Evaluation of the integration of eye care for children into primary health care system in Tanzania

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List of Abbreviations

CHMT	Council Health Management Team
CPD	Continuous Professional Development
EAs	Enumeration Areas
FGD	Focus Group Discussion
HIMS	Health Information Management System
IHI	Ifakara Health Institute
IMCI	Integrated Management of Childhood Illnesses
KAHE	Key Activities for Healthy Eyes
LSHTM	London School of Hygiene and Tropical Medicine
MoHSW	Ministry of Health and Social Welfare
MUHAS	Muhimbili University of Health and Allied Sciences
NBS	National Bureau of Statistics
NIMRI	National Institute for Medical Research
PHC	Primary Health Care
PMTCT	Prevention of Mother to Child Transmission
PNC	Post Natal Care
PPS	Probability Proportion to Size
RCH	Reproductive Child Health
RHMT	Regional Health Management Team
TDHS	Tanzania Demographic and Health Survey
WHO	World health Organization
UNICEF	United Nations Children's Fund

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Executive summary

Background

The prevalence of blindness in children is closely related to economic development and the social determinants of health. In low income countries, the prevalence of blindness in children ranges from 3 to 15/10,000 children. In Tanzania, the under 5 mortality in 2006 was 122/1000 live births, while the prevalence of blindness in children aged 0-15 years is around 8/10,000 children. Evidence from large scale studies indicate that in developing countries the majority of children who are blind are either born blind, or become blind before the age of five years. The pre-school age group should, therefore, be the target for interventions. The available evidence also suggests that in developing countries the major causes of blindness have changed over time: measles related blindness has declined as a result of better immunization programmes, and vitamin A supplementation means that corneal scarring is also becoming a rarity.

As corneal scarring from measles and vitamin A deficiency have declined over time, cataract, which is likely to have a constant incidence, has become a relatively more important cause. Countries in Africa with good immunization and vitamin A supplementation, cataract has overtaken corneal scarring as the predominant avoidable cause. Primary health care has the potential to play a major role in preventing blindness in children, through specific preventive measures.

The Integrated Management of Childhood Illness (IMCI) arose as an approach to reduce morbidity and mortality, with a focus on children aged 0-5 years. The approach was developed by United Nations Children's Fund (UNICEF) and the World Health Organization (WHO). IMCI has been adopted and implemented with varying degrees of success in developing countries, including Tanzania. The MoHSW in Tanzania is fully supportive of including eye care as part of IMCI. It has recommended a module to be developed specifically for eyes. This includes the diagnosis and treatment of common eye conditions.

Methodology

This was a cross-sectional study which used both quantitative and qualitative research methods. The quantitative data were obtained from the household level and health facilities in Singida rural and Manyoni districts. As for the quantitative survey, 860 participants from the households were recruited for interviews. Twenty four health facilities were surveyed in both districts. Furthermore, qualitative methods were also applied in triangulation, incorporating the advantages of each research approach. Thirty one in-depth interviews were conducted with health care providers and six FGDs with parents and grandparents of under-five children. In addition, key informants interviews were done at districts, regional and national levels.

Key findings

This study recorded vitamin A supplementation from the children growth monitoring cards. Overall, the study found that 70% of the children above 9 months received the supplementation at ninth month. Eighty seven percent of the children in Singida rural received vitamin A supplementation as compared to 50.8% in Manyoni district. Proportions of vitamin A supplementation in different age groups above 12 months were higher in Singida rural district as compared to Manyoni district. With regards to vitamin A supplementation given to children at 15 and 21 months, results show that it was 20.1% and 8.4% for the

two age categories respectively. On the other hand, ninety six percent the women reported that their children were given vitamin A supplementation. With regards to the reported number of doses, women in Manyoni district reported a relatively higher number of doses of vitamin A supplementation as compared to Singida rural.

There was a relatively low coverage of 53.8% for vitamin A supplementation to the children below 12 months. With regards to the number of doses of the vitamin A supplementation, the results show that only children below 12 months received appropriate number of doses (which are two doses). A number vitamin A supplementation doses received in Manyoni was higher as compared to Singida rural.

Mothers of the children aged above 9 months were asked if their children were given vitamin A supplementation. The results show that 96.3% of the children were reported to have been given vitamin A supplementation. Ninety seven of the children in Singida rural and 96% in Manyoni were reported to have been given vitamin A supplementation. The results also show that, children of the same age group were reported to have received an average of two doses of vitamin A supplementation.

Seventy percent of women delivered at health facilities. Of all the women who delivered at the health facilities, more than a half of the respondents reported to have been given vitamin A supplementation shortly after giving birth. The reporting was significantly higher in Singida rural 67% as compared to Manyoni district which was at 45.9%. However, 4.4% of the women in both districts couldn't remember if they were given vitamin A after delivery.

The study recorded measles immunization from the children growth monitoring cards. The results show that only six out of eleven children aged below 9 months were vaccinated. Likewise, 84.5% of children aged 9 months or older were vaccinated against measles immunization. Ninety three percent of the children aged 9 months or older in Singida rural were vaccinated against measles as compared to 76.1% of the children in the same age group in Manyoni district. Fifty seven present of the respondents in both districts reported that measles immunization prevents measles, keep the child healthy 22%, preventing diseases 1.2% and making the child strong 0.6%. More than half of the health care providers reported to have never seen a child with measles in the catchment areas.

With regards to the deworming tablets, 63.4% of the under five children were reported to have been given deworming tablets. Most of the children aged (12 – 23 months) 67.2% in Singida rural were given deworming tablets as compared to 48% of the children of the same age group in Manyoni district.

Malaria, pneumonia, measles and eye illnesses were the most reported health problems. Other chronic illnesses mentioned include coughing, diarrhoea, and fever. The most reported causes of illnesses included malnutrition, weather changes and lack of preventive measures like ITN. This was consistent with data from the health facility survey whereas fever, diarrhea and pneumonia were common mentioned.

Majority of the respondents in FGD sessions conducted with grandmothers, fathers and mothers of under-five in the surveyed districts reported to have sought care from health facilities. However, some respondents reported to have sought care from drug shops as well as self-medication. Health facilities were the first source of treatment followed by self-medication and traditional healers.

The common reported eye conditions by the mothers of children under-five included: red, watering or sticky eyes reported at 73% in Singida rural and 74.4% in Manyoni district. Trachoma illness was more

commonly reported at 20% in Manyoni district as compared to 8% in Singida rural. From the qualitative findings, the most reported eye problems were red eyes, discharging eyes and trachoma. Other reported eye problems mentioned included blindness and itching eyes.

All health facility in-charges of the visited health facilities were asked about the management of ophthalmia neonatorum as a service to manage eye conditions in neonates. All health facilities manage ophthalmia neonatorum through "start treatment and see the patient again". With regard to management of red eye/conjunctivitis in older children, 92% reported the practice "start treatment and see the patient again". The most treatment administered includes eye ointment 75%; Eye drop 13%; and antibiotic injectable 4%.

With regard to provision of ocular prophylaxis to the babies in the health facilities visited, the in-charges were asked if the service is performed. Ocular prophylaxis is performed at 58.3% for all babies and 4.2% being performed only if STD is detected. There was no statistically significant difference on performing ocular prophylaxis.

In terms of availability of equipment and supplies, health facilities in-charges were asked if the facility had functional torches, antibiotic eye drops/ointment, injectable antibiotics and sterile eye pads. Antibiotic eye drops/ointment and injectable antibiotics were available at 88%. Twenty one percent of the visited health facilities had functional touches and sterile eye pads.

With regard to the referral mechanisms, eighty three percent of the health facility in-charge in visited health facilities reported to have referred children to another facility. Among the referred cases, 90% were provided with details while standard referral forms were used only by 25%. About 30% of the health facilities which referred the cases received feedback from the referral made. The commonest reported reasons for referrals were malaria/fever 58%, followed by diarrhea 29% and failure to thrive 17%.

Supervision was also a point of interest in this study. We wanted to know if the facility had been visited in the last six months by RCH supervisors. Almost all 96% of health facility in-charge interviewed reported to have been visited in the period of six months prior to the survey. Although health care providers acknowledged that they felt supported during supervision, most of them said that the supervision did not involve case management observation.

Discussion

The study has documented Vitamin A supplementation and measles immunization of children to be high. However, our data suggest that vitamin A supplementation was high but routinely immunization coverage reported on children clinic card was not as high as from mass campaigns. The present study has also identified the utilization of health facilities to under-five children as in the previous studies.

Since December 2004, deworming for children aged 12-59 months has been integrated with the vitamin A supplementation events. It has been reported elsewhere that through these initiatives deworming coverage has been high. The results from this survey show that, despite the fact that deworming is biannual provided (every after six months) to children under-five years, deworming coverage has not been high as the coverage of vitamin A supplementation.

The study has also shown that eye infections were very common in the surveyed districts. Though, the challenge is whether community members are able to distinguish between trachoma and other causes of

red, discharging eyes. Besides, there were some gaps noted as most of women or care givers need health education about importance of different vaccines. There is also a need for health workers to continue providing health education to the mothers as only less than sixty percent get the vitamin A supplementation shortly after delivery.

Availability of drugs and supplies on eye health care was good in the visited health facilities. The high availability of antibiotics in the visited health facilities needs to be addressed with clear strategies. The training of health workers on how to effectively utilize available resources is an ideal preference.

Health policies and planning in any country depend heavily on having correct and timely information on health parameters. The new Health Information Management System (HIMS) for district level and above is being rolled out. Referrals and onward referrals can now be tracked through the register in Singida Regional Referral Hospital. However, referral mechanisms from RCH need to be improved i.e. standard referral slips in the lower health facilities and provision of eye health care training to the health care providers. The HIMS currently in use has one category of “eye infections” in which all eye conditions are included. Yet, the challenge will be to have appropriate HIMS for tracking referrals at facilities where there are no dedicated eye units.

Health facility supervision in the last six months prior to the survey was high. However, less than fifty percent of the supervision was not related to case management or clinical mentoring. This is consistent with what has been reported elsewhere.

Conclusions & Recommendations

1 Efforts should be made to sustain the high coverage of Vitamin A supplementation and measles immunisation. Increase mothers’ knowledge of eye diseases and how they can be prevented. Increase vitamin A supplementation to mothers through health education. Improve capabilities of RCH workers in the prevention, detection and management of eye conditions. There is also a need to include routine examination of the eyes of newborn at the primary health facilities.

2 Areas that need special consideration include; Improvement of HIMS in RCH clinics so referrals can be tracked. Improve supervision in terms of capacity building of staff in RCH clinics for eye care. Improve supervisor’s skills in teaching through case management: There is a need to develop training materials for eye conditions.

3 IMCI has the potential to contribute significantly to both the case management of illness and its prevention. The actual impact that will result from training health workers to use the IMCI guidelines and supporting them after training remains to be determined. Hence integrating eyeIMCI into the existing training structures is a recommended option for better training outcomes.

4 The study has identified the following gaps to be addressed: include leadership training of supervisors as good supervision can change attitudes and motivation; develop health education materials for eye care, including posters displayed where mothers can see them and availability of health education materials.

1 Background

The prevalence of blindness in children is closely related to economic development and the social determinants of health. In low income countries, the prevalence of blindness in children ranges from 3 to 15/10,000 children [1], [2], [3]. Some evidence suggests that the prevalence of blindness is associated with under-5 mortality rates. In Tanzania, the under 5 mortality in 2006 was 122/1000 live births, while the prevalence of blindness in children aged 0-15 years is around 8/10,000 children. Rates are likely to be higher in poor rural communities compared to more developed urban areas. Evidence from large scale studies indicate that in developing countries the majority of children who are blind are either born blind, or become blind before the age of five years [3], [4]. The pre-school age group should, therefore, be the target for interventions. The available evidence also suggests that in developing countries the major causes of blindness have changed over time: measles related blindness has declined as a result of better immunization programmes and vitamin A supplementation means that corneal scarring is also becoming a rarity [1]. Other avoidable causes of corneal blindness include conjunctivitis of the newborn, particularly that due to gonorrhea, and the use of traditional eye remedies. The latter are more likely in situations where primary eye care services are either not available or affordable, so parents use local remedies, or go to traditional healers. These practices can lead to visual loss from a delay in seeking appropriate treatment or through direct damage to the eye.

As corneal scarring from measles and vitamin A deficiency have declined over time, cataract, which is likely to have a constant incidence, has become a relatively more important cause, and in countries in Africa with good immunization and vitamin A supplementation programmes, cataract has overtaken corneal scarring as the predominant avoidable cause [1]. Cataract in children can be present at birth (congenital) or develop during the first few years of life (developmental cataract). Cataracts can also be unilateral or bilateral. Early detection and referral to centres able to manage childhood cataract can give good improvement in visual function, even if the visual acuity does not improve to normal levels[5], [6]. As with adult cataract, there is little that can be done to prevent cataract in children as the majority are of unknown cause, or are familiar. Control of cataract blindness, therefore, depends on early detection, counseling parents on the urgency of surgery, referral to the eye care centre which can manage children, and good follow up to detect and manage complications and provide high quality optical and low vision services [6]. Counseling is critical so that parents realize that cataract surgery is needed and urgent, butthis is only the first step in restoring sight to their child. However, in developing counties, including Tanzania [7], [8], there is evidence that children frequently present for surgery many years after the parents first noticed the problem, which may have been a white pupil, or “spot in the eye”, or the parents noticed that their child could not see properly. Barriers to presentation include misconceptions that congenital blindness cannot be treated; being given the wrong advice by health workers; not knowing where to go; believing that the condition would resolve on its own; preference for local remedies; cost; fear of the operation and of hospitals in general, and distance. Lack of education among mothers is another risk factor for late presentation [8]. Children can also develop other conditions which if not detected early and treated appropriately can also lead to loss of vision, such as corneal ulcers, trauma and strabismus, or loss of the child’s life e.g. retinoblastoma. There is another group of eye conditions which are common among children and where prompt and appropriate treatment eases the symptoms and prevents parents from using traditional remedies or purchasing and using medication from unregulated village drug sellers. These include conjunctivitis and allergic eye disease, and in some

settings trachoma and the eye signs of vitamin A deficiency (e.g. night blindness). In all countries significant refractive errors are uncommon in pre-school age children.

Children can also have unavoidable causes of visual loss, due to congenital abnormalities, retinal dystrophies or optic nerve conditions [2]. Many of these conditions only affect the retina or optic nerve, and the external appearance of the eyes is entirely normal. Parents will only notice that their child cannot see properly, as they do not behave “visually” e.g. they are afraid to walk around; they fall over things; they press on their eyes [9].These children also need to be detected and referred for investigation and diagnosis, and referred for rehabilitation and pre-school interventions. The latter are essential to prevent the developmental delay that accompanies profound visual loss of early onset.

