**Distribution Agreement**

In presenting this thesis or dissertation as a partial fulfillment of the requirements for an advanced degree from Emory University, I hereby grant to Emory University and its agents the non-exclusive license to archive, make accessible, and display my thesis or dissertation in whole or in part in all forms of media, now or hereafter known, including display on the world wide web. I understand that I may select some access restrictions as part of the online submission of this thesis or dissertation. I retain all ownership rights to the copyright of the thesis or dissertation. I also retain the right to use in future works (such as articles or books) all or part of this thesis or dissertation.

Signature:

_____ _____

Date

The Cultural, Social, and Environmental Factors that Influence Maternal Health Among the Soliga

By

Kelsey Holmes
Maters in Public Health

Global Health

_____

[Melissa Young, PhD]
Committee Chair

# The Cultural, Social, and Environmental Factors that Influence Maternal Health Among the Soliga

By

Kelsey Holmes

Bachelor of Science
Gettysburg College
2009

Thesis Committee Chair: Melissa Young PhD

An abstract of
A thesis submitted to the Faculty of the
Rollins School of Public Health of Emory University
in partial fulfillment of the requirements for the degree of
Master of Public Health
in Global Health
2016

# Abstract

The Cultural, Social, and Environmental Factors that Influence Maternal Health Among the Soliga

By Kelsey Holmes

Vivekananda Girijana Kalyana Kendra is a local non-government organization in Karnataka, India working to empower tribal groups through education and better access to healthcare. They have launched a study to investigate how to better contextualize The Safe Motherhood Program to be more inclusive to tribal women and to decrease maternal mortality. The Soliga tribe lives in Karnataka that has some of the poorest health indicators and highest rates of maternal mortality rates in the country[1]. A qualitative study of the maternal health practices of the Soliga women was conducted helped answer the question: What are the social, cultural, and environmental factors affecting maternal health in the Soliga community? A key theme that emerged was that maternal health was not solely the women's responsibility, she had a care team; maternal health is a shared responsibility among community members, family of the mother, and hospital workers. Participants also provided a list of their recommendations to improve the healthcare system. Among the recommendations were methods that described how to better improve the accessibility, acceptability, and accommodation of the healthcare system serving the Soliga. This included more home visits and community health education, and improving emergency transportation to the hospital for laboring mothers. Utilizing this information, The Safe Motherhood Program can be further developed to be better tailored towards the Soliga culture and help to reduce maternal mortality and morbidity.

# The Cultural, Social, and Environmental Factors that Influence Maternal Health Among the Soliga

By

Kelsey Holmes

Bachelor of Science
Gettysburg College
2009

Thesis Committee Chair: Melissa Young PhD

An abstract of
A thesis submitted to the Faculty of the
Rollins School of Public Health of Emory University
in partial fulfillment of the requirements for the degree of
Master of Public Health
in Global Health
2016

## Acknowledgments

I would like to express my gratitude for all of the guidance and support to Dr. Tanya Seshardi MBBS, MD Community Medicine. I am grateful for all of her encouragement through out the research and her instrumental role in serving as a mentor beginning in the planning phase of the study. I would also like to thank her for inviting me to come and conduct my research with VGKK.

I am very grateful to Dr. Melissa Young PhD for all of her support, time, and guidance spent in helping me write and analyze this study and my thesis.

I want to express my sincere thanks towards Kate Baur who provided invaluable support and guidance throughout this study. I appreciate her constant encouragement and availability to help with any challenges.

Dr. Prachanth Nuggehalli Srinivas MBBS, MPH, PhD was an integral part of the study design and I extend my thanks to him for all of the time and guidance spent to help develop this study.

I want to thank my field team, Roshni, Roja, Kamila, and Deepak. Without them this study would not have been possible.

I express a special thanks to all the women who participated in the study for their time, patients, and input. I hope to honor them through the utilization of the information gained from this study.

## Table of Contents

## Introduction

India has the highest number of maternal deaths in the world; 17% of women die from maternal complications, and maternal mortality rates are highest in rural areas[2,3]. The Indian government created the National Rural Health Mission (NRHM) to implement health plans that rely on local managers and healthcare workers[4]. The program's approach was to design projects and interventions on a local level that were specific to each jurisdiction's populations[4]. Since its commencement, the NRHM has increased staff and made improvements to 22,000 Community Health Centers, 4,000 Primary Health centers, and approximately 150,000 Sub-Health Centers in rural areas[4]. This helped to increase institutional deliveries from 51% to 70% from 2002 to 2008[4]. However, the reproductive and child health programs implemented by the NRHM still show disparities in health indicators among the rural poor[3]. An example of a reproductive and child health program that was launched by NRHM is The Safe Motherhood Program, which is designed to increase pre- and post-natal care and institutional births[3].

Particular groups that would benefit from maternal health programs designed to meet the cultural and health needs of the community are Scheduled Tribes (ST) and Scheduled Castes (SC)[1,4]. Research has shown that even when accounting for socio-economic status, members of ST/SC were less likely to give birth at a health center, and ST/SC accounted for of half of the maternal mortalities even though they only comprise 24% of the population[1,4]. Seshardi, 2014, hypothesized that social and cultural barriers were the main causes of the poor health care utilization[1].

The women of the Soliga tribe have disproportionality high rates of maternal mortality and their health and development indicators are among the worst in the country[1,4,5]. The Soliga are a tribe of about 30,000 people and predominantly reside in the Biligirianga Hills (BR Hills) of the Chamarajanagar district in the Karnataka state of Southern India[6]. This site is a tiger reserve that is monitored by The National Forest Service and home to the Soliga tribe. This has caused some contention, because the Soliga derive many of their beliefs about wellness from their connection with the forest and frequently forage for medicinal plants and food[6]. The Soliga population is dispersed through out the hills, but have a concentrated area in the Biligiri (white rock) area. The Soliga earn about 60% of their living from foraging in the forest, but farming is a popular vocation as well[3]. Much of the local philosophy and beliefs are centered in their partnership with the forest[3].

The Soliga were selected for this study because they have some of the poorest health indicators in the country[1]. There are a variety of health issues of the Soliga that increase morbidity and mortality from pregnancy and childbirth. Sickle cell anemia is the most notable of these diseases and is disproportionality high among the Soliga[6]. Maternal malnutrition has also been found to be high among the Soliga[6]. Other studies have shown that tribal women in India are more empowered than non-tribal rural women, but have poorer health outcomes[6]. However, age was also shown to be a factor in empowerment levels, with older women being more empowered than younger women.

Vivekananda Girijana Kalyana Kendra (VGKK) is a non-profit local organization that was formed in 1981 to empower the members of the Soliga tribe through education and health opportunities[7]. VGKK is conducting a study to contextualize The Safe

Motherhood Program to facilitate a better partnership between the health system and the Soliga population[8].

To better understand how to develop a contextualized maternal health program that is inclusive to the culture of the Soliga women, it is first necessary to learn what cultural, social, and environmental factors influence their maternal health. Learning the beliefs and practices around maternal health will be useful when modifying The Safe Motherhood Program to be more cultural inclusive to the Soliga.

