dose of iron-folic acid supplements (i.e., 200 IFA tablets), but 76% of these cases were not prescribed accordingly. And while 88% of pregnant women were given 100 IFA tablets (suboptimal treatment in the case of moderate anemia), only 31.5% completed the course of treatment.

Quality improvement support for Mansa District, Punjab

Although the State of Punjab generally performs better than the average state in India on most health indicators, Mansa District in Punjab is one of the Government of India’s Reproductive, Maternal, Neonatal, Child and Adolescent (RMNCH+A) health initiative’s high-priority districts as its health indicators are worse than the Punjab state average. Mansa is home to about 900,000 people, and around 7,500 women deliver every year.

The USAID Applying Science to Strengthen and Improve Systems (ASSIST) Project began working on improving maternal and newborn care with the District Hospital (DH), two Sub-District Hospitals (SDH), one Primary Health Center (PHC), and three Sub-Centers (SC) in Mansa in March 2014. After successfully improving compliance with delivery and newborn care standards (administration of oxytocin within one minute of delivery, sterile cord cutting and clamping, initiating breastfeeding within one hour of birth, administering vitamin K injections to newborns, and increasing the number of times post-partum vitals are checked), the project’s District Improvement Coordinator in Mansa and the facility improvement teams she supported started focusing on anemia in July 2014.

By this point, the teams of health care providers in each facility had gained the skills necessary to use improvement approaches to address gaps in care, confidence from their earlier successes, experience working together and meeting with providers from other facilities in “learning sessions” where they shared their work, and trust in the ASSIST staff supporting them.

Community-level anemia management

In an ideal system, anemia management begins at the community level, where efforts in prevention and early testing will yield the greatest results. ASSIST began work at the community and Sub-Center levels by establishing teams comprising auxiliary nurse midwives (ANMs), accredited social health activists (ASHAs), ASHA facilitators (who supervise ASHAs), and lady health visitors (who supervise ANMs at several Sub-Centers) to identify issues and challenges related to anemia. In the three Sub-Centers where the work began, they identified the following issues:

- Antenatal registration was about 90%, but most women registered in the last week of the first trimester or early in the second trimester, meaning many anemic women went months without an opportunity for diagnosis and treatment.
- ASSIST staff observed that during ANC visits, ANMs tended to only administer tetanus toxoid (TT) injections and provided iron-folic acid (IFA) tablets. Other ANC components were not being practiced, such as measuring hemoglobin levels, taking a woman’s medical history, conducting an obstetrical examination, measuring blood pressure and weight, and providing counselling. This meant that many anemic women missed an opportunity to be
diagnosed. On top of that, the lack of services provided contributed to the perception among women in the community that there were limited benefits to ANC, which in turn contributed to late and incomplete registration.

- The Sub-Centers’ ANC registers showed that ANC visits were not happening according to the appropriate schedule (one visit each in the first and second trimester, and two visits in the third trimester). Other HMIS data corroborated that only 20-30% of pregnant women came for three ANC visits and almost none for a complete schedule of four ANC visits.

- No effective mechanism existed for the identification and tracking of high-risk pregnancies. Officially, ANMs were supposed to maintain the record and details of all high-risk pregnancies in a separate register and report these high-risk cases to a higher level, but in reality this did not always happen, and follow-up was not ensured. In an ideal system, women identified as high risk would be referred to a higher facility, tracked to ensure they received care at that facility, and then followed up with back at the Sub-Center and community levels to ensure that treatment was completed and effective.

Recognizing these gaps, the facility teams decided to improve ANC. They wanted to increase early registration and ensure that all women came for four ANC visits per the recommended schedule so that severely anemic women could be identified early and managed appropriately. They also set up a referral and tracking system to make sure identified cases were treated.

The team identified what they believed were the reasons for low registration in the first trimester. They believed that the primary problem was that ASHAs and the community were not aware of the benefits of early registration. Further, few women in the community wanted to admit that they were pregnant to ASHAs or ANMs before the second trimester. They believed it was bad luck for people to know of their pregnancy, and were concerned that if they told ASHAs that they were pregnant, the ASHA would tell other people in their community. In addition, Mansa District in Punjab has one of the lowest sex ratios in India, with 883 females for every male, indicating that sex-selective abortions likely occur (Census Organization of India 2011). ASHAs and ANMs themselves sometimes preferred to avoid registering pregnant women early in pregnancy to avoid the paperwork required if baby is lost early in the pregnancy. As a result of these factors, the ASHAs and ANMs had a great challenge before them to convince people of the benefits of early registration and risks of anemia, build trust around confidentiality, and dispel persistent myths about antenatal care, such as that TT injections could lead to spontaneous abortions or iron tablets cause babies to have darkened skin.