Primary health care has the potential to play a major role in preventing blindness in children, through specific preventive measures i.e. maintaining high coverage with measles immunization and vitamin A supplementation; Credes prophylaxis to prevent ophthalmia neonatorum [10], and health education regarding a good diet, breast feeding and avoidance of traditional eye remedies. Many of these interventions have been shown to be highly effective in clinical trials [11] or as a result of large scale programmes. Primary health care workers can also play a key role identifying children who need urgent referral for investigation and/or treatment i.e. those with ocular abnormalities such as a white pupil; those whose parents report that they think their child cannot see normally. Primary Health Care (PHC) workers can also be trained to diagnose and manage the less serious but common eye conditions of childhood, such as conjunctivitis. Sensitive and informed counseling of parents is another important activity.

1.1 Primary health care and eye care for children

The Integrated Management of Childhood Illness (IMCI) arose as an approach to reducing morbidity and mortality, with a focus on children aged 0-5 years. There are three elements to IMCI: (1) improving partnerships between health facilities or services and the communities they serve; (2) increasing appropriate and accessible care and information from community-based providers; and (3) integrating promotion of key family practices critical for child health and nutrition [12]. The approach was developed by United Nations Children's Fund (UNICEF) and the World Health Organization (WHO). IMCI has been adopted and implemented with varying degrees of success in developing countries, including Tanzania [13], [14]. Despite being developed as a comprehensive approach, the focus in reality has tended to be on facility based interventions. IMCI materials have a section on “ear health” but there is no section on eye health, although certain eye conditions and their management (e.g. corneal ulceration as a complication of measles) are included. Tanzania has embraced IMCI, and the programme is being implemented through the Reproductive and Child Health (RCH) services.

1.2 The Ten Key Activities for Healthy Eyes (10 KAHE) in Children

Realization of the important role that PHC can play in promoting child eye health led to the development of the “ten key activities” for child eye health. These were delineated at a WHO/Lions meeting in Geneva in 2002 [15]. Recommended activities are as follows:

<u>Activities relating to primary prevention</u>

1. Clean the eyes at birth. Apply antibiotic eye ointment.
2. Give mothers vitamin A 200,000 I.U. immediately after delivery.
3. Promote breast feeding and good nutrition.

4. Immunize children against measles at 9 months and give vitamin A 100,000 I.U. Encourage second measles immunization.
5. Keep children's faces clean.
6. Do not put traditional eye medicines in the eyes.

Activities relating to early detection, treatment and referral:

7. Give high dose vitamin A to all children with measles infection
8. Any child who cannot see well - refer to an eye care worker as soon as possible.
9. Any child with a white pupil or other abnormality - refer to an eye care worker urgently
10. Any child with serious eye injury or red eye - refer to an eye care worker

A pilot study, undertaken in 15 Reproductive and Child Health (RCH) clinics in Dar-es-Salaam have shown that after training in these activities, RCH staff were more likely to implement activities specific to eye complaints, such as cleaning babies of newborn babies at delivery and instilling and antibiotic or antiseptic, referring to the eye doctor any child with trauma, white pupil, or red eyes [16]. They were also more likely to give vitamin A supplementation to mothers after delivery than their untrained counterparts [17].

Staff in RCH clinics are ideally placed to deliver eye care for children as they have very close contact with mothers from pregnancy onwards, and with young children. The success of this initial study has provided the impetus for this larger study.

1.3 Adding an eye module to the existing IMCI materials in Tanzania ("eyeIMCI")

The Ministry of Health in Tanzania is fully supportive of including eye care as part of IMCI. It has recommended a module to be developed specifically for eyes. The 10 KAHEs are fully supportive. Though, MoHSW has not readily accommodated the module. The module will be included and be used in training as a pilot pending further decision. These will be modified to be in line with IMCI format and content, and are likely to encompass the following:

Normal eyes and vision - prevent eye conditions and preserve sight:

1. Clean the eyes at birth. Apply antibiotic eye ointment.
2. Give mothers vitamin A 200,000 I.U. immediately after delivery.
3. Promote breast feeding and good nutrition.
4. Immunize children against measles at 9 months and give vitamin A 100,000 I.U. Encourage second measles immunization.
5. Keep children's faces clean.
6. Do not put traditional eye medicines in the eyes.

Detect and treat:

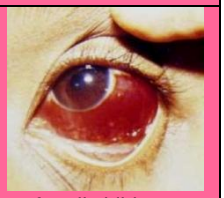
7. Prevent blindness in children with measles. Treat with high dose vitamin A on day 1, day 2 and day 10
8. Treat red, sticky eyes after checking that the corneas are normal. Treat with topical antibiotic. See in 2 days. Refer if not improving

Detect and refer immediately:

9. Refer all children with red eyes and whitish patch on the cornea. Ulcers can lead to loss of vision
10. Refer all children who cannot see normally – even if their eyes appear normal. Early treatment gives better results
11. Refer all children a white reflex or spot in the pupils even if you cannot see it. The child may have cataracts which need urgent management
12. Refer all children a history of injury with a blunt or sharp object. They may need specialist treatment

This includes the diagnosis and treatment of common eye conditions such as conjunctivitis or allergies which were not included in the 10 KAHEs. A poster, such as below, will be developed.

Figure 1: Poster showing diagnosis and treatment of common eye conditions

<table>
<tr><td colspan="6">Normal eyes and vision: prevent eye conditions and preserve sight</td></tr>
<tr>
<td> 
Give mothers high dose vitamin A after delivery. This increase their breast milk vitamin A</td>
<td> 
Promote breast feeding to reduce the risk of measles & vitamin A deficiency</td>
<td> 
Clean the eyelids at birth, and instil antibiotic, to prevent conjunctivitisof the newborn</td>
<td> 
Keep childrens' faces clean, to prevent infection, including trachoma</td>
<td> 
Immunization children against measles and give high does vitamin A: both prevent blindness</td>
<td> 
Do not use traditional eye medicines as they can damage the eyes</td>
</tr>
<tr><td colspan="2">Detect and treat</td><td colspan="4">Detect and refer immediately</td></tr>
<tr>
<td> 
Treat red, sticky eyes after checking that the corneas are normal Treat with topical antibiotic. See in 2 days</td>
<td> 
Prevent blindness in children with measles. Treat with high dose vitamin A. Treat with tetracycline ointment if the eyes are red.</td>
<td> 
Refer all children with red eyes and whitish patch on the cornea. Ulcers can lead to loss of vision</td>
<td> 
Refer all children who cannot see normally – even if their eyes appear normal. Early treatment gives better results</td>
<td> 
Refer all children a white reflex in the pupils even if you cannot see it. The child may have cataracts which need urgent management</td>
<td> 
Refer all children a history of injury with a blunt or sharp object. They may need specialist treatment</td>
</tr>
</table>

1.4 Health Systems Approach

The project focuses on integration, which is closely linked to the "systems" approach. Here, integration refers to identifying and targeting existing health providers (RCH services) and determining how eye health interventions for children can be incorporated to ensure the preventive measures, as well as early detection, diagnosis and treatment of eye related conditions are implemented in the most efficient way.

Academic literature refers to three basic models of integration: (a) provider level integration, where the same provider offers a range of services during the same consultation; (b) facility-level integration, where a range of services is available at one facility but not necessarily from the same provider; and (c) systems-level integration, which in addition to facility-level integration, incorporates a coherent referral system between facilities in order to ensure the patient is able to access all necessary services within the healthcare system and in their community [18]. This project explores integration at all three levels and aims to identify the most effective and efficient points for system entry and service provision.

Based on existing evidence of integration and empirically generated data, this project aims to support the development and implementation of policies, protocols and other tools and procedures that are important to help institutionalize and harmonize eye health services as part of child health care delivery. The project addresses issues of staff training and the mechanisms essential to sustain the delivery of eye health services over the long term. Integration will entail capacity building of staff and their supervisors, development of materials, ensuring adequate supplies of medicines as well as documentation systems. Decisions on integrating eye care into IMCI will entail a participatory approach to ensure participation, acceptability and ownership of the systemic change.

A recent systematic review of the literature on integrating primary health services at the point of delivery in low and middle income countries identified five randomized trials and four controlled before and after (CBA) studies [19]. This paper makes a useful distinction between integration and “linkages”, the latter being defined as sharing of information and referral between service providers or levels of service provision. The authors conclude that “There is some evidence that ’adding on’ services (or linkages) may improve the utilization and outputs of healthcare delivery. However, there is no evidence to date that full integration improves health care delivery or health status” [20]. The review highlights that evaluation of integration is challenging and that the anticipated results are not always achieved. Rigorous methods are required to enable the correct conclusions to be drawn in terms of benefits as well as possible downsides, and so that any change is attributed to the addition of the new service or component of the service.

1.5 Evaluation research

There has recently been increased interest in research which evaluates the delivery of one or more interventions, as opposed to clinical trials which focus more narrowly on assessing the efficacy of a specific intervention, such as a new drug [20], [21]. The study design of choice to assess efficacy is a randomized clinical trial, where individuals are randomly allocated. Trials are designed in such a way so that in an ideal situation the only difference between the two groups is the treatment they are allocated to, and great effort is made to ensure high levels of adherence to the intervention. Having shown that an intervention has high levels of efficacy (e.g. vitamin A supplementation reduces child mortality) the next step is to assess how the intervention can be implemented within health services. Often the interventions are complex, requiring more than just a new medication, and may entail a change in behaviour by patients and/or additional investigations, prescribing or reporting by health staff. Sometimes it is not possible to use randomized trials to assess these more complex interventions (i.e. those made up of a range of interconnecting or interrelated components), and “quasi-experimental study designs” can be used instead. These include interrupted time series, and uncontrolled or controlled before and after

studies [21]. Each has advantages and disadvantages, and the context as well as the nature of the intervention being evaluated has an important bearing on the study design.

The main factors which have to be in place for interventions to be effective in the real world are:

- Availability:
    - services have the new intervention;
    - facilities are available for diagnosis
    - staff are trained to deliver it
- Use:
    - patients access the service
        - demand side barriers: distance; cost; awareness; competing demands on resources; family decision making; waiting times; lack of drugs; staff attitudes; traditional beliefs and practices.
        - supply side barriers: lack of drugs/supplies; competing demands on time;
- Quality:
    - correct dose / regime prescribed; appropriate referrals;
    - patients adhere to intervention prescribed; attend for follow up; attend if referred;

All need to be taken into account when evaluating the effectiveness of a complex intervention and have been assessed in Phase 1 of this study.

1.6 Theory of change framework

In evaluating a complex intervention it is usual to build a theory of change framework. This starts with the desired positive change envisaged, using evidence of efficacy from trials, if available. Theories or frameworks are chosen to assess the steps which bring about change in behaviour or performance, and decisions are needed on the intervention(s) required, or package of interventions, where they will be delivered and by whom, and the inputs required to develop and deliver the intervention. Barriers to implementation at every step need to be delineated as well as assumptions.

1.7 Statement of the problem and rationale of the study

The control of blindness in children requires activities at the primary level. Some eyeIMCI activities relate specifically to eye health (e.g. refer children with visual loss) whereas others will also impact on general health (e.g. measles immunization). In Tanzania, a pilot study which evaluated the 10 KAHEs has shown that activities that relate to general health are already being implemented as part of RCH programs but staff did not realize that these are also control measures for visual loss. However, the activities that relate specifically to eye health (i.e. prevention of on/ treatment of common eye diseases, identification and referral for further management of children with ocular morbidity and blindness) are not routinely implemented by staff in RCH clinics. Failure to implement these activities leads to late presentation of children with ocular morbidity and blindness to tertiary eye centres in Tanzania leading to irreversible blindness. Lack of knowledge, skills and supervision were cited by RCH staff as reasons for failure to implement the eye specific activities. However, after training, RCH staff were more knowledgeable and were more likely to implement the 10 KAHE than their untrained counterparts.

Staff in RCH clinics have very close contact with young children and their mothers, providing opportunities for them to implement the activities which promote eye health and prevent blindness in children.

The results of this study will inform policy makers on the integration of eye care for children into primary health care system; and will be used to support the development and implementation of policies, protocols and other tools and procedures that are important to help institutionalize and harmonize eye health services as part of child care delivery.

2 Objectives

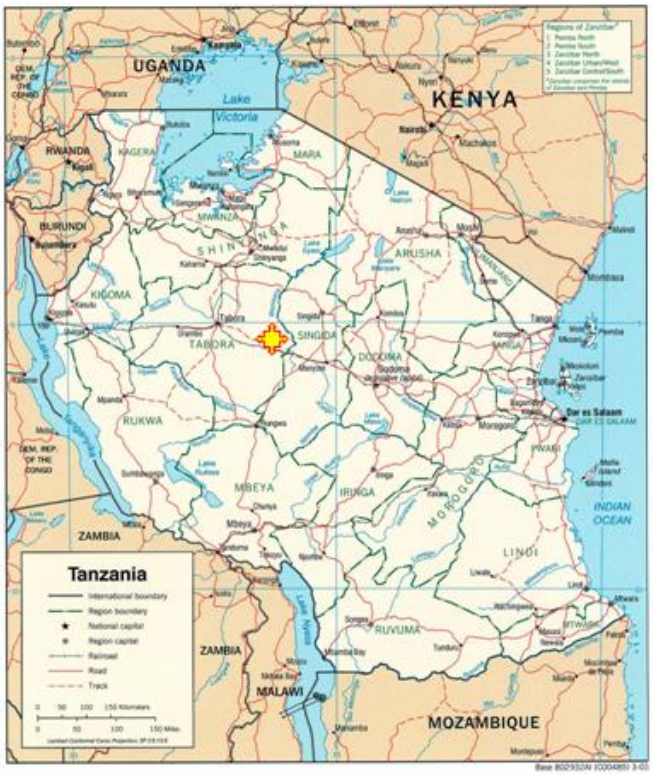
2.1 General Objective:

To evaluate eye health interventions which are to be integrated into the Integrated Management of Childhood Illness for children in facilities providing Reproductive and Child Health services in Singida region, Tanzania.

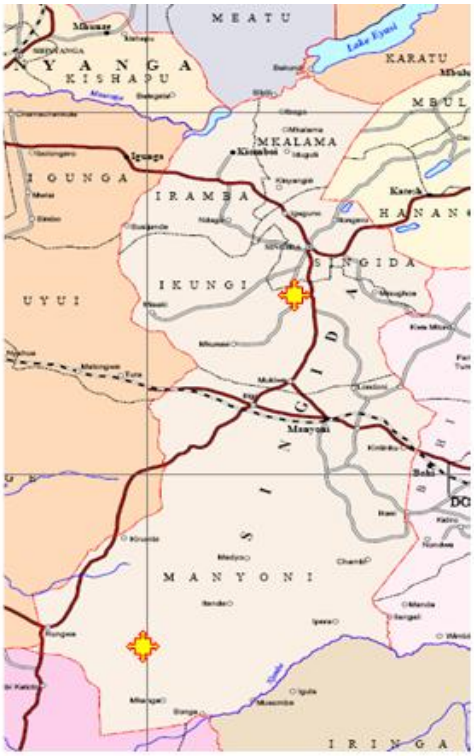
2.2 Specific Objectives:

1. To examine the current delivery of Reproductive and Child Health services and service outputs (e.g., immunisation and vitamin A uptake) using mixed methods
2. To assess knowledge, attitudes and current health seeking behaviour among mothers and the community regarding eye health/conditions in children and to assess their attitudes towards the service they receive
3. To assess the provision of eye care in Singida region, and to review referral pathways and record keeping
4. To assess elements of the health system that need to be strengthened to effectively deliver the intervention (e.g. supervision; equipment; supplies of consumables) and the current situation in these areas
5. To assess barriers to implementation (availability, use and quality) e.g. staff motivation and staff turnover.