**Research Objective:**

In order to determine the social, cultural, and environmental factor that affect maternal health among the Soliga, a qualitative study was conducted to gain the perspective of the Soliga women. Soliga women and mothers participated in focus group discussion and in-depth interviews to gather the data needed to answer the question: **What social, cultural, and environmental factors affect maternal health among the Soliga?** As well as three sub questions: What are the perceptions about maternal health from the perspective of Soliga women?, What are the roles and responsibilities of the key actors involved in Soliga maternal health issues from pregnancy to two years postnatal?, and What are the lessons learned from the Soliga women that can be used to improve The Safe Motherhood program?

The information from this study will be used to better inform The Safe Motherhood Program and be more tailored to the Soliga people. VGKK will also use this data to help inform a community based participatory project that works will local leaders to address and implement maternal health changes in the Soliga tribe and local health

system. The Soliga have a unique outlook on their health and their connection to the forest and it is an important consideration when tailoring a health program to their culture.

# Literature Review

## Introduction

In 2000, organizations working to improve health around the world gathered at the Millennium Summit and wrote the Millennium Development Goals[9]. Improving maternal health was determined to be one of the eight most pressing issues affecting people around the world[9]. Drastic improvements in maternal health were seen throughout the world between 2000 and 2015 that resulted in a decline of maternal mortality by 45% worldwide[9]. In Southeast Asia a 64% decrease in maternal mortality was observed[9].

However, India leads the world in maternal deaths per year at 63,000[2]. In India, 17% of women die from maternal complications with only a decline of 4.9% from 1900 to 2008[2]. Furthermore, the rates of maternal mortality in India are negatively disproportional in rural areas reaching up to 132% higher than urban areas[3]. To address this disparity and other disparities, the Indian government created the National Rural Health Mission (NRHM). Under the NRHM, The Janani Suraksha Yojana Safe Motherhood program was created to address maternal morbidity and mortality of rural women[4].

Scheduled Tribes (ST) and Scheduled Castes (SC) were previously marginalized and discriminated against throughout the country[2.] It is no surprise that historically the ST/SC had the lowest life expectancy rates and highest infant mortality rates[2]. What is surprising to many is that even though caste discrimination was deemed illegal by the Indian government over fifty years ago, the health disparities between casts still exists. The ST/SC make up 24% of the Indian population, yet they still are marginalized and

economically impoversihed[2]. Maternal mortalities among the ST/SC comprise about 50% of India's total maternal deaths.

The Soliga Tribe was declared an official ST by the Indian government in 1976[10]. The women of the tribe have disproportionality high rates of maternal mortality (including rate) and their health and development indicators are among the worst in the country[1,4,5,]. The Soliga tribe is about 30,000 people and predominantly resides in the Biligirianga Hills (BR Hills) of the Chamarajanagar district in the Karnataka state of Southern India[10]. The main area the Soliga inhabit has been declared to be a tiger preserve and is regulated by the Forest Department of Indian Government[6]. The culture of the Soliga centers around harmony with nature and the forest they inhabit[6]. Many Soliga believe that their relationship with the forest plays an integral part in the health of the community. This unique relationship with the forest adds to the complexities of addressing the health of the Soliga.

This literature review will depict the history of maternal health in India to help explain why the NRHM was created. The approaches of the NRHM will be described to show that the intended focus is on marginalized rural populations. The past and present discrimination of ST/SC will be highlighted by the health disparities seen in India. The culture and background of the Soliga people will be explained to further understand the current challenges and context of maternal health barriers seen among Soliga women. The information will provide a description of the historical and present day context that influence the Indian health system and Soliga culture to show that the cultural, social, and environmental factors that influence the maternal health of Soliga women are important

considerations when examining the implementation of maternal health programs for the Soliga.

## Maternal Health in India

Maternal health reform is not a new idea to India[11]. Beginning in the nineteenth century, childbirth practices were integrated into hygienic, political, social, and economic developments[12]. Along with these movements to better childbirth practices the role and societal view of women has also evolved[11]. This integration has had implications, not only for the treatment of women, but also for whom is conducting the practices. In the Indian context a change has also been seen in where the birthing and maternal care has occured[12].

Hodges describes the transition seen in the mid-nineteenth century as a movement from "wicked practices of barbarous midwives' and to the "deleterious effects" of child marriage and the seclusion of women" to the modern day practices in three phases[11].

The first phase is the integration of maternal health practices into medicine. This integration brought women's health to public and private intuitions such as hospitals and health centers. The knowledge of birth practices and maternal health also became incorporated into the medical field and gave rise to expertise in maternal health. This transition also altered the traditional practitioner-patient relationship, as men and medical professionals were now part of women's health instead of the long-established female midwives and traditional healers. In the beginning, these medical professionals were all male; it was not until the 1940s that women had a strong presence in the medical profession. Despite the medical advancements, women were not commonly patients at the hospitals and would often prefer traditional knowledge to medical practices. As a compromise, medical professionals formally trained traditional midwives to assist with

home births, these women came to be known as the zenana women. Many controversies arose from the workings of zenana women. Reports of unsterile instruments and reverting back to traditional techniques gave rise to a bad reputation; in some instances zenana women were accused of taking patients away from physicians[11]. This theme of traditional knowledge versus medical practices persists throughout the history of maternal health in India and brings to light the importance of the societal factors that influence health.

The second notable influence on the evolution of maternal health in India as described by Hodges is the social policies of reproduction. Child marriage was a societal norm in the early 1900s. The British Government passed a law entitled The Child Marriage Restrain Act in 1929 stating that the minimum age for girls to marry was 14 and for man it was 18 years of age[13]. Today child marriage is still an issue, but rates continue to decline from 50% in 1993 to 45% in 2006[13]. Eventually, reforms that resulted in legislation illegalizing child marriage were created to protect children, but also altered the culture of reproduction in India. It is notable that these reforms and legislations were campaigned for by medical practitioners and people who adopted scientific beliefs that were imported from western culture. These new ideals on reproductive appropriate age were not derived from the marginalized or impoverished communities, but by colonial apologists[12]. Though Hodges does not expand further on the acceptance for these new child marriage laws, the political origins that are tied to colonial rule were said to bring a "spiral of national, moral, and physical decay."[11] Indians viewed these restrictions as the colonizers trying to limit the growth of the native populations and change their culture to decrease productivity for the future[11]. The creation of policies involving the age of child

bearing girls/women reflects the social and political scene in which maternal health was set: outside forces imposing ideals and laws on issues that are still prevalent today in less severity. The struggle of tradition and culture versus medical knowledge and colonialism is clearly evident in the social and political realm of the past one hundred and fifty years of healthcare in India.

The third lens that Hodge examine the history of maternal health in India is from the viewpoint of maternal and reproductive health knowledge translation. As literacy rates of women increased in India, so did the number of women's health bulletins. Women become more informed about hygiene and family planning techniques through the literature available and were empowered to make informed decisions. It should be noted that the women who had access to this information were only those who were literate in certain languages. Also, the information provided varied in medical correctness. However, the idea that women could be responsible for their own health was instituted into the culture through literature and became a nationalized social ideal. The effect of the uptake of new health behaviors influenced by these popular literatures and national campaigns is best seen in the utilization of family planning techniques[11]. The acceptance of new health behaviors that were not in accordance with traditional practices occurred by educating the women and creating a place for women's voices in maternal and reproductive health. It should be noted that when women were able to make their own decisions based on knowledge they acquired they actively participated in behavior change, and chose modern ideals over traditional practices.