With the support of the ASSIST District Improvement Coordinator in Mansa, the facility teams in three Sub-Centers began testing change ideas that they believed could increase early registration, get pregnant women on track to complete all four recommended ANC check-ups on schedule, and identify and manage anemic women early. Their first idea was that they could educate women and their families about the benefits of healthy hemoglobin levels for both the mother and baby and the need to identify and treat anemia early. Because communities in Mansa valued strong, healthy babies – especially males – the team emphasized the problems that a baby can face if the mother is anemic during pregnancy, since this type of messaging motivated pregnant women and families to seek care early.

To implement this idea, the teams conducted a series of Plan-Do-Study-Act (PDSA) cycles to test and learn from changes (Table 1). The idea of PDSA cycles is to test a change in existing processes or behaviors by developing a plan to test a change (Plan), conducting a test (Do), observing and learning from the results (Study), and then deciding on next steps on the basis of those results (Act).
Table 1. Plan-Do-Study-Act (PDSA) cycles to address anemia in pregnancy

<table>
<thead>
<tr>
<th>Goal</th>
<th>Plan</th>
<th>Do</th>
<th>Study</th>
<th>Act</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>To make the nurses understand the information that needs to be shared with clients and the community</strong></td>
<td>Test training one nurse on the correct information to be conveyed about anemia (why to treat and how)</td>
<td>ASSIST coach (District Improvement Coordinator) taught one nurse for 1 hour</td>
<td>The nurse was able to repeat back key messages¹, but with some hesitation and difficulty</td>
<td>Decided to write out talking points</td>
</tr>
<tr>
<td></td>
<td>Develop written talking points</td>
<td>The nurse wrote draft version of points which the coach reviewed at next visit</td>
<td>Coach helped with minor revisions (a series of even smaller PDSAs)</td>
<td>Decided to test if ASHA understands the talking points</td>
</tr>
<tr>
<td><strong>To make nurses teach this information correctly to ASHAs</strong></td>
<td>Train nurse to teach the material correctly</td>
<td>Nurse practice teaching coach</td>
<td>Nurse able to teach correctly</td>
<td>Decide that nurse is ready to train an ASHA</td>
</tr>
<tr>
<td></td>
<td>Build skills of ASHA to counsel on anemia</td>
<td>Nurse trains four ASHAs on this material</td>
<td>ASHAs understood the material and were able to repeat back the counseling</td>
<td>Decide to find out if ASHAs can deliver this material to women and their families</td>
</tr>
<tr>
<td><strong>To make ASHAs and nurses understand how to share this information with clients and the community</strong></td>
<td>Test four ASHAs ability to convey messages by talking about anemia with their own families</td>
<td>Four ASHAs talk to their own families about anemia and asked if this information was useful or not</td>
<td>Family members thought the information would change behavior</td>
<td>Building on confidence gained from test, ASHAs decided to test on eligible couples</td>
</tr>
</tbody>
</table>