Figure 2: Map of Tanzania and the Study Site (Singida Region)



Tanzania showing location of Singida region



Singida region, showing location of Singida and Manyoni districts

3. Methods

3.1 Study design

This was a baseline cross-sectional study that employed both quantitative and qualitative research methods (FGD, key informant interviews, in-depth interviews and observation).The quantitative data were obtained from survey at household level and in health facilities. Qualitative methods aiming at triangulation were used to explore key aspects on the objectives outlined above. The triangulation methods were used to cross-check data collected by different methods for consistency and reliability.

3.2 Sample size

The sample size was calculated based on estimation of the coefficient of variance between clusters which gives a precise estimate of vitamin A supplementation by age group. In Tanzania vitamin A supplements are usually given at 9, 15 and 21 months, and annually thereafter. The sample size has been calculated focusing on children aged 13-24 months for the following reasons:

- Data are recorded more reliably in this age group than in older children, and so any change after the intervention can be more readily and reliably determined;
- The prime focus of the intervention focuses on activities for this age group (i.e. breast feeding; measles immunization, ocular prophylaxis; and detection of congenital cataract).

Data provided from Singida district showed that the proportion of infants receiving their first dose of vitamin A was high (>90%), while the proportion was lower in older ages, being 50% for 15 month olds, and 40% for 21 month olds. Annual doses for children aged 2-5 years are likely to be even lower, as these children do not have other interventions (such as immunization) which would necessitate mothers taking their children to the health facilities. Data with this level of detail are not available for the other districts. The sample size has been calculated for Singida (but also used for Manyoni) using the following assumptions for children aged 12-24 months:

- 50-60% of children aged 13-24 months have received more than one dose of vitamin A
- Precision of +/- 5 or +/- 8%.
- 95% confidence interval
- Coefficient of variance (K) of 0.2 or 0.25

The coefficient of variation and its precision are influenced by the design effect and the number of clusters. The sample size for 13-24 month olds has been calculated using 30 clusters per district. Values for the coefficient of variation (k) have been calculated for different design effects [22] together with the 95% confidence interval around k [23]. Summary statistics for sample size calculation and formula are indicated in the table 1 below:

Table 1: Household survey sample size estimates for Singida and Manyoni districts

% received >1 dose of vitamin A	Confidence interval	Precision	k	No. of clusters	Width of CI around k	Design effect	Sample size*	To allow for recruitment failure 10%	Children per cluster
VAS coverage 60%									
60%	95%	+/- 5%	0.2	30	0.125	2.1	769	846	28
60%	95%	+/- 5%	0.3	30	0.15	2.8	1026	1129	38
60%	95%	+/- 8%	0.2	40	0.1	2.1	302	332	8
60%	95%	+/- 8%	0.3	40	0.125	2.8	403	443	11
VAS coverage 50% +/- 5%									
50%	95%	+/- 5%	0.2	30	0.125	2.2	839	923	31
50%	95%	+/- 5%	0.3	30	0.15	2.8	1068	1175	39
VAS coverage 50% +/- 8%									
50%	95%	+/- 8%	0.2	40	0.1	2.6	388	427	11
50%	95%	+/- 8%	0.3	40	0.125	3.4	507	558	14
50%	95%	+/- 8%	0.2	30	0.125	2.2	328	361	12
50%	**95%**	**+/- 8%**	**0.3**	**30**	**0.15**	**2.8**	**418**	**460**	**15**

For practical reasons the sample size of 418, increased to 460 in 30 clusters in Singida rural district. A similar approach was used in Manyoni district but where age-specific data on coverage with vitamin A

supplements were not available. Therefore, a total of 920 were required from 60 clusters in both Manyoni and Singida rural districts.

Table 2: Summary of sample sizes for quantitative and qualitative data

	Activities	Whom	Expected number	Actual number	Place
A	**Key Informant interviews**				
1		RMO	1	1	Region HQ
		Regional RCH Co-coordinator	1	1	Region HQ
		Ophthalmic Medical Assistant in Singida	1	1	Region HQ
		Regional Eye Care Co-ordinator, Singida	1	-	Region HQ
		District RCH Co-coordinator	1 per district	1	District Hospital
		Cataract surgeon	1	1	Manyoni District
B	**Community based studies**				
2	Household survey	Care-seeking behaviour (interview care givers of under 5 children)	920 women in 60 clusters with under-five children	870	Manyoni & Singida rural districts
3	Focus group discussions	With fathers, mothers and grandmothers of young children to find out their health seeking behaviour	One of each (i.e., 3) per district	One of each (i.e., 3) per district	
C	**Facility based studies**				
C1	**RCH service providers**				
4	Interviews, with staff, observation	To assess services provided; their knowledge of eye conditions (shown in Figure 3); to assess current level of provision; assess process and outcome indicators which could be used in Phase 2	13 clinics / district. In each facility: in-Charge, and two other members of staff	Interview with staff on knowledge assessment 31; Observation 27; In-charge RCH staff 26	Health facilities selected so as to be representative of facilities in the two districts
5	Exit interviews	Mothers of children, to find out what they experienced and what they thought of the care they received	5 women with under-five children Approx. 60	195	
C2	**Eye care service providers**				
6	Interviews, with staff, observation	To assess services provided; their knowledge of eye conditions; to assess current level of provision; assess process and outcome indicators	All health facilities to be visited	24	All eye care providers in Manyoni & Singida rural districts

3.3 Sampling procedure

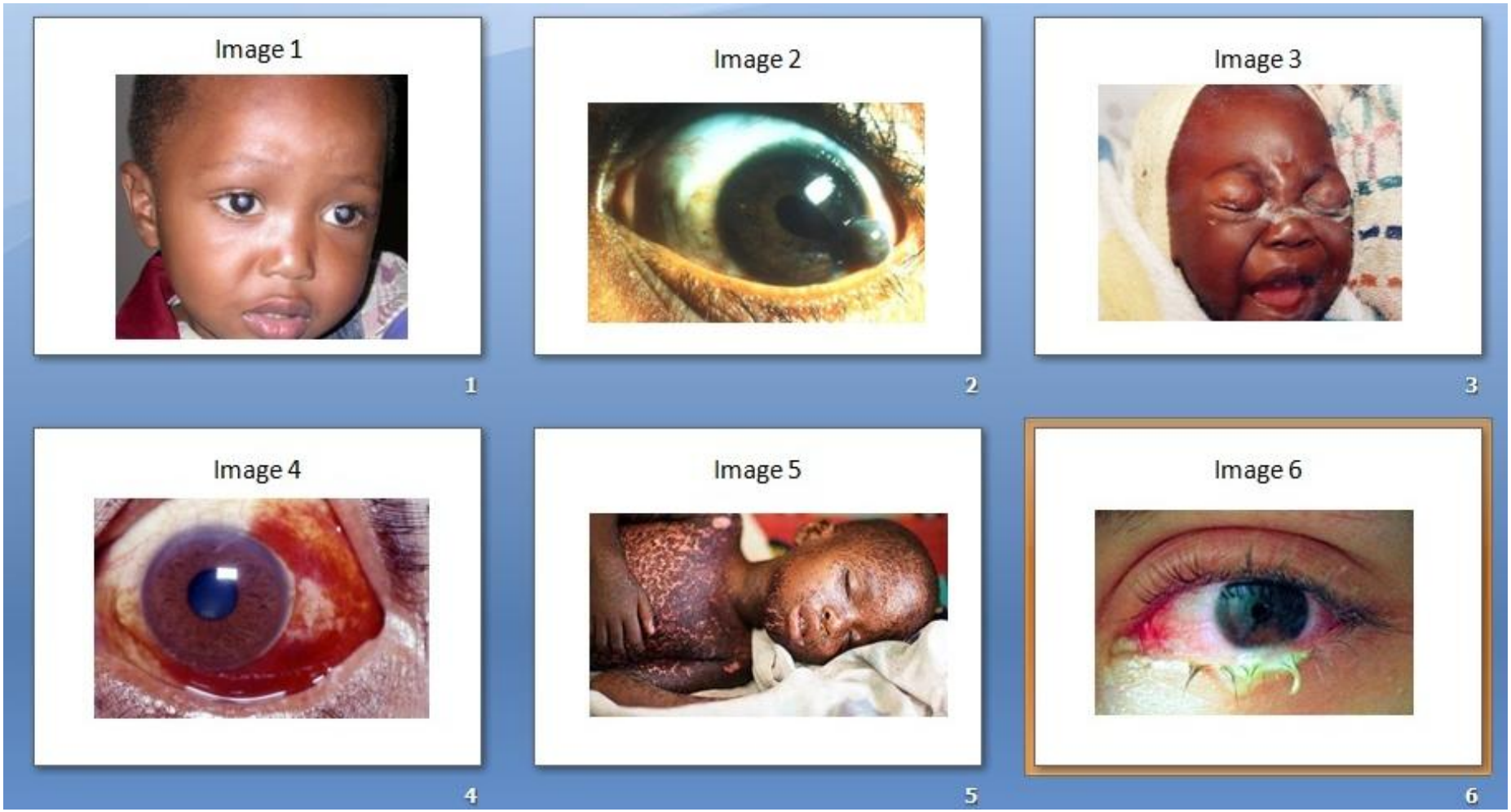
The procedure involved multi-stage sampling method starting with selection of health facilities. CSurvey software was used to sample required health facilities. In the second stage of sampling, eligible study participants were selected within each community around selected health facility. The selection of health facilities was based on probability proportional to size (PPS). After arriving at the selected health facility, all nearby villages surrounding health facilities were listed and one village was selected randomly. All eligible households were identified for recruitment (with assistance of community leader). This process was continued until all 15 eligible study participants were found. If the 15 eligible study participants were not found, a nearby village was selected to complete the required number.

3.4 Data collection

We visited 920 households and collected information about health care seeking behavior from mothers or caregivers of children aged <5 years. Thirty in-depth interviews were conducted with health care providers, 16 in Manyoni and 14 in Singida rural districts. Three FGDs based on the methodology described by Dawson et al. (1993) were conducted in each of the study district with six to eight women, fathers and grandmothers of under-five children. FGDs were done separately with each of the group-fathers, mother and grandmothers. The FGDs generally took place at a convenient place at the informant's village office. During FGD sessions, participants were provided with refreshments. Before the FGD, the moderator introduced all participants, explained the general topic of discussions, and let participants know that everyone should contribute his/her ideas. An experienced moderator, along with a note-taker, led the discussions, each taking notes. The FGDs were recorded using an MP3 voice recorder. After the FGD, a note-taker transcribed all the information by writing the text into a word format.

In facility based information, a list of facilities providing RCH services in each district were prepared, together with their catchment population. In each district 13 RCH clinics were selected to represent rural and urban communities.

Figure 3: Images were used in eye care knowledge assessment of Health Care Providers



3.5 Data management and analysis

Quantitative data were entered into password protected EPI DATA software. Data were reviewed after the initial data entry for out-of-range responses, missing values, or inconsistent skip patterns. The original data collection forms were reviewed to resolve any discrepancies or problems. Quantitative data were then transferred into STATA software (version 12, College Station, Texas, USA) for analysis.

Qualitative data (FGDs and In-depth interviews) were recorded using an MP3 voice recorder, upon getting permission from the participants. After the FGD, the note-takers and the moderator reviewed their hand written notes. The transcripts were typed and exported to NVivo 8 software for analysis. Qualitative data were analyzed based on major key themes emerging during interviews and all interviews were coded and analyzed using a thematic framework based on the study objectives.

3.6 Quality control

The survey was carried out by an experienced research team. Detailed field tools were prepared and piloted in Mkuranga district during the training sessions. Each completed questionnaire was checked both by the interviewers and supervisors on a daily basis. Similarly, close supervision were carried out by the research team throughout the training, data collection, data entry, cleaning and analysis.

3.7 Ethical consideration

Ethical approval was obtained from the Ethics Review Boards of Ifakara Health Institute (IHI), Muhimbili University of Health and Allied Science (MUHAS), London School of Hygiene and Tropical Medicine (LSHTM) and The National Institute of Medical Research in Tanzania (NIMR). Written informed consents were obtained in local language from all participants taking part in the study. No names were used in any analysis or reporting, as codes were assigned. Permission was sought to record interviews and to use anonymous quotes. In the community surveys, any participant or child identified with an eye complaint was advised to visit the nearby health facility for treatment.

4. Findings

4.1 Household participants and response rates

We expected to interview a total of 920 eligible women in both Singida rural and Manyoni districts. A total of 860 households agreed to participate in the survey. From these households, a total of 870 women aged 15 – 49 years agreed to be interviewed. Table 3 summarizes the study participants that were involved in the survey.

Table 3: Overview of the study participants in the household survey

Variable	Number
Households agreed to participate	860
Total women interviewed	870
Number of under-two year children	823
Number of under-five year children	1,097

The table 4 below shows the number of households and the women response rate for the baseline study. The response rate is important because a high rate of non-response may affect the results. A total of 920 households were estimated as the required sample for this study, of which 860 households successfully participated in the survey, yielding a household response rate of 93.5% (860/920). In the visited households, 870 women were identified for interview, resulting to a response rate of 94.6% (870/920).

Table 4: Number of households, interviews and response rates according to the districts

	Overall	Singida	Manyoni
Households			
Households sampled	920	460	460
Households interviewed	860	436	424
Households response rate (%)	93.5	94.8	92.2
Interviews with women aged 15 – 49 years			
Number of eligible women sampled	920	460	460
Number of women interviewed	870	441	429
Women response rate (%)	94.6	95.9	93.3

4.2 Demographic and Socio-economic Characteristics

This section provides the summary statistics on demographic and socio-economic characteristics of the households visited. Most of the results are summarized in table 5 below.

To begin with, respondents or care takers were asked questions related to the households characteristics. We provide the summary of both, Singida rural and Manyoni district. The proportion of households' heads with primary education was 79.8% (352/441) in Singida rural and 68.5% (294/429) in Manyoni. However, 18% (76/429) of the household heads in Manyoni district had no formal education

compared with 7% (31/441) in Singida rural district. Agriculture activity was main occupation for the most respondents in both Singida rural 88% (388/441) and Manyoni 78.8% (338/429) districts. The most prominent tribe in Singida rural was Nyaturu 88.9% (392/441) while in Manyoni was Gogo (38%) 163/429. The results show that Manyoni district appears to be much more heterogeneous ethnically. The majority of respondents in both Singida rural 87.5% (386/441) and Manyoni 68.3% (293/429) reported living in their own households. Fifty nine percent (260/441) of the visited households in Singida rural and 72% (310/429) in Manyoni had corrugated iron or tiles roofs. Six percent (26/441) of households in Singida rural and only 20.8% (89/429) in Manyoni were connected to electricity.