While Hodge provides three important perspectives in which to view the evolution of maternal health in India, women in marginalized populations were not

always included in the reforms that were occurring. For example, women in rural areas who were illiterate or whom did not have access to modern medical facilities. However, the theme of tradition versus modern science is still a prevailing theme in recent and current maternal health programs in rural India[12].

In the 1980s the traditional birth attendants and antenatal risk screening were popular in rural areas[12]. In the 1990s, however, these practices transitioned to women relying on skilled birth attendants and emergency care[12]. More recent policies and campaigns focus on institutional births and operate under the assumption that an institutional birth is a skilled birth[12]. In 1993, the 73rd Amendment to the Constitution of India was passed, which established a decentralized health system[14]. This gave rise to Panchayati Raj Initiations (PRI), which were a third level system of decentralization at district and village levels[14]. This passed the responsibility of governance from the federal level to the local level[14]. These emerging policies and ideals for maternal health reflect the idea that the responsibility for ensuring maternal health transitioned from the community to medical practitioners[12].

Throughout the course of the history of maternal health in India, the prevailing themes of medical science replacing traditional knowledge and the societies influence on a woman's maternal health decisions has prevailed over the past 150 years. When examining the maternal health in the current India context, it is important to use the perspectives of Hodge: medical integration, societal roles, and knowledge translation to understand the factors: historical, cultural, societal, and political that influence maternal health decisions.

## National Rural Health Mission

The National Rural Health Mission (NRHM) was created as a welfare initiative in 2005 as a result of disparities and deficiencies in the national health system[15]. The burden of poor health is more frequent among women and rural areas, particularly in ST/SC due to a skewed availability of access to healthcare[16]. The past patterns of tradition medicine abolishment and the exclusion of women in decision-making processes where addressed in the development of the NRHM approaches. The NRHM in its commencement, strove to create a system that was more holistic in its care model, increased capacity and resources through a grassroots approach, increased community ownership and accountability to the local health system, integrated disease management approaches, and eliminated a lack of care due to financial restrictions[15]. The five approaches that were developed to achieve these goals were "communication, flexible financing, improved management through capacity building, monitoring progress against standards, and innovations in human resource management"[15]. The mission of NRHM is to "provide universal access to equitable, affordable and quality healthcare which is accountable at the same time responsive to the needs of the people, reduction of child and maternal deaths as well as population stabilization, gender and demographic balance" [16].

The NRHM focused on a decentralized and community-integrated systems approach to healthcare[15]. India has both the unique challenge and incredible asset of being comprised of a wide array of diverse cultures and beliefs that influence health and the health system. By developing programs that were specific to rural areas, a traditionally ignored location[15], the NRHM was able to utilize the power of the community to achieve many of its goals. The importance of tailored programs that were specific to each culture was a new approach to healthcare in rural India. In theory, this

approach could involve the local leadership and incorporate local tradition into healthcare to address the conflict of tradition versus science.

Maternal mortality reduction was one of main objectives of the NRHM, more specifically, to reduce maternal mortality to 100/100,000 by 2012[16]. The community approach developed to address maternal health, led to the development of Accredited Social Health Activists (ASHA) workers[16]. An ASHA worker is a female health advocate that aids women in seeking improved healthcare from a household and community level[16]. Guidelines and training models were developed for ASHA workers to implement the program[16]. The JSY (Janani Suraksha Yojana) Safe Motherhood Program was also launched to address reproductive and child health as part of the NRHM[16].

The major constraints identified in achieving maternal mortality reduction in rural Indian women were identified as: a lack of round the clock access to health facilities including emergency care, underused and low access to skilled birth attendants, a lack of equity of services, a deficiency in access to specialists, an antiquated referral system, and an absence of referral transportation. Also, the needs for a universalized services system, investment in gender equity programs, and a link to public health and women centered health facilities were identified as needs required to improving maternal health[16].

To overcome these challenges, many approaches were proposed. Among these approaches were: utilizing locally trained healthcare providers that understood the local culture, emphasizing quality of care, creating a synergy between ASHA workers, other community health workers, and local women's groups, and encouraging institutional deliveries. These strategies also incorporated men into the design. NRHM was hopeful

in achieving their goals by using a comprehensive strategy of integrating local culture into healthcare and using local women to help educate and empower other women to make informed health decisions.

Yet despite all of their efforts, the goals of the NRHM for reproductive health and maternal mortality reduction were not met[3]. The maternal morality rate in 2012 was 178/100,000[17]. Sixty percent of India's population resides in a rural areas[16] and it is no surprise that creating tailored health systems to each rural culture was not an easy and achievable task. However, the successes that were seen were partially attributed to the community mobilization that had occurred and the involvement of women in this mobilization. The lessons learned from the history of maternal health of choosing between culture and science and excluding women in maternal health decisions were addressed in the design and much of the implementation of the NRHM. Even though the goals were not met, successes were seen in the integration of community into healthcare and the mobilization of female community health workers.

## Current Maternal Health in Rural India

According to WHO, 22% of maternal deaths in the world occur in India and millions more suffer from maternal morbidity issues[18]. These maternal deaths and mortalities comprised 21% of daily-adjusted life-year (DALYs) loss in India[18]. A study in Maharashtra reported that 66% of rural women were using contraception, but tribal communities in India had the lowest reported contraceptive use rates[19]. Furthermore, tribal groups have a reported increase in fertility rates, while the rest of India is showing a steady decline in fertility rates[19]. Access to maternal healthcare varies among different wealth sectors[20]. Women in India with low socio-economic statuses show 13% delivering at an institution, compared to 84% of affluent women[20]. Similarly, the

disparity also exists in illiterate women[20]. Eighteen percent of illiterate women delivered in an institution, compare to 84% of literate women[20]. Maternal indicators in India are low, but disproportionally even lower in rural women, impoverished women, and illiterate women.

Much of maternal health is focused on childbirth because the majority of maternal deaths occur during or soon after delivery[16]. India is no exception to this rule, but they also face other challenges such as overpopulation and geographic barriers to healthcare[3, 16]. Family planning initiatives have been successful in the uptake of family planning practices[20]. Family planning helps to implement population control, delay the age of first pregnancy, and introduce birth spacing into the India population[20]. Studies have show that tribal women are less likely to use birth spacing contraceptives than non-tribal women[22]. Theses differences can be attributed to cultural views of fertility norms and gender norms, as well as access to healthcare[22].

Access to maternal healthcare can be viewed using the five As. The five As refer to: Affordability, Availability, Accessibility, Accommodation, and Acceptability[16]. Affordability addresses both the willingness and ability to pay for the health services[16]. The NRHM has introduced several schemes into maternal healthcare that provides financial incentives to those who give birth at intuitions as part of The Safe Motherhood Program[16]. However, there is controversy over the effectiveness and success of these financial schemes[23, 24].

Availability refers to the resources available to the patient and the healthcare providers to treat the patient's needs[16]. The NRHM increased the number of AHSA, Auxiliary Nurse Midwives (ANM), and nurses at Primary Health Centers to increase the

human resources available[14]. Even, with the increase in staff, a recent study showed that 150,000 health centers lack physicians[3].

Accessibility refers not only the distance that one has to travel to obtain institutional care, but also to the access to transportation to get to a health facility[16]. The NRHM has increased the number of primary health centers in rural areas[3]. Nevertheless, case studies of maternal mortality found transportation and access to health centers to be a major barrier in maternal health[25].