¹ Key messages included: the risks and/or complications that can occur for the mother and baby if the mother is anemic, what diet can alleviate anemia, when to take iron supplements, why vitamin C is important in the diet to aid iron absorption, when to give a double dose of iron tablets, when and where to access the medical system, danger signs, birth preparedness, some history taking.
<table>
<thead>
<tr>
<th>Goal</th>
<th>Plan</th>
<th>Do</th>
<th>Study</th>
<th>Act</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>To make ASHAs and nurses understand how to share this information with clients and the community (continued)</strong></td>
<td>Nurses will talk about anemia on weekly immunization day (same day as feedback from previous test)</td>
<td>On immunization day, pregnant women and other mothers come to the Sub-Center to immunize their children; often accompanied by other family members like grandmother or husband. Nurses used the opportunity to talk to families and the community about anemia</td>
<td>The message was well received. Two women even went home immediately to bring young women for hemoglobin check. This result reinforced that people are very motivated to take action when they perceive there is a health risk to the baby.</td>
<td>Move on to larger test of effectiveness</td>
</tr>
<tr>
<td><strong>To make sure ASHAs and other community health workers (CHWs) can pass on this information correctly to decision makers</strong></td>
<td>Four ASHAs will talk to the eligible couples or their families they are visiting this week</td>
<td>Four ASHAs talked to families likely to want children (prioritized those with 0 or 1 child and those with no boys) Nurse double-checked with one house per CHW (1 week)</td>
<td>Families said that the information was useful and they would come for care Nurse identified that 1 ASHA was not conveying correct information</td>
<td>Move on to a larger test of effectiveness after nurse arranged 1 hour meeting with the ASHA conveying incorrect information to help her understand how to pass this information correctly</td>
</tr>
<tr>
<td><strong>To spread the testing to a larger scale and observe the results</strong></td>
<td>Four ASHAs to talk about anemia with the families they are visiting for the next month</td>
<td>Four ASHAs talked to families Nurse at clinic asked new attendees why they were coming to the clinic Nurse at clinic kept track of gestational age at first visit</td>
<td>Many women coming to the clinic said that they were motivated by anemia counseling to come Women coming had lower gestational age, indicating success in earlier registration</td>
<td>Continue scale up to other clinics. Move on to developing additional methods of increasing awareness of anemia and the need for testing</td>
</tr>
</tbody>
</table>
During this community education campaign, teams learned that correct and consistent information is essential. If all health workers say the same thing about the importance of early hemoglobin testing and anemia management, then it reduces the chance that individual women and their families won’t believe what they hear and increases the chance that they will take steps to prevent and treat anemia in pregnancy.

Other activities done at the Sub-Center level for anemia management

- Auxiliary nurse midwives (ANMs) started giving 200 IFA tablets rather than 100 IFA tablets to all anemic pregnant women. This double dose of IFA tablets is more likely to lead to a significant increase in a woman’s hemoglobin (iron) levels. While prescription of 200 IFA tablets was within the existing guidelines, it was not the standard practice in Punjab. These kinds of changes at the Sub-Center level required the support of much higher levels of the health system. Without approvals, district-level auditors would question why 200 IFA tablets were being prescribed. ASSIST staff worked with State-level administrators in Punjab on the issue, which resulted in the Government of India issuing guidance to all health facilities to provide double the amount of IFA tablets during and for six months after pregnancy if a woman is anemic. To follow this recommendation from the federal government, the State of Punjab increased its procurement of IFA tablets from 50 million to 330 million tablets per year based on the delivery load of the state.

- Managing and tracking the care and treatment of anemic pregnant women was another problem that the health system faced. When the improvement intervention started, there were no specific registers or formats available to maintain the records of anemic pregnant women. Categorizing a woman’s condition as mild, moderate, or severe was another challenge that needed to be addressed because each category needs a different type of management and tracking. There was an ANM who was using a bag with two packets to track children with missed immunizations. When the team saw this, they realized that this was a simple way to store Mother and Child Protection (MCP) cards (which already existed for recording details for mother and child health), categorized by anemia status. ANMs started entering all the details of ANC visits on MCP cards and filing them in the correct pouch for better tracking and management (see Figure 2).

- ANMs started maintaining a separate register for high-risk pregnancies to record details about anemic women, including referral and follow up visits and hemoglobin and blood pressure reports.

- The ANMs, ASHAs, and ASSIST staff also worked with other community members and groups (ASHAs’ husbands, local social workers, shopkeepers, local NGOs, etc.) to spread information regarding anemia to the community.

Results achieved at the Sub-Center level

The teams at the three facilities testing these changes began to see results quickly. Before beginning the work, women were typically coming for their first ANC visit at around 13 weeks of pregnancy. From August 2014 to February 2015, the first ANC appointment occurred on average before the eighth week of pregnancy (Figure 3). For those with anemia, this meant five or more additional weeks to manage their condition before it got worse. By having their first ANC visit in the first trimester, these women were then on track to have four ANC visits, and ANMs were able to identify high-risk
pregnancies much earlier in pregnancy and to refer high-risk women to hospitals for treatment. They were also able to track them to make sure they received appropriate and effective care.