Table 5: Characteristics of enrolled women aged 15 - 49 according to the districts

Variable	Overall **N=870**	Districts		P-value
		Singida **N=441**	Manyoni **N=429**	
	% (n)	% (n)	% (n)	
Education				
No education*	12.3 (107)	7.0 (31)	17.7 (76)	<0.0001
Primary	74.3 (646)	79.8 (352)	68.5 (294)	0.1166
Secondary and above	13.5 (117)	13. 2 (58)	13.8 (59)	0.7950
Occupation**				
Agriculture	83.5 (726)	88.0 (388)	78.8 (338)	0.0003
Employed	1.4 (12)	0.7 (3)	2.1 (9)	0.0731
Domestic service /Housewife	7.4 (64)	3.2 (14)	11.7 (50)	0.2118
Other income generating activities	12.0 (104)	6.6 (29)	17.5 (75)	<0.0001
Tribe				
Nyiramba	3.3 (29)	4.1 (18)	2.6 (11)	0.2125
Nyaturu	50.9 (443)	88.9 (392)	11.9 (51)	<0.0001
Sukuma	4.5 (39)	3.0 (13)	6.1 (26)	0.0265
Kimbu	2.5 (22)	0.2 (1)	5.0 (21)	<0.0001
Nyamwezi	6.2 (54)	0.7 (3)	12.0 (51)	<0.0001
Hehe	4.8 (42)	0	9.8 (42)	-
Gogo	18.9 (164)	0.2 (1)	38 (163)	<0.0001
Muha	1.2 (10)	0	2.3 (10)	-
Other tribes	7.7 (67)	3 (13)	12.6 (54)	<0.0001
Age (yrs)				
15 – 24	37.7 (327)	37.6 (166)	37.6 (161)	0.9727
25 – 34	41.3 (360)	39.2 (173)	43.6 (187)	0.1917
35 – 49	19.0 (165)	21.1 (93)	16.8 (72)	0.1054
Missing	2.1 (18)	2.0 (9)	2.1 (9)	0.9528
Social Economic Status				
Lowest	20.0 (176)	22.7 (100)	17.5 (76)	0.0686
Second	20.0 (174)	25.6 (113)	14.2 (61)	<0.0001
Middle	20.2 (176)	21.1 (93)	19.4 (83)	0.5227
Fourth	19.7 (171)	19.3 (85)	20.1 (86)	0.7744
Highest	19.9 (173)	11.3 (50)	28.7 (123)	<0.0001

*(*A respondent who had not received formal education)*
*(**Multiple responses)*

The majority 41.4% (360/870) of women of reproductive age in the households visited were in the age group 25-34 (table 5). With regard to socioeconomic status, respondents were asked about the possession of specific items such as bicycle, radio, mobile phone, mosquito net and animals. These items were weighted and categorised into five ranks: lowest, second, middle, fourth and highest social economic status. In general, Manyoni district had a higher proportion of households with higher SES than Singida rural district 28% (122/424) vs 11% (50/436). The following sections will present the results according to the specific objectives of the study.

4.3 Current delivery of Reproductive and Child Health services and service outputs

4.3.1 Vitamin A supplementation at 9, 15 and 21 months

This survey recorded vitamin A supplementation from the children growth monitoring cards. Overall, the study found that 70% (756/1081) of the children above 9 months received the supplementation at ninth months. Eighty seven percent (501/579) of the children in Singida rural received vitamin A supplementation at 9 months as compared to 50.8% (255/502) in Manyoni district with p-value <0.0001. With regards to vitamin A supplementation given to children at 15 and 21 months, results show that it was 20.1% (102/808) and 8.4% (36/430) respectively.

Mothers of the children aged above 9 months were asked if their children were given vitamin A supplementation. The results show that 96.3% (1041/1081) of the children were reported to have been given vitamin A supplementation. Ninety seven (559/579) of the children in Singida rural and 96% (482/502) in Manyoni were reported to have been given vitamin A supplementation. The results also show that, children of the same age group were reported to have received an average of two doses of vitamin A supplementation.

Respondents were asked about the perceived reasons of giving vitamin A supplementation to their children. Forty five percent (200/441) of the women interviewed in Singida rural and 41% (174/429) in Manyoni district reported that vitamin A prevents illness or keeps the baby healthy. Only 6.8% (59/870) of the respondents reported that vitamin A supplementation prevents eye diseases while 44% (385/870) of the women did not know any reason for giving vitamin A to their children. Another reason mentioned for giving vitamin A was to make the child strong 8% (67/870).

4.3.2 Vitamin A supplementation by age groups

This study looked at vitamin A supplementation in different age groups from children growth monitoring cards. There was a relatively low coverage of 53.8% (7/13) for children below 12 months. Proportions of vitamin A supplementation in different age groups above 12 months were higher in Singida rural district as compared to Manyoni district. With regards to the number of doses of vitamin A, the results show that only children below 12 months received appropriate number of doses (which are two doses). In Manyoni district, children received higher number of doses of vitamin A supplementation as compared to Singida rural. Tables 6 and 7 summarize the results. On the other hand, ninety six percent (1052/1097) of the women reported that their children were given vitamin A supplementation. With regards to the reported number of doses, women in Manyoni district reported a relatively higher number of doses of vitamin A supplementation as compared to Singida rural as shown in tables 8 and 9.

Table 6: Recorded vitamin A supplementation by age groups in both districts

Age group		Both Districts				
		Received VAS		Number of doses		
	N	n	%	Expected (cumulative)	Number of doses given (mean)	children given expected number of doses % (n)
<12	13	7	53.8	1	2	38.5 (5)
12 – 23	861	652	75.7	3	2	1.5 (13)
24 – 35	34	29	85.3	5	2	0*
36 – 47	110	96	87.3	7	2	0*
48 – 59	74	62	83.8	9	2	0*
Missing	5	3	N/A		N/A	5
Total	**1097**	**849**	**77.4%**			**1.6 (18)**

** No child was given expected number of doses*

Table 7: Recorded vitamin A supplementation by district

Age group	Singida					Manyoni				
		Received VAS		Number of doses			Received VAS		Number of doses	
	N (sample)	n (VAs)	%	Expected (cumulative)	Number of doses given (mean)	N (sample)	n (VAs)	%	Expected (cumulative)	Number of doses given (mean)
<12	9	5	55.6	1	1	4	2	50	1	5
12 – 23	433	375	86.6	3	1	428	277	64.7	3	2
24 – 35	21	18	85.7	5	1	13	11	84.6	5	3
36 – 47	71	66	93	7	2	39	30	76.9	7	4
48 – 59	53	47	88.7	9	2	21	15	71.4	9	3
Missing	5	3	-	N/A	N/A	-	-	-	N/A	N/A
	592	**514**	**86.8**			**505**	**335**	**66.3**		

Table 8: Reported vitamin A supplementation by age groups in both districts

Age group		Both Districts				
		Received VAS		Number of doses		
	N	n	%	Expected (cumulative)	Number of doses given (mean)	children given expected number of doses % (n)
<12	13	8	61.5	1	2	37.5 (3)
12 – 23	861	826	95.9	3	2	24.3 (209)
24 – 35	34	33	97.1	5	2	11.8 (4)
36 – 47	110	110	100	7	2	0*
48 – 59	74	70	94.6	9	3	1.4 (1)
Missing	5	5	-	N/A	N/A	5
Total	**1097**	**1052**	**95.9%**			**19.8 (217)**

** No child was given expected number of doses*

Table 9: Reported vitamin A supplementation by district

Age group		Singida					Manyoni				
		Received VAS		Number of doses			Received VAS		Number of doses		
	N (sample)	n (VAs)	%	Expected (cumulative)	Number of doses given (mean)	N (sample)	N (VAs)	%	Expected (cumulative)	Number of doses given (mean)
<12	9	6	66.6	1	1	4	2	50	1	1
12 – 23	433	417	96.3	3	2	428	409	95.6	3	2
24 – 35	21	20	95.2	5	2	13	13	100	5	3
36 – 47	71	71	100	7	2	39	39	100	7	3
48 – 59	53	50	94.3	9	2	21	20	95.2	9	3
Missing	5	5	-	N/A	N/A	-	-	-	N/A	N/A
	592	**569**	**96.1**			**505**	**483**	**95.6**		

4.3.3 Measles Immunization

The survey recorded measles immunization from the children growth monitoring cards. The results show that six out of eleven children aged below 9 months were vaccinated against measles. Likewise, 84.5% (918/1081) of the children aged 9 months or older were vaccinated against measles. Ninety three percent (536/579) of the children aged 9 months or older in Singida rural were vaccinated against measles as compared to 76.1% (382/502) of the children in the same age group in Manyoni district. There was statistically significant difference between the two districts p-value <0.0001. Summary of the results are shown in tables 10 and 11 below.

However, mothers were asked if their children were vaccinated against measles at 9 months and the result shows that 95.5% (533/579) of the mothers in Manyoni and 94% (472/502) in Singida rural reported to have vaccinated their children against measles.

With regards to the reasons for providing measles immunization to children, 57% (496/870) of the respondents in both districts reported that measles immunization prevents measles. Other reasons given were 'to prevent illness or keep the child healthy' 22% (191/870); 'preventing diseases' 1.2% (10/870) and 'making the child strong' 0.6% (5/870). Twenty one percent (184/870) of the women did not know the reasons for giving measles immunization to their children.

Table 10: Overall measles Immunization

		Both Districts	
		Measles Immunized	
Age group	N	n	%
<9 months	11	6	54.5%
9 months or older	1081	918	84.9%
Missing	5	5	N/A
	1097	**929**	**84.7%**

Table 11: Measles Immunization by district

Age group	Singida			Manyoni			P-value
	(sample) N	(received) n	%	(sample) N	(received) n	%	
<9 months	8	5	62.5	3	1	33.3	0.3869
9 months or older	579	536	92.6	502	382	76.1	<0.0001
Missing	5	5	-	-	-	-	N/A
	592	**546**	**92.2**	**505**	**383**	**75.8**	

4.3.4 Last measles seen in the catchment population and at the facilities

Health facility staff in RCH were asked when was the last time they saw a child with measles in their catchment area and at the facility. Overall, more than half of the respondents 58.3% (14/24) had never seen a child with measles in the catchment area. Sixty three percent (15/24) of the health facility staff in RCH reported that they had never seen a child with measles at their facilities. Only one percent of the health facilities RCH staff had seen a child with measles within the last month at both facility and in the catchment area. Twenty one percent (5/24) of the in-charges had seen a child with measles in the catchment population.

4.3.5 Deworming tablets to under five children

With regards to the deworming tablets, 63.4% (696/1097) of the under five children were reported to have been given deworming tablets. Most of the children aged (12 – 23 months) 67.2% (291/433) in Singida rural were given deworming tablets as compared to 48% (209/428) of the children in the same age group in Manyoni district. Tables 12 and 13 below summarize the results.

Table 12: Overall deworming tablets to under five children

Age group		Both Districts	
		Received deworming tablets	
	N	N	%
<12	13	3	23.1%
12 – 23	861	500	58.1%
24 – 35	34	25	74.5%
36 – 47	110	97	88.2%
48 – 59	74	68	92.9%
Missing	5	3	N/A
	1097	**696**	**63.4%**

Table 13: Deworming tablets to under five children by district

Age group	Singida			Manyoni			P-value
	(sample) N	(received) N	%	(sample) N	(received) n	%	
<12	9	3	33	4	0	0	-
12 – 23	433	291	67.2	428	209	48.8	<0.0001
24 – 35	21	14	66.7	13	11	84.6	<0.0001
36 – 47	71	65	91.5	39	32	82.1	0.1399
48 – 59	53	50	94.3	21	18	85.7	0.2204
Missing	-	3	N/A	-	0	N/A	-
	592	**426**	**72**	**505**	**270**	**53.5**	

4.3.6 Vitamin A supplementation to women delivering at health facilities

Of all the women who delivered at the health facilities 69.5% (762/1097), more than a half (55.5% (423/762)) of the respondents reported to have been given vitamin A supplementation shortly after giving birth. The reporting was significantly higher in Singida rural 67% (233/348) as compared to Manyoni district 45.9% (190/414)(p-value <0.0001). However 4.4% (34/765) of women couldn't remember if they were given vitamin A.

The study wanted to see if there was an association between social economic status of the respondents and education against vitamin A supplementation for women delivering at health facilities. Overall, there was no association between social economic status and vitamin A supplementation for women delivering at health facilities. However, there was an association between vitamin A supplementation for women delivering at health facilities and education. Many women with primary and secondary education were more likely to receive vitamin A supplementation shortly after delivery as compared to those with no education. Tables 14 and 15 below summarize the results.

Table 14: Vitamin A supplementation to women delivering at health facilities vs social economic status of the respondents

Variable		Social Economic Status					X^2	P-Value
		Lowest	Second	Middle	Fourth	Highest		
Overall	% (n/N)	56.9 (62/109)	56.5 (78/138)	60.1 (92/153)	58.1 (101/174)	47.9 (90/188)	18.5784	0.099
Singida	% (n/N)	72.2 (39/109)	65.9 (56/138)	73.9 (51/153)	68.7 (57/174)	52.6 (30/188)	15.1926	0.231
Manyoni	% (n/N)	41.8 (23/55)	41.5 (22/53)	48.8 (41/84)	48.4 (44/91)	45.8 (60/131)	15.7047	0.205

(Independent variables)

Table 15: Vitamin A supplementation to women delivering at health facilities vs education of the respondents

Variable		Overall	Education			X2	P-Value
			No education	Primary	Secondary+		
Overall	% (n/N)	55.5 (423/762)	41.7 (35/84)	58.6 (332/567)	50.5 (56/111)	13.0096	0.043
Singida	% (n/N)	67.0 (233/348)	72.2 (13/18)	70.0 (198/284)	46.8 (22/34)	12.1218	0.059
Manyoni	% (n/N)	45.9 (190/414)	33.3 (22/66)	47.2 (134/284)	53.1 (34/64)	6.2679	0.394

(Independent variables)

4.3.7 Nutrition to under-fives children

With regard to the nutrition, we asked mothers or caregivers the usual type of food given to the child in addition to breastfeeding. We wanted to capture if the food was given daily or sometimes. Grains were the most prominent foodstuff given daily to the children in both districts 81% (893/1097). In addition, 84% (683/1097) of mothers/caregivers reported to have sometimes given their children grains in both districts. Table 16 below summarizes the type of foodstuff usually given to children.

Table 16: Foods usually given to children in addition to breast feeding

Variable	Overall **N=1097**	**Districts**		P-Value
		Singida **N=592**	Manyoni **N=505**	
	% (n)	% (n)	% (n)	
Daily given grains	81.4 (893)	78.0 (462)	85.4 (431)	0.0019
Daily given protein	11.3 (124)	6.8 (40)	16.6 (84)	<0.0001
Daily given vegetables	5.4 (59)	2.4 (14)	8.9 (45)	<0.0001
Daily given fruits	2.2 (24)	2.7 (16)	1.6 (8)	0.2068
Given nothing	0.1 (1)	0.2 (1)	0	0.3555
Sometimes given grains	84.2 (683)	88.9 (345)	79.9 (338)	0.0032
Sometimes given protein	13.7 (111)	5.9 (23)	20.8 (88)	<0.0001
Sometimes given vegetables	5.7 (46)	3.4 (13)	7.8 (33)	0.0004
Sometimes given fruits	11.6 (94)	8.3 (32)	14.7 (62)	0.0001

(Multiple responses were allowed)

The study shows that 67.3% (716/1097) of the children under-five years were being breastfed and given complementary foods. Thirty seven percent (262/716) of those children were greater than 18 months. Most of the children 96.2% (252/261) above 18 months were daily given grains. These children were less given protein 24.1% (61/261), vegetables 3.8 (10/261) and fruits 14.5% (38/261).There was a

significant difference between the two districts for the children 18 months who were daily given grains while weaned breast milk with p-value 0.0019. Table 18 summarizes the results.