Accommodation refers to the health center's capacity and efficiency in receiving patients and meeting their healthcare needs[16]. The NRHM has a referral system that allows for more difficult cases to be referred to higher-level health centers[14]. Still, case studies have shown that the lower-level health centers are often unable to treat mothers and even when referred to higher-level health centers, some laboring mothers were still sent home to die[25].

Acceptability is determined based on how comfortable the patient is with the care providers[16]. The NRHM was founded on ideals that in order to meet the needs of rural areas, culture had to been woven into the healthcare system at a local level[14]. Yet, studies have suggested that a reason why marginalized women, particularly in ST/SC, are not seeking institutional care is due to social and cultural barriers they face at health centers[3]. Discrimination and lack of cultural inclusion are listed among these barrieres[3].

The NRHM made great strides in trying to provide accessible and acceptable quality care to mother's in rural areas. However, many of the goals of the NRHM are still unfulfilled. The current issues of maternal health in rural India are addressed in the NRHM, but the application of these ideas seems to be lacking. In order to better serve

the mothers of rural India, more research must be conducted to determine how the NRHM can better tailor their health system to rural cultures.

## Scheduled Tribes (ST) and Scheduled Casts (SC)

Historically, India had a caste system that not only determined social status, but also livelihood and opportunities[26]. The lowest caste was named 'untouchables' and was severely impoverished and faced heavy social discrimination[3]. Caste status was inherited and the tribal groups of India were placed in the lowest class[26]. The health indicators of ST/SC were very poor and were among the worst health in the country[3].

To address the disparities and discrimination of the ST/SC, the Indian government created the Reservation Policy that was designed to eliminate social and economic disparities within societal castes[26]. The implementation of the Reservation Policy led to the creation of political positions that were more evenly dispersed among the different economic classes[26]. However, it has been shown that the indicators for political seats, which are determined by population size, are out of date and that the ST/SC are underrepresented in the government[26]. The Indian constitution now has requirements for providing not only political seats, but also education and employment opportunities to ST/SC[26]. Laws were also created to protect ST/SC and to discourage social inequality and discrimination practices and to create a more inclusive health environment[26].

Scheduled Tribes and Scheduled Castes comprised 25.2% of the population in 2011 at an estimated 300 million people[27]. Despite all the policies, ST/SC still face discrimination and have poorer social and economic indicators than the rest of the population[26]. ST/SC have a low life expectancy and high rates of mortality, both in children and adults[26]. Child malnutrition is higher in SC/ST and it is estimated that 50% of all maternal mortality occurring in India is from a woman belonging to a ST/SC[26].

Studies have attributed the reasoning for some of these poor health indicators to poor utilization of health services[26]. Other studies have hypothesized that poor utilization in health services is due to discrimination and a lack of cultural and social understanding at the healthcare facilities[26]. ST/SC are listed as underutilizing maternal health services[26].

In order to address these disparities in health, particularly maternal health, among the ST/SC, it is important to understand the cultural feelings towards maternal health, the social factors that influence a women's maternal health decisions, and the impact of the environment on access healthcare. When these factors, along with the input of the women themselves, are included into the health system at a local level, many of the gaps in care can be addressed.

## The Soliga

India recognized the Soliga among the Scheduled Tribes in 1950[6]. The Soliga are a tribal group that resides in southern India[6]. The majority of the population lives in BR Hills, which is a hilly, forested area that is part of the Western Ghats[6]. The Soliga are a forest tribe that share a deep connection with the forest they inhabit[6]. The majority of the forest where the Soliga have lived for thousands of years has been declared a wildlife sanctuary and a tiger preserve by the Indian governemnt[6].

The Soliga are historically foragers and derive much of their income and food from the forest[6]. The Soliga have had many disputes with the government over their rights to the forest[28]. The Indian government has often sought to remove all people from protected areas[28]. In 2006, the forest department banned the sale or harvest of any forest products, which until that point was 60% of Soliga income[6]. In 2011, the Soliga finally won the rights to their forest and were allowed to harvest from the forest[28].

The social structure among the Soliga is based on a patriarchal sytem[29]. Family is seen as both a nuclear family, as well an extended communal family[29]. The leadership of the clans that comprise the Soliga is given to one male member[29]. This leadership is passed down from a father to his eldest son[25]. Today there is an official tribal council called the Kula Panchayat[25]. The council is made up of members that represent all clans of the Soliga and their main function is the governing of their people[25].

Maternal health among the Soliga has many cultural ties. Women have historically given birth in their homes with the assistance of a dias (traditional midwife)[29]. Dias are trained in the community by traditional health practitioners and have had a high success rate compared to that of other midwives[29]. Much of the traditional health practices of the Soliga revolve around medicinal plants that are harvested from the forest[29]. These practices and medicines are an accumulation of over 300 years of knowledge passed down from healer to healer[29].

Today there is a primary health center in the village just outside of the preserve and a health center at the middle of the preserve[29]. Many of the tribal members rely on both traditional practices and modern medicine to maintain their health[29]. Vivekananda Girijana Kalyana Kendra (VGKK) is a non-profit local organization that was formed in 1981 to empower the members of the Soliga tribe through education and health opportunities[7]. The organization uses an integrated approach of tribal knowledge and medical practices to address health issues of the Soliga[29].

A common medical issue that greatly increases maternal risk is sickle cell anemia[29]. Up to 37.8% of the tribe has been reported to have sickle cell anemia[29]. The health facilities have a screening program to help detect sickle cell anemia[29]. Other

health issues that the Soliga experience disproportionality include: malaria, tuberculosis, and nutritional defiencies[29]. However, compared to neighboring communities there are lower rates of appendicitis, colonic cancers, sexual diseases, and stress-induced illnesses[29]. It was proposed that this difference could be attributed to access to forest food, diet, and medicines[29].

The clash of traditional medicine and modern science can also be observed among the Soliga. The NRHM includes the Soliga in their objectives to increase maternal care and improve accessibility and accommodation issues; however, no major impacts have been observed[1]. The Soliga have faced discrimination, similarly to other ST/SC, when interacting with other communites[29]. Their tedious relationship with the forest department has also led to further feelings of exclusion by the governement[29]. The importance of the forest as an integral part of health among the Soliga is yet another example of how knowing the social, cultural, and environmental factors that affect health will help improve the integration of community and culture into the health system.

## Conclusion

Maternal health is an important issue that not only affects women and children, but a communities as a whole. Maternal health has gone through a series of transitions: traditional healers to medical physicians, new policy reforms affecting maternal and reproductive norms, and new knowledge translation pathways that led to women's autonomy[13]. Social norms and cultural implications have played an important role in maternal health that has been seen throughout the history[11]. Today, cultural and social factors that influence maternal health are just as important and still hold a vital role in the maternal health of a community. The NRHM has worked to decentralize healthcare and transition the power of decision making to the local level to help ensure a holistic and

community driven approach to healthcare[16]. The goal of NRHM's The Safe Motherhood program is to increase maternal health indicators and to work towards closing the gap of health disparities seen in ST/SC, who have been historically discriminated against and denied many health services available to other Indian citizens[16]. The Soliga have a unique approach to health that incorporates the environment in which they live[29]. This rare attitude towards health is just further proof that in order to be effective in increasing the maternal health of a community, social, cultural, and environmental factors must be included into the health systems approach. Tailoring healthcare to the community in which it serves will help to decrease the tension of tradition versus science and lead to a more effective healthcare approach.