**Figure 3. Women registering earlier in pregnancy for antenatal care and increased identification of high-risk pregnancies at Sub-Center level (May 2014 – Jan 2015)**

### Facility-level anemia management

While ASSIST staff worked with counterparts at the Sub-Center and community level, they also worked concurrently with other levels of the health system, knowing that making changes at the Sub-Center level alone would not be sufficient to reduce anemia in pregnant women in Mansa District. In Sub-District Hospital (SDH) Budhlada, the hospital started to focus on improving facility-level anemia management in July 2014. At that time, no fixed mechanism existed at the facility for providing treatment to severely anemic women coming to the facility. As a result, many women did not receive treatment on time, and those who were started on treatment often didn’t complete it. Generally, the gynecologist prescribed IFA tablets along with Vitamin C for managing mild and moderate anemia. For severe anemia, facility staff administered five iron sucrose injections on every alternate day for 10 days (irrespective of hemoglobin level), and women with hemoglobin levels of less than 5 g/dl were referred to the district hospital for a blood transfusion.

To develop a plan to improve care, ASSIST staff worked with a team of health care providers at SDH Budhlada to create a diagram of the existing processes by which anemic women are treated. By going through this exercise, the team identified gaps in the process of care. With no system to track...
anemic women, they were relying on the women themselves to ensure that they completed the prescribed course of iron sucrose injections. The staff agreed to modify their existing process and developed a mechanism within the facility wherein each woman coming to the outpatient department (OPD) for ANC check-up, if found to be severely anemic, would be initiated on treatment, tracked and followed up with until delivery. In mid-2014, the Government of Punjab began piloting an incentive system in two districts that rewarded ASHAs with Rs 400 (about $6.50) for each woman they support who completes their prescribed course of iron sucrose therapy. By creating a tracking system whereby information flowed between the ASHAs and sub-district hospital staff through Sub-Center ANMs, the system improved its ability to care for anemic women and saw some positive results.

Modified Process

Results at the Sub-District Hospital level

There are several things one would expect to observe if this concerted effort to reduce anemia in pregnancy in Mansa District had an impact. One is that fewer women should have been identified as severely anemic during ANC visits. This was observed at Budhlada SDH. In the five months prior to the start of the intervention in July 2014, an average of 28 women per month were determined to be severely anemic during their ANC visits at the facility. For the subsequent five months, that number was reduced to fewer than seven. This reduction reflects both more effective strategies to prevent severe anemia (seen in the reduced number of new cases) and more effective care treating severe anemia (seen in the reduced number of returning cases) (see Figure 4).

After a system for tracking anemic women was put in place and women's hemoglobin levels were being tested more times during pregnancy, another thing we would expect to observe is a significant rise in the hemoglobin levels of individual women. Women who were identified as severely anemic during an antenatal care visit from July to October 2014 at Budhlada SDH tended to do better if they were treated earlier in their pregnancy. Of 64 women identified as severely anemic, 47 women returned for a subsequent ANC visit at Budhlada (six women delivered in Mansa District before their next ANC, seven sought treatment outside the district, one refused treatment, and three were lost to follow-up). Their hemoglobin levels had increased by an average of 1.2 g/dl (15% had increased by at least 2.0 g/dl, n=64). For those that returned for two ANC visits before delivering, their hemoglobin levels increased by an average of 1.3 g/dl (20% by at least 2.0 g/dl, n=33), and for those who returned for third visit before delivering, their hemoglobin levels had increased by an average of 1.6 g/dl (33% by at least 2.0 g/dl, n=9).
Figure 4. The number of cases of severely anemic pregnant women reduce at Budhlada Sub-District Hospital (Mar 2014 – Mar 2015)

While encouraging, these results were less dramatic than the team had hoped. If a woman is identified with severe anemia in the second trimester, she should, with appropriate treatment, have normal hemoglobin levels – or at least be only mildly anemic – by the time she delivers. The team identified several possible reasons for the modest gains in hemoglobin levels among severely anemic women: measurement issues by either the hospital lab technicians or Sub-Center ANMs, worm infestation reducing the effectiveness of treatment, iron sucrose dosage problems, and missed disease diagnoses.

To investigate these problems, ASSIST staff and Mansa District counterparts conducted a validation study of hemoglobin (Hb) testing done by both ANMs and lab technicians. The study found no issues with the tests conducted by lab technicians at the SDH, but considerable issues with the tests administered by ANMs at the Sub-Center level. The root cause identified in most cases was equipment, some of which was damaged and giving incorrect readings and has since been replaced. The State Medical Officer (SMO) also provided retraining on Hb testing for the ANMs.