Table 17: Foods usually given to children above 18 months while being weaned breast milk

Variable	Overall **N=261**	Districts		X^2	P-Value
		Singida **N=135**	Manyoni **N=127**		
	% (n)	% (n)	% (n)		
Daily given grains	96.2 (252)	93.3 (126)	99.2 (126)	6.1615	0.0019
Daily given protein	24.1 (62)	26.7 (36)	21.3 (27)	1.0474	0.306
Daily given vegetables	3.8 (10)	5.9 (8)	1.6 (2)	3.3747	0.066
Daily given fruits	14.5 (38)	17.8 (24)	11.0 (14)	2.4074	0.121
Sometimes given grains	12.6 (34)	13.3 (18)	12.6 (16)	0.0876	0.957
Sometimes given protein	8.8 (23)	8.9 (12)	8.7 (11)	0.0996	0.951
Sometimes given vegetables	3.8 (10)	3.7 (5)	3.9 (5)	0.133	0.936
Sometimes given fruits	3.8 (10)	1.5 (2)	6.3 (8)	5.2933	0.071

(Multiple responses were allowed)

With regards to foods given to the children above 18 months in relation to social economic status, the results show that there were associations of social economic status in relation to children who were daily given fruits. Likewise, there was also an association between children sometimes given protein, given vegetables and given fruits with social economic status of the parents/guardians. Mothers with highest social economic status were likely to sometimes give their children protein and fruits while those with lowest social economic status were more likely to sometimes give their children vegetables.

In addition, there was no association between the children who were daily and sometimes given fruits against mothers/guardians education. The only noted association was between mothers/guardians education against children who were daily given fruits. Mothers with secondary school education were more likely to give fruits daily to their children than those with no education or with primary education. Tables 18 and 19 summarize the results.

Table 18: Foods usually given to children above 18 months while being weaned breast milk Vs social economic status of the respondents

Variable	Overall N=261	Social Economic Status					X^2	P-Value
		Lowest N=54	Second N=62	Middle N=46	Fourth N=54	Highest N=46		
	% (n)	% (n)	% (n)	% (n)	% (n)	% (n)		
Daily given grains	96.2 (252)	96.3 (52)	96.8 (60)	95.7 (44)	98.2 (53)	93.5 (43)	1.5809	0.812
Daily given protein	24.1 (62)	22.2 (12)	22.6 (14)	17.4 (8)	35.2 (19)	21.7 (10)	5.0893	0.278
Daily given vegetables	3.8 (10)	7.4 (4)	3.2 (2)	0	5.6 (3)	2.2 (1)	4.5637	0.335
Daily given fruits	14.5 (38)	5.6 (3)	22.6 (14)	4.4 (2)	20.4 (11)	17.4 (8)	12.3829	0.015
Sometimes given grains	12.6 (34)	9.3 (5)	11.3 (7)	17.4 (8)	20.4 (11)	6.5 (3)	15.2549	0.054
Sometimes given protein	8.8 (23)	5.6 (3)	4.8 (3)	4.4 (2)	13.0 (7)	17.4 (8)	16.8091	0.032
Sometimes given vegetables	3.8 (10)	7.4 (4)	4.8 (3)	4.4 (2)	0	2.2 (1)	19.5666	0.012
Sometimes given fruits	3.8 (10)	0	8.1 (5)	0	3.7 (2)	6.5 (3)	17.0755	0.029

(Multiple responses were allowed)

Table 19: Foods usually given to children above 18 months while being weaned breast milk Vs education of the respondents

Variable	Overall N=261	Education			X^2	P-Value
		No education N =32	Primary N=193	Secondary+ N=37		
	% (n)	% (n)	% (n)	% (n)		
Daily given grains	96.2 (252)	100 (32)	95.9 (185)	94.6 (35)	1.5809	0.454
Daily given protein	24.1 (63)	21.9 (7)	23.3 (45)	29.7 (11)	0.7933	0.673
Daily given vegetables	3.8 (10)	6.3 (2)	4.2 (8)	0	20,410	0.36
Daily given fruits	14.5 (38)	3.1 (1)	14.5 (28)	24.3 (9)	6.219	0.045
Sometimes given grains	12.6 (34)	18.8 (6)	12.4 (24)	10.8 (4)	2.2614	0.688
Sometimes given protein	8.8 (23)	3.1 (1)	8.8 (17)	13.5 (5)	6.0385	0.196
Sometimes given vegetables	3.8 (10)	12.5 (4)	2.6 (5)	2.7 (1)	7.8165	0.099
Sometimes given fruits	3.8 (10)	3.1 (1)	3.6 (7)	5.4 (2)	1.6901	0.793

(Multiple responses were allowed)

4.3.8 Knowledge, attitudes and current health seeking behaviour

The study assessed knowledge, attitudes and current health seeking behaviour among the women/guardians and the community at large. With regard to the general illnesses facing under five children in the community, responses from FGD sessions with community members when asked about the most common problem showed that Malaria, pneumonia, measles and eye illnesses were the most

reported health problems. However, other chronic illnesses mentioned include: coughing, diarrhea, and fever. The most reported causes of illnesses included malnutrition, weather changes and lack of preventive measures like Insect treated Nets (ITN). This was consistent with data from the health facility survey whereas fever, diarrhea and pneumonia were common mentioned by health care providers as most diseases seen to under five children. For example, in some of the FGD sessions in both district, participants had this to say:

"Children are suffering from fever, diarrhea and worms especially during rainy season" Participant, FGD session, Manyoni district.

"*In fact, children suffer from diseases like eye illness. You may see children playing while one of them is sick*" Participant, FGD session, Singida district

"During rainy season until the time when people starts to harvest crops, people get sick frequently. Children suffer mainly from worms and sometimes from eye illness during hot season. All my children suffered from eye illnesses recently. Other diseases that affect our children include rashes. I have also seen children with rashes" Participant, FGD session Singida rural

Community members were also asked about the steps taken when a child become sick. The majority of respondents (mothers, grandmothers and fathers) in FGD sessions in both Manyoni and Singida rural districts reported to have sought care from health facilities. However, some respondents reported to have sought care from drug shops as well as self-medication. Health facilities were the first source of treatment followed by self-medication and traditional healers. If a child does not get better after first source, the child was reported to be taken to the second source of treatment. These include: traditional healers, district hospital and regional hospital. With regards to the place of eye care seeking, majority of respondents reported to have sought care from dispensaries and followed by hospitals. Home remedies were reported by a few respondents. The following typical statements were recorded:

"Like others have earlier said, when you get illness you have to go to an expert at a health facility to seek further medical assistance. As we have said, you cannot just buy drugs for a child at the local shops because the baby cannot speak like an adult; you need to take the child to dispensary" Participant, FGD session Singida Rural

"To me for example, If I take a child to a dispensary and doesn't get better, I usually go to the health centre, and if still the child doesn't get better I go to the district hospital or regional hospital " Participant, FGD session Singida Rural

"The last resort depends on the discussion with a clinician. I may ask a doctor to let me take the child for more investigation at higher facility like St. Gasper. If that option fails, we have our local remedies which we also use." Participants, FGD session, Manyoni district.

4.3.9 Common illnesses in children

From the household survey, the study also wanted to quantify if eye problems were common in children in the study districts. Sixty eight percent (592/870) of the mothers of under-five children in both districts

reported that eye problems were common in children, while 9.2% (80/870) of the mothers did not know whether eye problems were common in children.

Women in the visited communities who reported eye problem as common in children were also asked to mention the common eye conditions in children. The common reported eye conditions by the mothers of children under-five included: red, watering or sticky eyes reported at 73% (214/295) in Singida rural and 74.4% (221/297) in Manyoni district. Trachoma illness was more commonly reported 20% (58/297) in Manyoni district as compared to 8% (23/295) in Singida rural. Other eye illnesses that were also prominent in the surveyed districts are shown in the table 20 below.

Table 20: Mothers' perceptions on the commonest eye conditions in children in the community

Variable	Overall **N= 592**	Districts		P-Value
		Singida **N=295**	Manyoni **N=297**	
	% (n)	% (n)	% (n)	
Sore, irritable, itchy eyes	14.0 (83)	11.5 (34)	16.5 (49)	0.0814
Trachoma	13.7 (81)	7.8 (23)	19.5 (58)	<0.0001
Red, watering or sticky eyes	73.5 (435)	72.5 (214)	74.4 (221)	0.6066
Injuries / something in the eyes	1.7 (10)	1.0 (3)	2.4 (7)	0.2059
Other	14.4 (85)	13.2 (39)	15.5 (46)	0.4314
Don't know	6.4 (38)	5.4 (16)	7.4 (22)	0.3248

(Multiple responses were allowed)

From the qualitative findings, the most reportedly eye problems were red eyes, discharging eyes and trachoma. Other reported eye problems mentioned were blindness and itching eyes. With regards to the causes of eye illnesses, participants in FGD session reported that weather changes, dust and flies were commonly main causes of the eye illnesses. However, in some FGD sessions, respondents did not know the causes of eye illness. The following quotes explain about the association of weather changes and eye illness:

"There is a time when we say it is due to weather changes. If you visit our village you will hear everyone talking about eyes illness. That is why we conclude by saying that it is weather changes" FGD session Singida Rural.

"We may also associate eye illness with dust and rain. Most eye cases decreases during rain seasons but increases during hot seasons when there is much dust". FGD session Singida Rural

4.3.10 Perceived reasons for eye illness

The study also wanted to understand the perceived reasons for eye illness in the community. Majority 48.5% (422/870) of the women or caregivers reported that dirty and dusty environment were the main reason for eye illness in children. There was a significant difference between the study districts, Manyoni having higher proportion 61.5% (264/429) of respondents who mentioned that dirty and dusty environments were the main reason for eye illness in children as compared to Singida rural district which

reported at 35.8% (158/441)(p-value <0.0001). Flies were also mentioned as the next perceived reason for eye illness after dirty and dust environment as shown in the table 21 below.

Table 21: Perceived main reasons of contacted eye diseases in children

Variable	Overall **N=870**	Districts		P-Value
		Singida **N=441**	Manyoni **N=429**	
	% (n)	% (n)	% (n)	
Seasonal disease	9.1 (79)	4.5 (20)	13.8 (59)	<0.0001
Dirty, dusty environment	48.5 (422)	35.8 (158)	61.5 (264)	<0.0001
Problem that runs in the family	1.8 (16)	0.5 (2)	3.3 (14)	0.0020
Flies	24.7 (215)	11.3 (50)	38.5 (165)	<0.0001
Be bewitched, angering spirits	0.6 (5)	0	1.2 (5)	0.0230
Lack of vitamin and nutrition	0.8 (7)	0.7 (3)	0.9 (4)	0.6773
Fever	0.6 (5)	0.7 (3)	0.5 (2)	0.6762

(Multiple responses were allowed)

4.3.11 Community perceptions on preventive methods for eye illness

We also asked the respondents in the visited households on the preventive methods for eye illness in the community. Although there was no significant difference between the two districts, the majority 38% (330/870) of the respondents reported that they keep their children's faces clean. Washing baby's face frequently was reported as another method used to prevent eye illness in the community. This prevention method was significantly reported in Manyoni district 39% (166/429) as compared to 17% (76/441) in Singida rural district. However, 26.2% (228/870) of the respondents did not know the preventive methods of eye diseases in children. There were no reported association between social economic status and education of the respondents against the reported prevention methods. The table 22 below shows the prevention methods applied for eye illness.

Table 22: Perceived prevention methods of eye diseases in children

Variable	Overall **N=870**	Districts		P-Value
		Singida **N=441**	Manyoni **N=429**	
	% (n)	% (n)	% (n)	
Give him/her vaccine	8.3 (72)	5.2 (23)	11.4 (49)	0.0009
Wash his/her face frequently	27.8 (242)	17.2 (76)	38.7 (166)	<0.0001
Keep him/her clean	37.9 (330)	34.9 (154)	41.0 (176)	0.0635
Take him/her away from witches	0.2 (2)	0.2 (1)	0.2 (1)	0.9844
Give vitamin A	1.3 (11)	0.7 (3)	1.9 (8)	0.1180
Don't Know	26.2 (228)	34 (150)	18.2 (78)	<0.0001

(Multiple responses were allowed)

4.3.12 Health care providers' knowledge assessment

Heath care providers were asked about the duration they had worked in the visited health facilities. Majority reported to have been working in the health facilities for more than five years and had never been transferred. Likewise, they also reported to have not been satisfied with the health facility infrastructure. Health provider's knowledge was assessed by asking questions related to the interventions.

With regard to the knowledge on vitamin A supplementation, we asked health care providers through in-depth interviews about the reasons and the intervals for giving vitamin A supplementation and measles immunization to children. Majority of the health care providers were aware that Vitamin A supplementation prevents eye illness. With regard to the time intervals, most of the respondents reported that vitamin A supplementation is given every six months during mass campaigns while measles immunization is provided at nine months. For example, the following typical statements were documented:

"*We provide vitamin A supplementation to the children in order to improve their health, eye in particular. They are supplemented every after six months".* In-depth interview with HCP, Singida rural

"*The child gets measles vaccination once and this is at nine month*" In-depth interview with HCP, Manyoni district

"*Measles vaccination is provided once at nine month. But we have heard that there is another one (second dose) coming*" In-depth interview with HCP, Singida rural

4.3.13 Health care providers' knowledge on eye conditions

Reproductive and child health care providers were asked about how often they see children with eye problems. Thirty nine percent (12/27) reported to have seen children with eye problems once or more times in a week while 19.4% (6/27) of the respondents reported once a month and 38.7% (12/27) less than once a month. Respondents from Manyoni district reported to have seen a few children with eye problem as compared to Singida Rural district. Table 23 below summarizes the results.

Table 23: Frequency of encountering children with eye problem

Variable	Overall **N=27**	Districts		P-Value
		Singida **N=14**	Manyoni **N=13**	
	% (n)	% (n)	% (n)	
Once a week or more	35.5 (11)	43.8 (7)	26.7 (4)	0.3096
About once a month	19.4 (6)	37.5 (6)	0	-
Less than a month	38.7(12)	6.3 (1)	73.3(11)	0.0001
Missing	6.5 (2)	12.5 (2)	0	-

With regard to the eye problem we asked health care providers to mention the common eye problems seen in children in the surveyed districts. Ninety two percent (22/24) of the health care providers

reported to have seen red, discharging eyes within the first month of birth. This was commonly reported in Manyoni district at 100% (11/11) as compared to Singida rural which was 85% (11/13). Likewise, red eye with discharge in older children was reported to be 8.3% (2/24) while itches were around 4.2% (1/24) and 17% (4/24) reported other eye conditions. The summary of the findings are presented in the table 24 below.