# Methods

## Context of Study

The research study was conducted in BR Hills located in Karnataka state of India. The data was collected in July of 2015. Many people were involved in the data collection including: a team research leader, VGKK supervisors, a facilitator, a notetaker, and a translator. All members of the team were Indian nationals with the exception of the team research leader. The facilitator and the notetaker were Soliga tribal members. The study was conducted in collaboration with VGKK. An International Review Board (IRB) application was submitted to Emory review board and was deemed except. A study on discrimination during childbirth in health centers among the Soliga was also being conducted in conjunction with this study.

## Study Design

Qualitative methods were used to collect information from Soliga women on their maternal experience. Grounded theory, which refers to learning about the issues through the research instead of prior knowledge, was applied to the data collection. An iterative approach of generating questions based of the preliminary research was also applied (see Figure One). This approach was chosen because of the researcher's lack of knowledge on maternal health of the Soliga and unfamiliarity with their culture. By using an iterative approach, the data collection and analysis was constantly tailored to invoke a more complete understanding of maternal health among the Soliga.

**Figure One**

Research Questions

- What are the cultural, social, and environmental factors that influence maternal health among the Soliga?
  - What are the perceptions about maternal health from the perspective of Soliga women?
  - What are the roles and responsibilities of the key actors involved in Soliga maternal health issues from pregnancy to two years postnatal?
  - What are the lessons learned from the Soliga women that can be used to improve The Safe Motherhood program?

Figure One: This figure lists the major research question and the three sub-questions that this study sought to address.

## Study Population

This study focused exclusively on Soliga women living in BR Hills. In order to gain the perspective of maternal health among the Soliga, data was collected from those who had personally experienced pregnancy and/or childbirth. The study population of Soliga women who had recently given birth, showed an average age of twenty-three according to local healthcare records (see Figure Two). Soliga mothers were from a variety of pudos (villages/neighborhoods). The also varied in the fact that they had given birth any where from one to three times, with three births being rare. The women gave birth at a variety of locations, but personal reporting of the birth location contradicted the hospital reports 31% of the time. Overall, the participants for the focus group discussions (N = 22) and in-depth interviews (N = 13) were all Soliga mothers living in BR Hills.

**Figure Two**

Demographics on Soliga Women whom Gave Birth between March 2013 and March 2015 (N = 58)

| **Village (Podu)** | | **Location of Birth** | | **Number of Births** | |
|---|---|---|---|---|---|
| Bangle Podu | 12% | Chamarajangar Hospital | 9% | 1st | 48% |
| Hospudo | 19% | Gumballi Primary Health Center | 14% | 2nd | 40% |
| Kalayni Podu | 3% | Home | 3% | 3rd | 12% |
| Muthagade gadde | 12% | Sante Maralli FRU | 12% | | |
| Purani Podu | 19% | VGKK Hospital | 57% | **Average Age** | |
| Sigabetta | 7% | Other | 5% | 23 | |
| Yarkingadde | 17% | | | | |
| Other | 10% | | | | |

Figure Two: This figure shows the demographics of Soliga women who gave birth from March 2013 to March 2015 according to the hospital records.

## Data Collection Methods

The study used four focus group discussions (3-8 participants/ focus group discussion; total = 22) and thirteen in-depth interviews to obtain the perspectives of Soliga women on maternal health. The focus group discussion method was chosen because it provided a community perspective and background knowledge that helped to shape the in-depth interview tools. The focus group discussions focused on the perspective of maternal health in the community and how a woman remains healthy from pregnancy till the postnatal period. The focus group discussion data also helped to answer the first research sub-question (see Figure One). In-depth interviews were conducted because the intimate details of maternal health are more easily shared in a private setting. In-depth interviews also provide an opportunity for participants to share their maternal experience more completely. The in-depth interviews asked participants about their maternal health experiences from pregnancy to up to two years postnatal. They were asked about the stakeholders who were involved in their maternal health

experience and the roles, expectations, and responsibilities of each stakeholder. The in-depth interview data was used to answer the second research sub-question (see Figure Two).

## Data Collection Process

In order to benefit from both outsider and insider perspective the research team contained two field assistants that collected all of the data. Two women, one who was a mother and one who was childless, were hired and trained to collect qualitative data. They were invaluable to the team due to their knowledge in the local dialect, culture, and local politics. Both women were trained in: the concepts of qualitative research, direct translation, the purpose of the study, qualitative methods, the iterative approach, reflexivity, and the ethics of research. The facilitator was also trained in question delivery, active listening, and probing. The notetaker was trained in recruitment, and note taking. The entire team contributed to the development of the tools for data collection. Debrief meetings were held after data collection and notes about the thoughts of the entire team were recorded and contributed to alternations in data collection tools.

## Participant Recruitment

For both the focus group discussions and the in-depth interviews, the selection criteria for participants included: women who had given birth with in the last two years, lived in BR Hills, and eighteen years or older. The exclusion criteria included women whose children had died in infancy, and non-Soliga women.

To understand the community perspective of maternal health, four focus groups were conducted. Participants were selected based on child status and cultural identities. The participants were segregated into four groups: women who had given birth within a year, women who were leaders in their community, women whose children that were

entering adulthood, and a women's group containing women of mixed ages and experiences. Each focus group was conducted in a different village to increase the diversity of the data. Women were recruited through snowballing (one participant connecting researchers to other participants), using already existing community groups, and through the knowledge of the field assistants. The intention of the focus groups was to provide a diverse view of maternal health from different types of women. After four focus groups the team decided that saturation had been met due to repetition in the data across a diverse groups of women.

The interview participants were selected from the local health center's list of registered births (see Figure Three). From March 2013 to March 2015, 58 births were recorded. Three women gave birth twice within the two years, four were not Soliga, two lost their children, and one was under 18 years old, numbering 48 possible participants. The list was randomly divided in half due to two-research projects that were being undergone simultaneously. Of the 24 participants assigned to this research project, three participated in focus group discussions, and 13 were interviewed. The remaining possible participants were not selected due to a variety of barriers. One woman was not accessible due to forest department restrictions, four women participated in the pilot testing of the focus group discussions and interviews, and the remaining women were either away from BR Hills or did not want to participate. The research team determined that after 13 interviews, saturation had been reached and all available and willing participants within the criteria were interviewed.

**Figure Three**

| Demographics on the Soliga Women Interviewe (N=13) | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| **Village** | | **Location of Birth According to Hospital Records** | | **Location of Birth According to Participant** | | **Number of Births** | |
| Bangle Podu | 8% | Chamarajangar Hospital | 0% | Chamarajangar Hospital | 0% | 1st | 69% |
| Hospudo | 0% | Gumballi Primary Health Center | 15% | Gumballi Primary Health Center | 8% | 2nd | 31% |
| Kalayni Podu | 8% | Home | 0% | Home | 23% | 3rd | 8% |
| Muthagade gadde | 23% | Sante Maralli FRU | 23% | Sante Maralli FRU | 15% | | |
| Purani Podu | 31% | VGKK Hospital | 62% | VGKK Hospital | 54% | **Average Age** | |
| Sigabetta | 8% | Other | 0% | Other | 0% | 22 | |
| Yarkingadde | 23% | | | | | | |
| Other | 0% | * Hospital records and personal reporting disagreed 31% of the time on birth location, but not other demographics | | | | | |

Figure Three: This figure shows the demographics of the interviewees and the contrasting hospital data to personal reporting.