To complement this quantitative study, the ASSIST District Improvement Coordinator also interviewed women about their experiences of anemia care to gain a better qualitative understanding of possible gaps. Through these interviews, the team was able to identify additional issues affecting the effectiveness of the women’s iron deficiency anemia treatment. For example, many women were taking the iron supplement with milk, which is contraindicated as the calcium in milk reduces iron absorption. Other women felt that the iron supplements were causing nausea and headaches, and so discontinued the supplements. While the sample size was small, the results give the team confidence that the quantitative data were real and that women who received proper treatment showed improvement.

The gynecologist and staff nurses at SDH Budhlada were confident that women had worm infestation. Because they felt that administering stool examinations for all ANC visits was not feasible, they started prescribing albendazole to all pregnant anemic women in September 2014.

Lastly, there were several issues identified with iron sucrose dosage. The staff were giving only five doses of iron sucrose injections to all the severely anemic women irrespective of their hemoglobin levels because iron sucrose ampoules are costly. The standard dosing formula calls for up to 15 doses. ASSIST supported negotiation with the State Government for SDH Budhlada to receive 300 ampoules, which allowed the facility to test providing some anemic pregnancy women with a varying dosage, according to the standard formula available, and tracking them until their delivery. This was tested on a small scale on four women, whose hemoglobin levels improved by 2.8 g/dl on average.
and all improved at least one classification (see Table 2). These results came from the combined efforts of Sub-Center and facility staff at SDH Budhlada.

Table 2. Improving severely anemic women with varying doses of iron sucrose injections

<table>
<thead>
<tr>
<th>Case</th>
<th>Prior to treatment</th>
<th>After treatment</th>
<th>Net improvement in Hg level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Case 1</td>
<td>6 g/dl (severe)</td>
<td>9 g/dl (mild)</td>
<td>+3 g/dl</td>
</tr>
<tr>
<td>Case 2</td>
<td>7 g/dl (moderate)</td>
<td>9.4 g/dl (mild)</td>
<td>+2.4 g/dl</td>
</tr>
<tr>
<td>Case 3</td>
<td>5.5 g/dl (severe)</td>
<td>8.5 g/dl (moderate)</td>
<td>+3 g/dl</td>
</tr>
<tr>
<td>Case 4</td>
<td>7 g/dl (moderate)</td>
<td>9.8 g/dl (mild)</td>
<td>+2.8 g/dl</td>
</tr>
</tbody>
</table>

The ultimate goal is that, with proper treatment and management, pregnant women would no longer be anemic by the time they deliver. While this goal remains far off for Mansa District, there has been significant progress towards it. From July to September 2014, 61.7% of women delivering at Budhlada were either moderately or severely anemic. That figure was reduced to 43.3% of women from January to March 2015. Over the same period, the condition of delivering while severely anemic was reduced, and the percentage of women delivering with normal hemoglobin levels has more than doubled.

Conclusion

The efforts to improve anemia management during pregnancy in Mansa District from July 2014 to April 2015 met some success in identifying severely anemic women as early as possible and reducing the percentage of severely or moderately anemic women delivering babies through effective, well-coordinated treatment. In improvement work that involves only staff from a single health facility, aims are relatively easy to achieve. ASSIST’s experience in Mansa District showed that addressing health problems that are inter-connected at all levels of the health system – from the community and village level on up to the block, district, and state levels – is more complicated, but it is possible to achieve results.

Health problems like anemia in pregnancy are difficult for the health system to address because they involve so many factors that are beyond the control of the health sector, such as availability of nutritious foods and social and cultural norms and beliefs around pregnancy. Further, the health sector can only maximize its impact on the problem if it acts as a true system, coordinating prevention and treatment efforts through all levels of the health system, from community-based efforts to those in a referral hospital, from before a woman gets pregnant until well after she delivers. Working in isolation, teams of health care providers in individual facilities cannot address all problems (Bethune 2015). However, high-level changes alone won’t yield the desired results either. Addressing a large-scale challenge like anemia requires people throughout the health system to apply their creativity, dedication, and hard work to make many coordinated changes to the system and requires buy-in from the thousands of health workers who are on the frontlines of patient care.