Table 24: Reported common eye conditions seen in children

Variable	Overall **N=24**	Districts		P-Value
		Singida **N=13**	Manyoni **N=11**	
	% (n)	% (n)	% (n)	
Red eye with discharging in first month	91.7 (22)	84.6 (11)	100 (11)	0.1742
Red eye with discharge in older children	8.3 (2)	7.7 (1)	9.1 (1)	0.9017
Itches	4.2 (1)	7.7 (1)	0	-
Others	16.7 (4)	7.7 (1)	27.3 (3)	0.1997

(Multiple responses were allowed)

Health care providers in RCH were also asked whether they feel confident in examining children's eyes. About 43% (13/30) of the respondents reported to have felt somewhat confident while 40% (12/30) reported to be very confident and 17% (5/30) were not confident in examining children's eyes.

Table 25: Health care providers who feel confident in examining children's eyes

Variable	Overall **N=30**	Districts		P-Value
		Singida **N=15**	Manyoni **N=15**	
	% (n)	% (n)	% (n)	
Yes, very confident	40.0 (12)	46.7 (7)	33.3 (5)	0.4561
Somewhat confident	43.3 (13)	33.3 (3)	53.3 (8)	0.0582
Not Confident	16.7 (5)	20.0 (3)	13.3 (2)	0.6242

We also asked if HCP feels confident in treating children's eye. Only 39% (11/30) of the respondents reported to be very confident while 36% (10/30) reported to have felt somewhat confident and 25% (7/30) were not confident in treating children's eyes.

4.3.14 Eye care knowledge assessment (images and case studies)

The study assessed knowledge of health care providers on different children eye conditions. Health care providers were provided with different images which included: cataract; trauma; ophthalmia neonatorum; mild trauma; measles and conjunctivitis as shown in figure 3 in page 12.

Image 1: Cataract

With regard to the first image, the following questions were posed: what did health care providers notice wrong with the child eyes and if they had ever seen this condition before; what eye condition was that and what could they do? These questions had pre-corded answers.

Ninety percent (28/31) of the health care providers reported that the pupils were white. Only 6.7% (2/31) of the respondents reported anything other than a white pupil and 3.2% (1/31) didn't know what was wrong with the eyes. Likewise, 71% (22/31) had seen this condition before and 71% (22/31) mentioned that this was cataract. With regard to the action to be taken, 84% (26/31) reported that they could refer the child urgently.

Image 2: Trauma

With regard to the second image (on figure 3 in page 13), two questions were posed: what did health care providers notice wrong with the child eyes and what could they do? Twenty three percent (7/31) of the health care providers reported that the pupil was not round. Only 10% (3/31) of the respondents repo rted something coming out of the eye while 48% (15/31) reported anything other than the above and 19% (6/31) couldn't know what was wrong with the eyes. With regard to the action to be taken, 90% (28/31) of the respondent reported that they could urgently refer the child.

Image 3: Ophthalmia neonatorum

With regard to the image three, the following questions were posed: what did health care providers notice wrong with the child eyes and if they had ever seen this condition before; what eye condition was it and what could they do? Ninety seven percent (30/31) of the HCP noticed swollen eye lids with discharge. Likewise, 90% (28/31) had seen this condition before and 90% (28/31) mentioned that this was infection with sexually transmitted diseases or ophthalmia neonatorum and 6% (2/31) could not understand this condition. Lastly, 39% (12/31) reported that they could clean the eyes; 29% (9/31) reported that they could give injection of antibiotics and 13% (4/31) of the respondents mentioned that they could refer the child urgently and 19.3% (6/31) mentioned other things different from the above.

Image 4: Mild trauma

An image with a mild trauma (image 4) was shown to the health care providers and asked what was wrong with the child's eye. Most respondents reported that the eye was very red 64.5% (20/31), and 13% (4/31) reported that there was a bleed in the eye and 23% (7/31) of the respondents mentioned other causes different from the above. Only 16% (5/31) of the respondents said that they had seen this condition before. Thirteen percent (4/31) of the respondents reassured the mother that it would get better while 80.7% (25/31) mentioned other measures other than the above; 6.4% (2/31) reported to have no treatment for such a case and 9.7% (3/31) didn't know any measure they could take.

Image 5: Measles

With regard to the fifth image, we asked a set of three questions with pre-corded answers. The first question was what was wrong with the child and if the condition can affect the child's eyes and lastly what can be done to prevent eyes problems from this condition. Eighty four percent (26/31) of the health

care providers said that it was measles. Only 16% (5/31) mentioned other conditions. Health care providers were asked to mention if measles can affect eyes. Almost all the health care providers 97% (30/31) said that the condition can affect eyes. With regard to prevention of the problem, 42% (8/31) of the respondents reported that giving vitamin A supplementation could help to prevent eye problem while 6.5% (2/31) said antibiotic drops/ointment; 42% (13/31) reported anything other than the above and 10% (3/31) of the respondents did not know how to prevent the condition. Table 26 summarizes the results.

Table 26: Reported preventive methods of measles condition (responses to image 5)

Variable	Overall **N=31**	Districts		P-Value
		Singida **N=15**	Manyoni **N=16**	
	% (n)	% (n)	% (n)	
Give vitamin A supplementation	41.9 (8)	33.3 (5)	50.0 (8)	0.3473
Antibiotic drops/ointment	6.5 (2)	6.7 (1)	6.3 (1)	0.9624
Anything other than above	41.9 (13)	46.7 (7)	37.5 (6)	0.6052
Don't know	9.7 (3)	13.3 (2)	6.3 (1)	0.5050

Image 6: Conjunctivitis

With regard to the image six, the following questions were posed: what did health care providers notice wrong with the child's eyes and if they had ever seen this condition before; what eye condition was that? what could the HCP do? and lastly, what could HCP tell the mother? These questions had pre-corded answers. Eighty seven percent (27/31) of the respondents reported that the eye was red with discharge. Forty eight percent (15/31) of the respondents reported to have seen this condition before. Likewise, 61.3% (19/31) of the respondents reported that the condition was conjunctivitis/infection. On the other hand, 26% (8/31) didn't know this eye condition and 13% (4/31) of the respondents mentioned other things different from the conjunctivitis. With regard to the action to be taken by health care providers, 39% (12/31) could provide antibiotics; 52% (16/31) mentioned other things different from providing antibiotics while 6.4% (2/31) didn't know what to do.

With regard to the action they would take to inform mother about the illness, 42% (13/31) of the respondents reported to advice mother to put the drops as prescribed while 52% (16/31) mentioned other things different from the above and 6.4% didn't know what to tell the mother.

5. The provision of eye care services, referral pathways and record keeping

5.1 The provision of eye care services

All health facility in-charges of the visited health facilities were asked about the management of ophthalmia neonatorum as a service to manage eye conditions in neonates. The result shows that all health facilities manage ophthalmia neonatorum through "start treatment and see the patient again". With regard to management of red eye/conjunctivitis in older children, 92% (22/24) reported that they

practice “start treatment and see the patient again”. The most treatment administered includes eye ointment 75% (18/24); Eye drop 13% (3/24); antibiotic injectable 4% (1/24).

5.2 Ocular prophylaxis

With regard to provision of ocular prophylaxis to new born babies to prevent conjunctivitis of the new born in health facilities visited, the in-charges were asked if the service is performed. Results show that ocular prophylaxis is performed by 58.3% (14/24) to all new born babies while 4.2 (2/24) HCP performed the procedure only if STD has been detected in the mother. There was no statistically significant difference on performing ocular prophylaxis between the two districts with 0.7925 p - value.

5.3 Referral mechanism

With regard to the referral mechanisms we asked health facilities’ in-charges if they had ever referred children to another facility. Eighty three percent (20/24) of the respondents in visited health facilities reported to have referred children to another facility. Among of the referred cases, 90% (19/20) were provided with details while standard referral forms were used by only 25% (5/20). About 30% (6/20) of the health facilities which referred the cases received feedback from the referral made. The commonest reported reasons for referrals were malaria/fever 58% (14/24), followed by diarrhea 29% (7/24) and failure to thrive 17% (4/24).

5.4 Health facility record keeping

Record keeping was also a point of interest for this study. In-charges of the visited health facilities were asked if ocular prophylaxis performed is recorded in the register at delivery. Thirty three percent (8/24) reported that ocular prophylaxis is recorded in the register. With regard to recoding of vitamin A supplementation to children, the results show that 95.8% (23/24) of the health facilities provided and recorded vitamin A supplementation in the registers in the previous month before the survey. Likewise, the record shows that 79.2% (19/24) of the visited health facilities provided vitamin A supplementation to the women on routine basis. Record reviews revealed that 87% (20/24) of the health facilities referred children to another facility and 90% (18/24) provided details of place of the referral point.

At regional level, the findings from OPD register showed that the age of the patient, place of residence and diagnosis were always recorded. There were no routine recording for patients referred in or out of the facility.

6. Elements of the health system that need to be strengthened

6.1 Supervision

Supervision was also a point of interest in this study. We wanted to know if the facility had been visited in the last six months by RCH supervisor. Almost all 96% (23/24) of health facilities in-charges interviewed reported to have been visited in the period of six months prior to the survey. Of those who were visited, the in-charges were asked about activities that the supervisor did. More than half (13/23) of the health care providers who were visited reported that the supervisor collected data; 87% (20/23) reviewed records; 47.8% (11/23) of the supervisors provided supplies; 39% (9/23) observed health talks; 43.5%

(10/23) conducted clinical training; 60.9% (14/23) listened to problems; 30.4% (7/23) offered to solve problems; 47.8% (11/23) supervisor courtesy call only and 43.5% (10/23) of the supervisor made observation (clinical mentoring).

The study also wanted to know how long did the supervisor stay at a facility. Majority, 57% (13/23) of the supervisors stayed at a facility for 1-2 hours. Likewise, 26% (6/23) of the supervisors spent more than two hours while 13% (3/23) stayed for less than one hour.

With regard to qualitative information (in-depth interviewers with health facilities' in-charges) on supervision, majority of the respondents reported to have been supervised within six months before the interview. Although health care providers acknowledged that they felt supported during supervision, most of them said that the supervision did not involve case management observation by the supervisors. A checklist is sometimes used to assess the facility. The most common method of giving feedback was through meetings. The following typical statements were made:

"*When the supervisor came he checked the environment, clinical records and the drugs. He called a meeting thereafter and insisted on the better use of drugs and the Community Health Fund (CHF). The supervisor didn't observe when I was with the client".* HCP, Manyoni district

"*It was a normal supervision that the supervisor asked some questions only and gave some instructions because it was late in evening"* HCP, Singida rural district.

6.2 Health facility equipments and supplies

In terms of availability of equipments and supplies, health facilities in-charges were asked if the facility had functional torches, antibiotic eye drops/ointment, injectable antibiotics and sterile eye pads. Antibiotic eye drops/ointment and injectable antibiotics were available at 88% (21/24). Twenty one percent (5/24) of the visited health facilities had functional touches and sterile eye pads. Sterile eye pads were available at Mtinko and Kintinku health centres.

7. Barriers to implementation

7.1 The proximity to health facilities

With regards to the proximity to health facilities, we asked women or care takers how far they live from the health facilities; within 5 kilometres; between 6-10 kilometres and beyond 15 kilometres from the health facilities. Seventy percent (299/429) of women/care takers in Manyoni reported to be living within five kilometres from health facilities as compared to 25.2% (111/441) in Singida rural. However, 74% (328/441) of the respondents in Singida rural could not estimate the distance from their home to the health facilities as compared to 26% (111/429) of the respondents in Manyoni district. Majority of the respondents 96.4% (839/870) in both districts went to the health facilities on foot. There was statistically significant difference between travelling by foot in Singida rural as compared to Manyoni with a (p-value <0.0001). Singida rural had many respondents travelling on foot as compared to Manyoni district. The table 27 below shows more details about the distance to the nearest health facility.

Table 27: The proximity to health facilities

Distance	Overall N=870	District		P-Value
		Singida N=441	Manyoni N=429	
	% (n)	% (n)	% (n)	
Within 5 km	47.1 (410)	25.2 (111)	69.7 (299)	<0.0001
6 – 10	2.1 (18)	0.2 (1)	4.0 (17)	0.0001
> 15	0.3 (3)	0.2 (1)	0.5 (3)	0.3030
I don't know	50.5 (439)	74.4 (328)	25.9 (111)	<0.0001

7.2 Community challenges and copying mechanisms

Participants were also asked to mention the challenges which are encountered when a baby gets sick in the family. The most commonly reported challenges in FGD sessions were financial constraints, with difficulties in mobilizing cash. Another problem reported during FGD sessions was lack of transport to the health facility. The following are some of the quotes from the FGD sessions related to the challenges in cash mobilization when the child gets sick:

"*The first main challenge is when the child is sick and parents are not prepared. Illness comes unplanned and sometimes there might be no cash to send the child to the dispensary or health centre*" Participant, FGD session, Singida rural.

"*First of all economically I have to think about what to do in order to get some money for child treatment. I have also to struggle to get cash even through borrowing*" Participant, FGD session, Manyoni district

"*In this village for example, most of the women do not have business, they mainly depend on agriculture. Sometimes a child might get an accident by falling from a tree and you might sell a reserved sack of sunflower or sorghum, chicken, sheep or cow to support for health facility services*" Participant, FGD session, Singida rural.

7.3 Health education in the visited health facilities

Women or care takers were asked if the health facilities they visit provide health education. About seventy six percent (830/1097) of the respondents reported to have been given health education when attending clinics. Eighty two percent (485/592) in Singida rural compared with to 68.3% (345/505) in Manyoni district.

7.4 Frequency of health talks

The study captured the frequency of health education talks at the visited health facilities. The pre-corded answers were: 'yes every time I attend there were health education'; 'yes sometimes there was heath education' and 'no there is rarely health education'. Overall, 43.7% (380/870) of respondents reported that there was health education every time they attend. Singida rural reported higher proportion 62% (277/441) of women who heard health education every time they attend at health facilities compared to 24% (103/429) in Manyoni. Respondents were asked about the topics covered during health education. The most prominent topics covered were nutrition or growth monitoring 67.6% (561/830) followed by breastfeeding 31.2% (259/830) and reproductive and child health 30.1% (195/830). With the exception

of measles and reproductive and child health topics, there were no statistically significant differences to the rest of the topics heard in Manyoni and Singida rural districts. Table 28 below shows the details of the topics covered.