## Focus Group Discussions

The focus group discussion guide was developed from previous literature on maternal health in marginalized populations. Input from the research teams was incorporated into the guide. The questions on the guide were pilot tested on one woman from the community and then two different groups of women from community. With each pilot test, the wording of the questions was altered. Also, the facilitator's technique was critiqued until the concept of probing was fully understood and executed. The data for both the focus groups and interviews was recorded on a digital recorder and notes were taken. Challenges to data collection included: cultural restrictions on leaving the house for women who were up to six months postnatal, the loss of one of the recordings, and non-mingling of women from neighboring villages. Also, the female research assistants were not willing to conduct a focus group with men due to cultural restrictions.

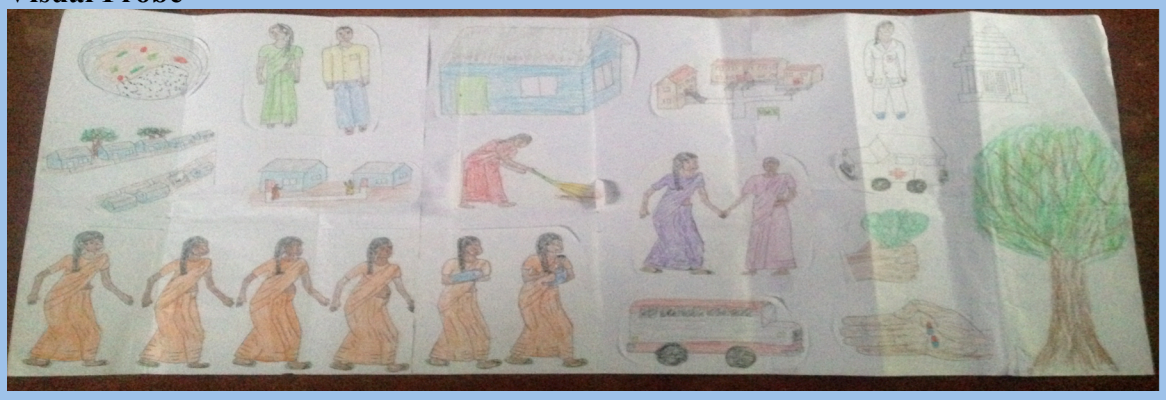
For both the focus group discussions and the in-depth interviews, issues of confidentiality, minimization of harm, and the benefits of the research were all considered when designing the study. Confidentiality was addressed through location selection by ensuring that the environment was suitable to the interviewees as well as training the research team in the importance of confidentiality. Meeting participants on their schedule and in their preferred location and making sure that participants knew it was voluntary addressed minimizing harm. The research will be used by VGKK to address the issues of The Safe Motherhood program and the information will be passed on to community leaders.

## In-depth Interview

The interview guide developed for the interviews mirrored the making of the focus group discussion, except that the responses from the focus groups were used to frame the guide, instead of the literature. The interview guide was pilot tested on women in the community and staff at VGKK. Issues of complex questions that were not typical in the culture became apparent in the piloting. A new method was developed to encourage longer and more detailed responses (see Figure Four). The issues in data collection included forest department restriction on access to distant villages, cultural traditions that placed women in their maternal homes for the postnatal period, and language barriers within the research team.

**Figure Four**

**Visual Probe**



The new method developed was named visual probing. The repetitive themes that presented in focus groups discussions were identified and were used to encourage interviewees to talk more. Drawings that were culturally recognizable and appropriate were created for each theme from the focus group discussions and were placed onto a poster. The facilitator would present the drawings to the interviewee and ask her to tell her story of maternal health using the pictures. With this new method, participants were more forthcoming about the details of their maternal health experience and allowed the facilitator to probe for more information. On average interviewees spoke 74 words in a single response to the visual probes. The average response word count for questions that did not have visual probes was 19 words. The visual probes were only prompted with one question. The average answer word count for other questions was 18 words. All participants had a higher word count when given the visual probes as compared to a response to a question without a visual probe. Overall, the visual probes resulted in over 350% increase in word count compared to verbal questions..

Figure Four: This demonstrates the method of visual probes that was created and utilized for in-depth interviews.

## Data Analysis

After data collection, the audio file was transcribed, and translated from Kananada into English by a professional translator/transcriber. Having a tenth of the data transcribed by two different transcribers and comparing the results verified the accuracy

of the translation and transcription. Grounded theory and the iterative process were also applied to the data analysis. To analyze the data, code definitions were first developed and then the data was coded. Codes were drawn from the data itself and the literature. Next, the codes were used to develop a theory. The theory was validated by: checking for consistency, using a conditional matrix to ensure that each experience and perspective from the data was consistent with the theory, and cross checking findings with existing literature.

## Data Quality and Study Limitations

The strengths of the data collection were: the culturally appropriate questions and methods, the diversity of the participants, and the multitude of topics mentioned in the information collected. The study was limited by the cultural tendency have short answers that were not rich in information, and the automated responses of many subjects. To combat these issues, the new method of visual probes was developed. This method made a difference in response length and details shared, but did not eliminate the issues. Even with extensive probing and different ways of asking questions, women would not explain the reasoning behind certain behaviors.

# Results

**Figure Five**

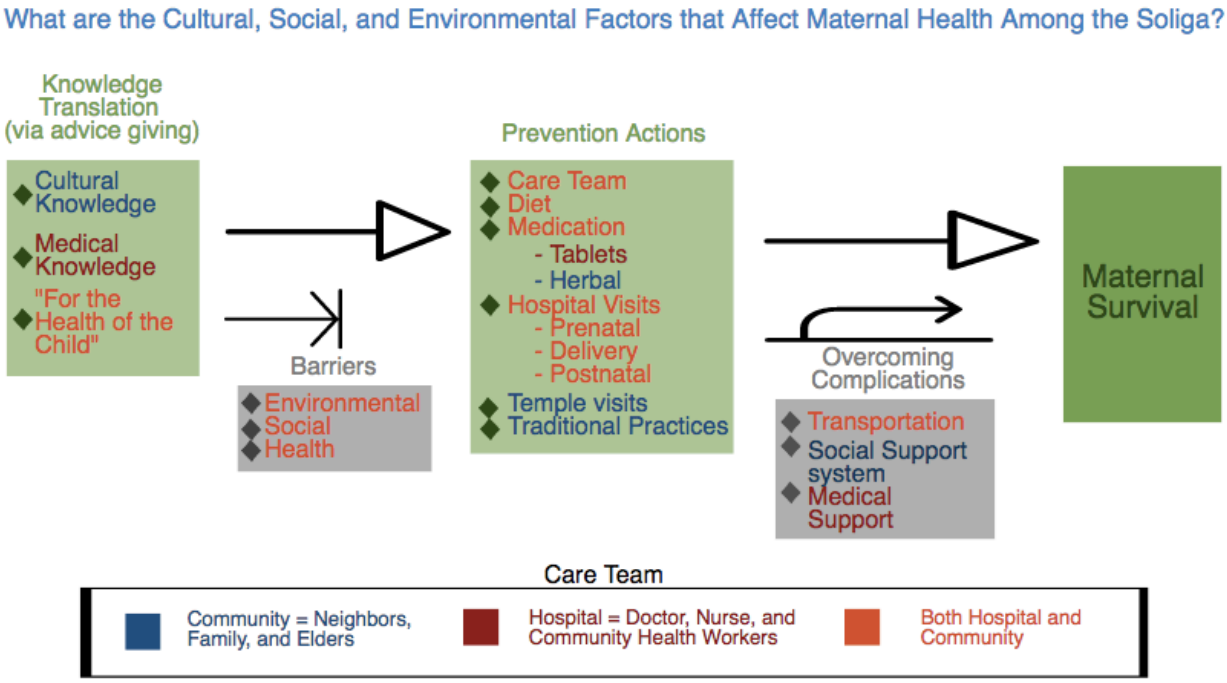



Figure Five: The theory developed based on the data is represented pictorially above. The maternal health process of knowledge translation, preventative actions, and maternal survival is illustrated and the key stakeholders that add in this process are also represented.