To address large-scale challenges like these, ASSIST began by working with facility-level staff, building their capacity to test changes and improve their processes of care – and then initiated efforts far beyond this. It would have been difficult to work in Mansa District on a complex problem like anemia without having already achieved earlier successes improving newborn and delivery care. These successes not only built capacity among facility staff to test ideas and improve care; they also built trust among key stakeholders in the ASSIST staff and in improvement methods.

In moving beyond these clinical processes to address health systems challenges, ASSIST worked together with emerging leaders, including facility-, district-, and state-level Ministry of Health staff, to address limitations beyond the control of staff in a single facility. Table 3 presents different changes that were implemented at the state, district, hospital, clinic, community level and demonstrates how they worked together to strengthen key components within the overall health system.
Table 3. Changes implemented at state, district, hospital, clinic, community level to improve anemia management in Mansa District, Punjab, India

<table>
<thead>
<tr>
<th></th>
<th>Supplies</th>
<th>Laboratory</th>
<th>Health workforce</th>
<th>Information systems</th>
<th>Governance</th>
<th>Financing</th>
<th>Service delivery</th>
<th>Demand generation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>State</strong></td>
<td>-Procured iron-folic acid tablets and iron sucrose injections -Changed guidelines</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Provided funds for iron sucrose injections</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>District</strong></td>
<td>replaced equipment</td>
<td>organized training</td>
<td></td>
<td>validated online HMIS information with data system maintained by facilities in monthly meetings</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Facility</strong></td>
<td>health workers procured and distributed double the amount of iron tablets</td>
<td>conducted refresher training for all the block nurses on Hb testing</td>
<td></td>
<td>data collection, recording and tracking system of anemic women coming to facility from community -Referral tracking system for severe and moderate pregnant anemic women -Biweekly meetings with ANMs</td>
<td></td>
<td></td>
<td>changed the process of identifying and recording information of women coming to ANC OPD and tracking severely anemic women until delivery</td>
<td>ANMs /ASHAs counselled pregnant women and family members on anemia and the myths associated with it</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Community</strong></td>
<td>integrated anemia messages with ASHA</td>
<td>separate registers for tracking anemic women and referring them to higher facility</td>
<td></td>
<td>system for tracking and following high risk pregnancies</td>
<td></td>
<td></td>
<td>changed process to increase early registration, ensuring 4 ANC check-ups, identifying anemic women early, and beginning management</td>
<td>involved community members and tailored message to address community concerns</td>
</tr>
</tbody>
</table>
Reflection

Addressing a problem like anemia required leadership that constantly asked questions, including: Why are we getting the results we are getting? What can we do next to improve? It required inquisitiveness about how things work in the health care system, vigilance and healthy skepticism around data and truth, knowledge about the correct clinical practices needed, and the ability to understand and motivate all the people who need to do the work of improving the health care system.

While training people on quality improvement methods is valuable, and eventually those skills and the leadership improvement requires can be built within a health system, the process takes time. By working across these multiple levels, ASSIST’s support helped to strengthen the ability of the health care sector to act as a system. By addressing one (or a few) overall goals at a time (in this case decreasing the incidence and severity of anemia in pregnancy), ASSIST helped to build links between people in the health system – frontline health providers and high-level administrators – who can move the system forward to address broad challenges.
References

http://blogs.bmj.com/quality/2015/02/11/the-limits-of-quality-improvement/

Census Organization of India. Mansa District: Census 2011 data. Available from: 


Ezzati M, Lopez AD, Rodgers AA, Murray CJL. 2004. Comparative quantification of health risks: 
global and regional burden of disease attributable to selected major risk factors. Geneva, Switzerland: 
World Health Organization.

Ministry of Health and Family Welfare (MoHFW), Government of India. District Level Household and 
mis.nic.in/SitePages/DLHS-4.aspx.

Ministry of Health and Family Welfare (MoHFW), Government of India. District Level Household and 
Facility Survey (DLHS) 4 (2012-13): Key Demographic Indicators, Mansa. Available here: 
https://nrhm-mis.nic.in/SitePages/DLHS-4.aspx?RootFolder=%2FDLHS4%2FState%20and%20District%20Factsheets%2FPunjab%2FDistrict%20Factsheets&FolderCTID=0x012000742F17DFC64D5E42B681AB0972048759&View=(F8D23EC0-C74A-41C3-B676-5B68BDE5007D).

Adolescent Division, Ministry of Health and Family Welfare. Available at: 