Table 28: Topics heard by mothers during health education sessions

Variable	Overall **N=830**	Districts		P-Value
		Singida **N=485**	Manyoni **N=345**	
	% (n)	% (n)	% (n)	
Fever	4.1 (34)	3.5 (17)	4.9 (17)	0.2976
Measles	5.4 (43)	1.2 (6)	10.7 (37)	<0.0001
Diarrhea	1.6 (13)	1.7 (8)	1.5 (5)	0.8742
Nutrition/growth	67.6 (561)	64.3 (312)	72.2 (249)	0.1082
Breast feeding	31.2 (259)	33 (160)	28.7 (88)	0.1364
Chest infections	2.7 (22)	2.5 (12)	2.9 (10)	0.8279
Vaccination	1.5 (10)	2.2 (8)	0.7 (2)	0.1246
Reproductive and child health	30.1 (195)	19.2 (70)	43.9 (125)	<0.0001
HIV/AIDS	3.4 (22)	2.2 (8)	4.9 (14)	0.0579

(Multiple responses were allowed)

7.5 Health talks on eye conditions: Clients' perspectives

Women were also asked if they had ever heard about a health talks on eye conditions at their clinics. Only 23.6% (196/873) of the respondents reported to have heard about health talks on eye conditions in both Singida rural and Manyoni districts.

7.6 Health talks on eye conditions: Providers' perspectives

In connection to the above, the study asked the RCH staff in the visited health facilities if they provide health education related to eye conditions. Forty four percent (12/27) of the health care providers reported to have provided health talks related to eye conditions in children. There was a significant difference between Singida rural 50% (7/14) and Manyoni district 39% (5/13) in relation to the health education on eye illness.

7.7 Mothers/guardians knowledge on exclusive breastfeeding

With regard to exclusive breastfeeding, the respondents were asked for how long should a child be exclusively breastfed. This question aimed at testing the level of knowledge on exclusive breastfeeding. Majority of the respondents in both Singida rural 85% (374/441) and Manyoni 74% (318/429) districts respectively reported that children are exclusively breastfed for six months. With regards to the best foods to give young children while weaning, majority of the respondents 97% (840/870) in both districts reported to give them grain foodstuff.

7.8 Management of sick children (illnesses in the past 2-3 weeks)

At household level we asked women or caretakers about illness and health-seeking behaviour in under-five children in the previous two to three weeks before the survey. The most common reported illnesses were malaria, diarrhea, cold and coughing. Table 29 summarizes types of illnesses that children were suffering.

Table 29: Illness for under – 5 children in the last 2-3 weeks

Variable	Overall **N=1097**	Districts		P-value
		Singida **N=592**	Manyoni **N=505**	
	% (n)	% (n)	% (n)	
No, the child is healthy	16.5 (181)	12.7 (75)	21.0 (106)	0.0002
Malaria/fever	9.2 (101)	6.9 (41)	11.9 (60)	0.0047
Diarrhea	7.9 (87)	7.3 (43)	8.7 (44)	0.3759
Eye problems	1.0 (11)	0.2 (1)	2.0 (10)	0.0027
Cold	3.5 (38)	2.7 (16)	4.4 (22)	0.1355
Coughing	3.4 (37)	1.0 (6)	6.1 (31)	<0.0001
Breathing fast or with difficulty	0.2 (2)	0.3 (2)	0	-
Vomiting	0.7 (8)	0.8 (5)	0.6 (3)	0.6269
Rash/scabies all over the body	0.6 (6)	0.5 (3)	0.6 (3)	0.8451
Floppy/feel loose	0.1 (1)	0	0.2 (1)	-
Other	3.4 (37)	1.9 (11)	5.2 (26)	0.0026

(Multiple responses were allowed)

Caregivers or the respondents were asked to mention about how long the child had experienced the illness. On average, most of the children had been with the illness for seven days. However, in Singida rural the average time was higher (ten days) as compared to six days in Manyoni district.

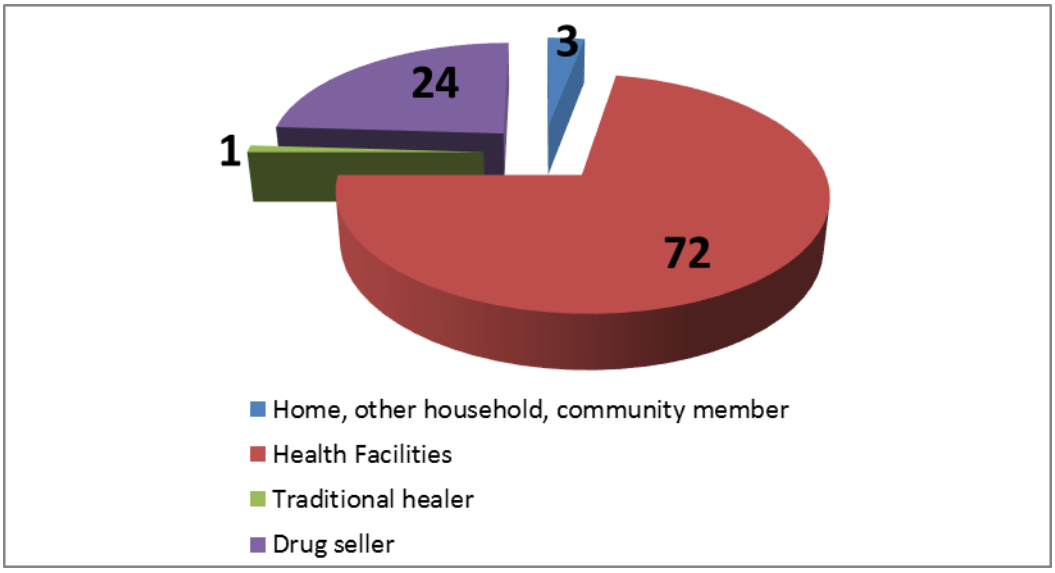
Table 30: Respondents who sought care for health problem

Variable	Overall **N=312**	Districts	
		Singida **N=123***	Manyoni **N=189****
	% (n)	% (n)	% (n)
Have you sought care for this health problem?	83.0 (259)	77.2 (95)	86.8 (164)

*(*missing for 5 children)*
*(** missing for 11 children)*

The study findings show that more than half of the respondents in the study districts reported to have sought care from a health centre or dispensary. This was followed by seeking care from drug sellers 24% (59/327) and from the hospital 14% (36/327). Figure 4 below summarizes the results.

Figure 4: Where was the care sought for health problem in the last 2 - 3 weeks- not eyes problem.



7.9 Management of eye problems in children

With regard to eye illness, we asked women/caregivers if the child had ever had an eye problem. Thirty percent (327/1097) of the respondents reported that their children had experienced eye illness. Eye illness in children was much higher in Manyoni 44.2% (223/505) as compared to Singida rural 18% (104/592) p-value <0.0001.

The most common type of eye problem experienced in children was red and discharging eyes reported at 86% (274/230) by the respondents. There were no significance differences for the prevalence of eye illness between Manyoni and Singida rural districts. Other problems are shown in table 31 below.

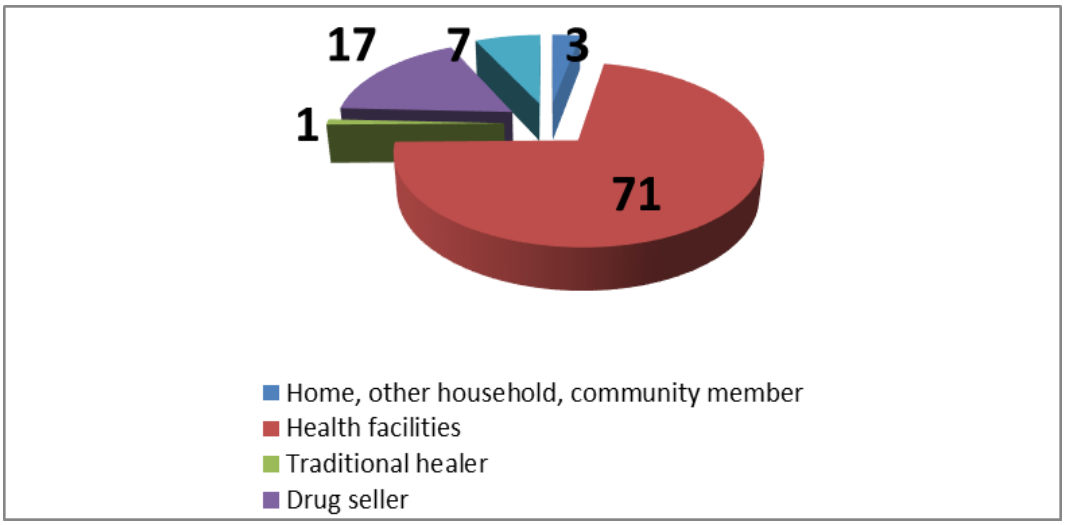
Table 31: Types of eye problem for children

Variable	Overall **N=320**	Districts		P-Value
		Singida **N=98**	Manyoni **N=222**	
	% (n)	% (n)	% (n)	
Red and discharging eyes	85.6 (274)	82.7 (81)	86.9 (193)	0.3822
Injury or something in the eye	1.3 (4)	4.1 (4)	0	-
White spot in the eye or eyes	0.6 (2)	0	0.9 (2)	-
Child seemed to be in pain	4.4 (14)	3.1 (3)	5.0 (11)	0.4408
Child could not see properly	0.6 (2)	1.0 (1)	0.5 (1)	0.5533
Other	7.5 (24)	9.2 (9)	6.8 (15)	0.4541

Of the children who had eye problems, 93% (303/327) sought care from various sources. Besides, the results further show that there was high attitude of health care seeking behaviour across the districts. For example, in Manyoni district majority of the respondents (95% (211/223)) reported higher percentages of eye care seeking as compared to Singida rural district 88% (92/104). With regard to the

place of care, 71% (233/327) sought care from the health facilities followed by drug seller 17% (57/327). Figure 5 below gives a summary of the place of care.

Figure 5: Place where the care was sought for the eye problem



For those who did not seek care for eye illness 1.9% (21/1097), we asked the women or care givers the reasons for not seeking eye care. The most prominent reason was that the condition being not serious at 42.9% (9/21) in both districts and lack of money 33.3% (7/21). Table 32 below summarizes the results.

Table 32: Perceived reasons for the care not sought at a health facility

Variable	Overall **N=52**	**Districts**		P-Value
		Singida **N=13**	Manyoni **N=39**	
	% (n)	% (n)	% (n)	
The condition was not serious	26.9 (14)	15.4 (2)	30.8 (12)	0.2788
Local / traditional treatment is better	1.9 (1)	7.7 (1)	0	-
Unfriendly staff	1.9 (1)	7.7 (1)	0	-
Too far / transport difficulties	19.2 (10)	30.8 (4)	15.4 (6)	0.2229
No time/other commitments	11.5 (6)	38.5 (5)	2.6 (1)	0.0005
Facilities have no medication	3.9 (2)	0	5.1 (2)	-
Other	34.6 (18)	0	46.2 (18)	-

Furthermore, we asked mothers and caregivers how often they wash their children's face. Forty two percent (462/1097) of the respondents in both districts wash their children's faces more than twice a day. Likewise, 41% (448/1097) of the respondents in both Singida rural and Manyoni district wash their children's faces twice a day. There was significant differences for the mothers who reported to wash their children's faces twice a day and more than twice a day in Singida and Manyoni districts, with p-value <0.0001. However, there were no association of the respondents' social economic status and

education against the reported frequencies the parents/guardians washing their children's faces. The summary of the findings are shown in table 33 below.

We also wanted to know the association between the respondents who have ever heard health talks against children face washing. Overall 38.7% (242/1097) of the under-five mothers reported to have ever heard health talks in the facilities said to have washed their children faces. Majority of those who reported to have ever heard health talks said that they washed their children faces more than twice a day 51.7 (125/242).

Table 33: Under 5 mothers reporting frequency they usually wash their children's faces

Variable	Overall **N=1097**	Districts		P-Value
		Singida **N=592**	Manyoni **N=505**	
	% (n)	% (n)	% (n)	
Less than once a day	0.2 (2)	0.2 (1)	0.2 (1)	0.9103
Once a day	13.0 (143)	13.9 (82)	12.1 (61)	0.3849
Twice a day	40.8 (448)	47.5 (281)	33.1 (167)	<0.0001
More than twice a day	42.1 (462)	35.1 (208)	50.3 (254)	<0.0001
Only when their face is dirty	3.6 (39)	2.9 (17)	4.4 (22)	0.1856
Missing	0.3 (3)	0.5 (3)	0	-

7.10 Health care providers' pre-service and in-service trainings

The study also looked at the pre-service and in-service training received by RCH providers. Most of the health care providers (through in-depth interviews) reported to have received pre-service training on nutrition, immunization, family planning and Antenatal Care. On the other hand, most of the health care providers reported to have received in service training on IMCI, family planning, Prevention of Mother to Child Transmission (PMTCT), breastfeeding, Focused Antenatal Care, immunization and Basic Emergency Management of Obstetric and Neonatal Care (BeMONC). Most of the in-service trainings were reported to have been conducted within a year. The most important challenges related to in-service training includes: long modules, limited time, limited supply of electricity in some of the health facilities (specific for IMCI trainings) and lack of materials in local language.

"*Yes, I have received training on IMCI. However I have not completed all modules as my colleague was on leave as I was alone at the facility. I have completed two module against nine required*" HCP, Singida rural

"*I have received in-service training on IMCI about nine month ago. The training was useful; I learnt many things in practical and through pictures. The challenge is that the modules were long and the time was short*" HCP, Manyoni district

"*I received in-service trainings on PMTCT, family planning, vaccination, IMCI and breastfeeding. Trainings were good as they help in data collection from the patients. The participants get to hear and see through pictures. We were organized in groups during trainings, this helped the participants to ask questions and have great understanding but the training time was too short*" HCP, Manyoni district

Health care providers were also asked if there was any areas which they would like more training. The majority of health care providers reported to have needed more training in PMTCT, family planning and eye care. With regard to the factors preventing health care providers from obtaining more training, most of them had the views that the decisions on whom to train are not under their control and were cadre specific. The decisions on whom to train were reported to be made at the district level. Other reported reasons include delaying in getting the information on the training because of long distance to the health facilities, inadequate health care providers to support activities while one is away and family issues.

"*In fact, I don't understand the reasons preventing from obtaining more training, because the selection is made at the district level. Probably, the decision may be training of the RCH staff so that they can later impact the knowledge to us. Midwives are the ones mostly attending the training*" HCP, Singida Rural.

"*It depends if you are selected from the district level and if you will receive the information about the training on time*" HCP, Manyoni District

Although most of the health care providers were not specific on skills needed to do their job well, the majority reported financial incentives as the main motivation to improve delivery of service provision. Other things reported that could help to improve the services include: recognition of the contribution of health care providers, availability of guidelines on eye health care, new posters, conducive working environment and increase the number of health care providers.

"*Yes, we need working tools and incentives (financial) such as changing of uniforms, timely salaries and promotion*" HCP, Singida Rural

"*Need to increase number of health care providers. For example, today I am alone, I have to do everything myself (including RCH and OPD services) without any assistance*" HCP, Singida rural

With regard to the support, majority of respondents reported to have been supported by their colleagues. If the clinic gets very busy, respondents reported to have been working as a team. For example if one department is overwhelmed, staff from other sections would move and support. If one comes across a problem that cannot be managed easily, majority reported to consult colleagues and higher authority to get it resolved.