The responsibility of maternal health and survival was shared among a 'care team' consisting of: community members, family members of the mother, and healthcare providers. This persisted throughout the maternal health process shown in Figure Five. The process included receiving information and acting on this information to survive the risks associated with childbirth. When complications arose the 'care team' worked to overcome them. Figure Five shows the division and sharing of the roles and responsibilities of the 'care team' throughout the maternal process represented by the colors described in the key. A major part of maternal health is that women were able to

learn about maternal health knowledge. This knowledge often translated into preventative health actions to maintain the mothers' health. However, social, environmental, and health barriers still persisted in some cases and prevented women from seeking the recommended health practices. Even when complication occurred all the participants in the study survived the maternal process, through some faced life-threating complications.

## Care Team

A common concept throughout all the interviews and focus group discussions was that maternal health was not the sole responsibility of one person and that the women wanted a team of people to assist in keeping them healthy. This 'care team' included members from the community including neighbors and elders, family members of both their maternal family and their husband's family, and hospital staff and community health workers. Each of the three 'care team' groups; community members, family, and hospital staff, had defined roles and expectation from the perspective of the Soliga women. Women relied on community members for advice on maternal health and support throughout the pregnancy and postnatal period. Family members were more involved in decision-making and the physical care of the mother. Hospital staff were expected to complete home visits, assess the mother's health through scans and tests, prescribe medications, and help transport women to the hospital for delivery.

"I want the cooperation of doctor, nurse, people in my community, and elders at my house, my parents, and my husband everybody. I want all of them."

"The villagers here stand by our side in trouble times, and the doctors in the hospital help us during the delivery time, since the community people give a helping hand, we need their help in those times."

The mothers interviewed expected this combined effort to keep them healthy and even requested it for future generations. Though these roles sometimes overlapped, they were usually in agreement. For example, hospital workers and neighbors gave advice about diet; this advice did not contradict what the other had said. There were however expressions of disappointment in the lack fulfillment of a role or expectation. Also, the expectations and roles could slightly differ within the population. For example, some women looked to the health center if they had an issue, where others turned to their family and neighbors.

Caring for a Soliga mother or mother-to-be included aspects of her physical health, mental health, and resources that could to maintain her health. This 'care team' concept was present in the entire process of ensuring maternal survival. The maternal process as shown in Figure Five includes gaining knowledge that results in actions and helps maintain maternal survival.

## Advice Giving

The maternal health knowledge was taught to the women and the community through the method of advice giving. The tone of the advice was often welcomed and expected. It was a method to teach women how to be healthy, not only during delivery, but also throughout pregnancy and after the baby was born. The advice came from a variety of people and sources. Community members and family advised women on how to remain healthy. Much of the advice was specific to pregnancy or postnatal care, but occasionally advice for delivery was addressed.

"When I was pregnant our neighbors and elders in the podu used to come and tell me, don't lie down always then your legs will swell... They were telling whatever I do not know."

"This has been followed from ages, my parents and my parents in law, their parents, everybody will tell us, and even the doctors will give us some education."

The majority of the community and family's advice was determined to be cultural knowledge because the source was said to come from the elders and past generations. The advice received from the community members and the family members was often the same advice, or were not discernable from one another, so it is described together. This advice included topics of diet, physical activity, going to temple, dos and don'ts, travel restrictions, medicinal herbs, and cultural beliefs that were part of pregnancy and postnatal care. Community members, elders, and neighbors would give advice similarly to family members, but the tone was different in regards to the how the mothers received this advice. Community member's advice was often told in a tone of caring or interest in the mother's wellbeing, the term "looking after" was used repeatedly. Where family members advice had the tone of obedience and the term "take care of me" was used frequently.

The hospital staff also gave women advice on how to maintain their health. Much of this advice was rooted in evidence-based medical science. The advice included topics on medications, going to pre and postnatal check ups, and getting scans and test done. Recommendations for improvements at the hospital, according to the study participants, also included more maternal health education outreach. It was mentioned that the outreach was part of the hospital's role in the community in the past, but the extent of the outreach and the information provided was not part of the data. Though the hospital staff did give advice to women, it was not mentioned as frequently as the community and family advice that was received. Also, there was limited detail in why healthcare workers advised something or the specifics of the advice.

"My in-laws were telling all these things. My parents especially my mother used to teach me these things. Nurse and doctor also used to teach me these things. Asha worker also used to tell."

In many instances the source of the information was not specified or the information coming from both the hospital and the community overlapped. When pressed for an explanation as to why this was important and advised, women would often answer "for the health of the child". This overlapping and general knowledge advice was typically directed towards delivery and diet. The advice given from all three groups of people was usually in agreement. In some instances, one mother would receive information about diet from a neighbor, where in another instance a mother would receive the same information from the hospital. Other times the source of the information was not specified towards the hospital, community, or family. In a few cases the different sources of information were combined together because they had received same information from multiple sources.

The most frequent method of knowledge translation in which Soliga women reported learning about how to maintain their health during pregnancy through the postnatal period, was advice. The advice came from three different sources and varied in detail and topics, but rarely conflicted. Advice received from community members and family was talked about more frequently and understood more than the advice from the hospital staff. This knowledge translation method is a large part of maternal health because it can transform into action.

## Actions to Maintain Health

After receiving advice, the mother's take the information and act upon it to stay healthy. The preventative actions taken included: utilizing those around them as a 'care team', maintaining a healthy diet, taking medications, going to the hospital for care,

going to the temple, and specific traditional practices. Every action mentioned that was important to maintain a mother's health was also previously part of a piece of advice received.

'Care team' as previously described comprises many people in a women's life to keep her healthy. The 'care team' does many things for mothers, but one of their major roles is in helping women to enact upon the advice that was given. For example, escorting women to the health center for prenatal consultation, or taking her to the temple. Interviewees also spoke of people in their lives who took on some of their household chores so they did not strain themselves or family member whom went to the forest to find medicinal plants. In some very extreme cases, this 'care team' went to extraordinary measures to get a woman to distant healthcare facilities. While the majority of caring was accredited to family members or even community members, occasionally hospital staff were part of this element of care that ensure a women could maintain her health. The majority of the participants wanted the hospital staff to play a more pivotal role in being a care provider and most women interviewed had higher expectations of hospital staff in the caregiver role than the current norm of care. The 'care team' is a vital part of the view of maternal health in general, but more specifically in preventing maternal morbidities and mortalities through support and making health maintenance possible for the mother.