"*If there is a staff who is not well collaborating with others, I call a meeting of all staff and talk to him/her. If we don't get a solution I channel it to higher authority in the hospital*" HCP, Manyoni

"*I seek support from my colleagues in identifying new case which I do not understand. You know it is very difficult to deal with such a case while alone. It is better to seek support from others"* HCP, Singida Rural

In IMCI training we asked the health care providers working at the RCH units whether they have ever received pre-service or in-service IMCI training. The results from this study show that 46.2% (12/26) and 42.3% (11/26) of the enrolled nurses and medical attendants received pre-service training on IMCI respectively. On the other hand, 34.6% (9/26) and 30.8% (8/26) of the enrolled nurses and medical attendants have received in-service training on IMCI respectively. The finding shows that a few of clinical officers and registered nurses have received the training on IMCI as illustrated in table 34 and 35.

Table 34: RCH staff who completed pre-service training on IMCI

Variable	Overall **N=26**	Districts	
		Singida **N=13**	Manyoni **N=13**
	% (n)	% (n)	% (n)
Clinical Officers	26.9 (7)	7.7 (1)	46.2 (6)
Registered Nurses	19.2 (5)	23.1 (3)	15.4 (2)
Enrolled Nurses	46.2 (12)	53.9 (7)	35.5 (5)
Medical attendants	42.3 (11)	53.9 (7)	30.8 (4)

(Independent variables)

Table 35: RCH staff who completed in-service training on IMCI

Variable	Overall **N=26**	Districts	
		Singida **N=13**	Manyoni **N=13**
	% (n)	% (n)	% (n)
Clinical Officers	3.9 (1)	7.7 (1)	0
Registered Nurses	15.4 (4)	15.4 (2)	15.4 (2)
Enrolled Nurses	34.6 (9)	53.9 (7)	15.4 (2)
Medical attendants	30.8 (8)	53.9 (7)	7.7 (1)

(Independent variables)

7.11 Health facility service delivery

7.11.1 Reported place of birth

Place of delivery is another important indicator for the child wellbeing. We asked all eligible women with children aged 0-60 months old in the visited households about the place of delivery. The study found that health facility delivery was 70% (762/1097). However, heath facility delivery was more prominent in Manyoni district 82% (414/505) as compared to Singida rural district 59% (348/592) p <0.0001 as shown in table 36. For children delivered at home we asked their mothers or caregivers on the timing of taking their babies to the clinic after delivery. The overall average time was seven days for both Singida rural and Manyoni districts. However, in Singida rural the average time was eighteen days as compared to nine days in Manyoni district.

Table 36: Place of delivery

Variable	Overall **N=1097**	Districts		P-Value
		Singida **N=592**	Manyoni **N=505**	
	n (%)	n (%)	n (%)	
Home	29.4 (323)	40.5 (240)	16.4 (83)	<0.0001
Health Facility	69.5 (762)	58.8 (348)	82.0 (414)	<0.0001
Other place	1.1 (12)	0.6 (4)	1.6 (8)	0.1493

7.11.2 Availability of clinic cards to under five children

With regard to the availability of clinic cards, all mothers were asked if their children 0-60 months had clinic cards. Availability of cards was at high level in both districts at 91% (1003/1097).

7.12 Post Natal Care Services, health care provider's views

Respondents were also asked on their perceptions of women using Post Natal Care (PNC). Majority of health care providers reported that there was limited awareness on using PNC to most of the mothers. Distance to the health facility was mentioned by the health care providers as the main reason hindering mothers from sending their children for postnatal care. Other reasons mentioned were negative attitude towards vaccine and other conflicting home obligations. Likewise, new pregnancies can force women to stop attending PNC while attending ANC.

"*I think most of the women don't have enough health education on maternal and child health issues. Also, most of them walk long distances attending to the health facilities. I think they get tired"* HCP Singida rural

"*It is due to lack of health education. Some live far away from the facility as well as negative attitude to the new vaccine (PCV 13) and rotavirus. Most women may find themselves pregnant while having children who are supposed to attend PNC. This can force them to leave the older children at home while mothers attend new ANC alone. Health education about the importance of vaccination should be provided*" HCP, Manyoni district.

7.13 Community healthcare seeking behaviour

In most of the FGD sessions, both men and women reported to have sent their children to the health facilities for health care services. However, the majority of participants reported that children are mostly sent to the clinic by women. With regard to the seeking permission from husband, majority of women reported to have sent their children to clinic without father's consent.

"It is probably true, children are mostly sent to clinic by women, personally I have to take the baby myself, and this depends on child's age. If my child has stopped breast feeding, I usually carry the child myself to clinic" Fathers FGD session Manyoni

"It is us (women) because we know that this is our responsibility, you may wake up the husband and tell him that the child is sick. I noticed some changes, but for now I see the situation is not good, I tell him to accompany me to the facility. He only becomes an accompanying person but the woman goes to explain herself." FGD Singida Rural

With regard to community perceptions on the use of PNC for under-five children, majority of the study participants reported that children are sent to the PNC for growth monitoring within the first year. The findings from qualitative study, FGDs in particular, have shown that most of the women do utilize heath

facilities for immunization and supplementation for their children below 12 months. However, we noted some reported cases of children above one year who were discontinued from the routine immunization and growth monitoring as a result of their mothers having other pregnancies. We also noted the cessation of health facility use for growth monitoring by mothers of the under-five children. Some women reported to have been using health facilities only when the children get sick. This was revealed from the FGD sessions in both districts.

"We take children to PNC in the first year of life as the children are on vaccinations, once the child finishes vaccinations we usually stop and the mother continues with other business. After that you only take the child to clinic when is sick". Participant, FGD session, Manyoni District

"*You take the child to clinic at first year of life, at the second year you may find having another pregnancy; therefore you stop sending the first child to PNC and continue with the second*" Participant, FGD session Singida rural

7.14 Clients' perceptions on service delivery

Clients were asked whether they were satisfied with the service they received on the day of the service. Eighty six percent of the respondents reported to be very satisfied with the service while 35% (69/195) said that they were satisfied with the service and 10% (19/195) were not satisfied. With regard to the level of satisfaction, Singida rural clients were more likely to be satisfied 87% (79/195) as compared to Manyoni district clients 26% (27/106). Table 37 below summarizes the results.

Table 37: Clients satisfaction on the day of service

Variable	Overall **N=195**	Districts Singida **N=91**	Manyoni **N=104**	P-Value
	% (n)	% (n)	% (n)	
Very satisfied	54.4 (106)	86.8 (79)	26 (27)	<0.0001
Satisfied	35.4 (69)	12.1 (11)	55.8 (58)	<0.0001
Not satisfies	9.7 (19)	1.1 (1)	17.3 (18)	0.0001
Very unsatisfied	0.5 (1)	0	1 (1)	-

9.

8. Discussion

The study has documented that vitamin A supplementation and measles immunization in children to be high. This is consistent to what has been reported elsewhere [24], [25]. Although the data suggests that vitamin A supplementation is high, routine immunization coverage and number of doses of vitamin A supplementation recorded on children's clinic cards are not as high as what is reported from the bi-annual mass campaigns. As compared to the results from the other studies, deworming medication to under-five has significantly increased since 2010 [24].

Despite the fact that most prominent topic covered in health education sessions at clinics was nutrition, the practice of the proper provision of nutrition foods to weaned children was low. The results have shown less impact of health education on better foods given to under five children. This indicates the need to promote awareness of the proper nutrition package during health education sessions [26].

The present study has identified the utilization of health facilities to under-five children as in the previous studies [27]. However, the study noted some reported cases of children above one year who were discontinued from a routine immunization and growth monitoring as a result of their mothers having another pregnancy and hence limit or lower vitamin A supplementation and immunization to the older groups. We also noted that women use health facilities when their children are sick. This is similar to other findings [27], [28]. Most of the respondents in Singida rural lived far away from the facilities as compared to Manyoni, yet, most of the respondents in Singida rural could not estimate distance to the health facilities. This may be due to the literacy level of the respondents as respondents who had no education were more available in Singida rural as compared to Manyoni. Although prevalence of eye conditions was high in Manyoni as compared to Singida rural, health workers in Singida rural have reported to see the cases quiet often. This might be attributed by the health care seeking behavior which is lower in Singida rural as compared to Manyoni.

Since 2004 deworming for children aged 12-59 months has been integrated with the vitamin A supplementation events; and through these initiatives deworming coverage has been high [29]. Despite the fact that deworming is every after six months, its coverage has not surpassed the coverage of vitamin A supplementation.

There have also been high levels of satisfaction with service offered in health facilities in Singida rural district. This might have been contributed to the regional philosophy spearheaded by the regional leadership in reducing maternal and newborn mortality [25]. Demand good services in Manyoni district might be due to economic wellbeing of both multi-cultural inhabitants and education. There is a need to sustain the best practices in the districts.

The study has also shown that eye infections are very common in the surveyed districts. Though, the challenge is whether community members are able to distinguish between trachoma and other causes of red discharging eyes. Besides, there were some gaps noted as most of women or care givers need health education about importance of different vaccines. There is also a need for health workers to continue health education [30] to the mothers as only less than sixty percent get the vitamin A supplementation shortly after delivery. In addition to that, there is a challenge as most of the health care providers don't know how to treat common eye condition like conjunctivitis. Mothers' knowledge on causes of eye problem is important. This study confirm findings from other studies on the provision of quality primary health care service [22], [23], [31].

Health policies and planning in any country depend heavily on having correct and timely information on health parameters [32]. New HIMS for district level and above is being rolled out, using a separate register. There is an active eye department in Singida Regional Referral Hospital with a newly qualified ophthalmologist who has been oriented in eye care for children. Referrals and onward referrals can now be tracked through the register in Singida Regional Referral Hospital. However, referral mechanisms from RCH need to be improved i.e. standard referral slips in the lower health facilities and provision of eye health care training to the health care providers. Currently MoHSW has developed registers which will capture eye conditions as they were previously not in HIMS recording register. Yet, the challenge may still be referrals to the facilities where there is no eye unit.

Health facilities supervision in the last six month prior to the survey was high. However, less than fifty percent of the supervision was not related to case management observation or clinical mentoring. This is consistent to what has been reported elsewhere [33]. The study documented that there was relatively low staff turnover in the visited districts which implies that training of health care providers on eyeIMCI will not affect the intervention as trained staff will be available to offer services in their facilities with newly acquired skills.

Availability of drugs and supplies on eye health care was good in the visited health facilities. The high availability of antibiotics in the visited health facilities needs to be addressed with clear strategies of training health workers on how to effectively utilize available resources. Eye care has been incorporated into the Standard Treatment Guidelines and National Essential List of Medicines [18]. There has been successful efforts of including essential medication for eye care in the Medical Store Department (MSD) price catalogue [28].

This study identified the financial incentives to health care providers as the main motivation to improve service delivery. Financial incentives are mostly claimed when staff work overtime or when they are very tight with extra duties. When these health care providers are not motivated, faced with little or no recognition of their contributions, limited availability of working tools, the sector should not expect wonders of better results. This is similar as reported in other settings [34], [35].

Important to note is that efforts to reduce child mortality need to improve both care seeking for childhood illnesses and quality of case management [36]. IMCI has the potential to contribute significantly to both the case management of illness and its prevention [37], [17]. The actual impact that will result from training health workers to use the IMCI guidelines and supporting them after training remains to be determined [37]. In this study, most of the health care providers reported to have received in service training on IMCI. There is documentation from many countries that a number of vertical programmes are bundled to address several diseases through IMCI strategy for prevention and hence delivered together as a cluster in primary care [30], [31]. It is therefore worth mentioning that integrating eye care for children into the existing training structure will have better impact to improve knowledge of health care providers.

9. Study limitations

This study is not immune to limitations. The first limitation was enquiring about the information on the record keeping without viewing the records. This resulted into the study relying mostly on information that was supplied by in-charges of health facility.

Another limitation was that, the survey was carried out during rainy season where most target respondents were in farms. This also was associated with difficult to travel to most hard to reach terrains due to hampered roads as the results of rainy weather. In turn this increased time consumed to complete the survey and increased cost implication.

The study noted multiple messages on posters related to the benefits of vitamin A supplementation displayed at health facilities. The messages to be displayed should be clear and more focused on eye health care, measles complications as well as physical body strength.

The report has not covered aspect on exclusive breastfeeding. The important variable on calculation exclusive breastfeeding was missing. The variable could lead to standard calculation of exclusive breastfeeding. The report has documented only community perceptions on exclusive breastfeeding.

10. Conclusions & Recommendations

1. It was established that staff in health facilities visited know how to refer children with serious eye conditions and that health education is frequently being given on a range of topics but almost none on eye care. However, there were areas which need attention. These include: effort should be made to sustain the high coverage of vitamin A supplementation and measles immunization. Improve ocular prophylaxis coverage. Increase mothers' knowledge of eye diseases and how they can be prevented; increase vitamin A supplementation of mothers through health education. Improve capabilities of RCH in the prevention, detection and management of eye conditions and a need to include routine examination of the eyes of newborn at the primary health facilities.

2. The following areas need special consideration: Improve HIMS in RCH clinics so referrals can be tracked; improve supervision in terms of capacity building of staff in RCH clinics for eye care; Improve supervisor's skills in teaching through case management as there are different checklists through different donor funded projects. There is a need to include eye care in supervisors' check lists to be implemented by eye care personnel; improve the provision of equipment for eye examination; develop training materials for eye conditions; involve end users in designing the eye health module as current modules are considered long; all cadres need to be trained, including Medical Attendants; engage Regional and District Medical Officers in the roll out to improve ownership: through leadership it is advocated that Regional and District Eye Care Coordinators be included in the relevant management teams which include Regional Health Management Team (RHMT) and Council Health Management Team (CHMT); there is a need to include eye health talks in health education sessions in clinics for better behavioural change outcomes. Lastly, the eye health care trainings need to include a range of health care cadres such as nurses, medical attendants and clinical officers across the districts as similar to the current IMCI distance learning training practice.

3. As IMCI has the potential to contribute significantly to both the case management of illness and its prevention, the actual impact that will result from training health workers to use the IMCI guidelines and supporting them after training remains to be determined. Hence integrating eyeIMCI into the existing training structure is a recommended option for better training outcomes.

4. The results do not only give an insight on how the intervention should focus with regards to health education topics , but also indicates the need to promote awareness of the proper nutrition feeding practices during the ANC/PNC visits.

5. In conclusion, the study has found out that measles immunization, vitamin A supplementation, utilization of health facilities by under-fives are high in Singida rural and Manyoni districts and need be sustained as best practices. Primary health Care providers refer children for secondary care but are have inadequate knowledge to treat even common conditions like conjunctivitis. The study has identified the following gaps that need to be addressed: improve attitudes to work: recognition of the contribution of health care providers; supply of guidelines and educational materials (like posters and brochures) on eye health; conducive working environment; include leadership training of supervisors as good supervision can change attitudes and motivation; train health workers on child eye health to equip them with knowledge and skills for management of eye conditions and health education for mothers, develop health education materials for eye care, including posters displayed where mothers can see them and availability of health education materials.

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