"I will eat nutritious food like vegetables and greens so that the baby will be healthy inside."

"If we eat greens we will catch cold, so we used to eat pepper and ragi balls, that is all, nothing else."

Diet was the primary way to ensure a mother stayed healthy according to the participants. Diet was deeply associated with maternal health within the culture. Specific

foods are eaten at certain times. The recommended pregnancy diet is different from the postnatal diet. An example of this was a specific diet that consisted of only eating ragi ball and a pepper sauce after childbirth. Participants did not explain why the diet varied at different points in the maternal process. Many of the recommended foods are foraged from the forest and others are part of the traditional diet. Certain foods were avoided to prevent harm, while others were consumed to ensure health. Also, when asked what the mothers would advise future mothers, diet was mentioned as an important factor to ensure their health. The different interviewee's all had very consistent information on what foods to eat at which times. There was some variation on the explanation as to why certain food had to be avoided or eaten. Explanations included: to make sure lactation was good, to avoid getting cold, and for the baby's health. Overall, the maternal diet was a very well understood in comparison to other factors of maternal health.

"I will eat nutritious food like vegetables and greens so that the baby will be healthy inside."

Medication was another factor that attributed to maternal health. Medication was in the form of traditional herbs and tablets given by the hospital. Herbal medication was foraged by the community members or a member of the household. The distinction between herbal medications that came from the forest and gathered by tribal people, and tablets that were given by the health center was consistent throughout each interview and focus group. A particular tablet that was sometimes mentioned by name was iron tablets for anemia. In the situation of medications, the two different types have very

"When I was pregnant I used to go to the hospital, and they used to give me tablets."

"We will take the tablets regularly... And take home made medicines made of roots and plants."

"There is danger in home delivery, in hospital they will do smooth delivery."

distinct sources and varying sectors of the 'care team' that were involved in their procurement.

Going to the hospital for delivery was another very popular and consistent message throughout all of the data to the point that it almost seemed like an automated response. Going to the hospital included pre- and post-natal consultations as well as for delivery. However, giving birth at a hospital was an overwhelmingly popular statement. All participants, even for those who had not given birth at the hospital, recommended giving birth at the hospital. Every participant had been to the hospital or received care from a hospital staff at least once in the maternal process, even if they gave birth at home. Also, all participants stated that they would recommend giving birth at a hospital to future mothers. Explanations as to why giving birth at the hospital was preferred over home deliveries were the facilities, skills, and resources that are available at the hospital and not at home. The advice given to deliver at the hospital was encouraged by all three groups of people on the 'care team'. Participants whom had a negative tone towards hospital staff, still advised women to give birth at the health center. Among those whom had given birth at a hospital did not all give birth at the same hospital. A specific hospital was not specified as the best place to give birth, just a hospital in general in comparison

"Next time, I want to go to hospital for delivery. This time I delivered at home."

"There is difference in a home delivery and institutional delivery, in home delivery, there may be danger for either mother or the child, if we go to the hospital, they know about the health care of both mother and the baby, and we also know that they will protect us, for this reason we go to the hospital, we know they will do a safe delivery."

to a home delivery. Overall, the knowledge that one should give birth at a hospital was well established in the community.

"During the time of difficulty I was going to temple."

Visiting the temple was also a part of a maternal healthcare regime. Temple visits were only referenced in accordance with family members and community members. Hospital workers were not involved in this aspect of maternal care according to the mothers. Going to temple was often said to be an activity that mothers would do with their neighbors. Most interviewees spoke about it as a part of their belief system and a source of stability in times of difficulty. One interviewee also referred to temple visits as something she did when she was bored. Though the visits to the temple do not provide direct care to the mother, participants described it as part of the maternal care process.

"I believe in God. I was visiting temples. I used to do what God says. I had full faith in God. I had faith in hospital also. I had believed both and everything went on well."

"We will also go to the temple if we feel bored."

Interviewees also describe particular traditional practices that were carried out to either prevent harm or ensure health. These practices included avoiding a solar eclipse, and staying at home the first few months after giving birth. The explanations for these behaviors were typically stated in regards to avoiding bad spirits. Others just mentioned this in passing without an explanation with a tone that implied it was not an unusual practice. The avoidance of the solar eclipse or certain lunar periods was mentioned a few times, but remaining in the house till at least three months after birth, was

"I was not going outside, they used to scare me that the ghost will catch me."

"I used to never move out of the house, because of the fear of some evil effect. And if it was solar eclipse they were not sending me out."

mentioned by all interviewees. When asked, women stated that the source of this knowledge was from the elders of the tribe.

The Soliga use the advice that is given to them to maintain their health through preventative actions. The actions of the 'care team', maintaining a specific diet, taking medication, going to the hospital, visiting the temple, and adhering to traditional practices were explained to be vital to the health of mother and child. In many instances, these actions were followed without complications and both mother and baby were healthy. In other instances, these actions could not be carried out due to barriers.

## Barriers to Following Advice

Mother's reported following all advice to the best of their ability. However, there were three main types of barriers that can be described as environmental, social, and health barriers. These three different categories also persist through ways in which complications were overcome.

The major environmental barrier was the forest and the difficulty it that caused to transporting women to the hospital. The animals in the forest can be very dangerous and walking in the forest while in labor can be life threatening. Also, the roads in the forest are not always passable to a vehicle. These two combinations make it very difficult to transport women to the hospital. In some instances, it was described that women were carried to the hospital through the forest. The environment was a

> "We cannot go to the hospital through the forest full of elephants, even if we go in the bus, still elephants are there too, every where there is elephants, if we go this side to (town name), that is very far, it is not near to us, we have to be very careful and watchful."

> "I went to hospital for delivery in jeep, even sending jeep is very difficult, it may come or may not, we have to carry the pregnant women physically and take her to hospital, if the jeep does not come, they used to carry her to hospital get the delivery done and bring her back."

major influence on whether women could follow the advice of going to the hospital for pre- and post-natal consultations and to give birth.

The major social barrier that was observed was the societal role of the woman in the culture and the interactions between men and women. An example of this is when a woman wanted to give birth at the hospital, but her husband decided that she would give birth at home. She had previously stated in the interview that she "obeys" her husband and he makes the household decisions. In this situation, the husband did not want his wife to give birth at the hospital due to the male gender of the doctor. This sense of obedience and lack of autonomy was not seen in every interview, but in many. Several women said that their husbands make the decisions in the household. Some women welcomed the advice and the care of their husband and saw it as a duty of their husband to care for them. On more than one occasion, interviewees reported that their husbands took them to the hospital for treatment. Some women were even expectant of this dominant male behavior and found it to be a positive thing. The data did not fully show if there was a true lack of autonomy among all of the women or just in certain circumstances and to what extent. What the data did reveal is that women's submissive cultural role did influence their health.

"I will listen to whatever my husband says."

"The doctor was a male doctor. So I didn't go to hospital, I feel shy." "Who took the decision?" "My husband was telling that."

The third barrier was health and was detected when a person's health inhibited them from following the advice. An example of this occurred when an anemic woman was instructed by her neighbors and hospital staff to take iron

"Why you had to take blood?" "I was not taking tablets properly." "Why you were not taking medicine properly?" "I was taking medicine but I used to vomit."

tablets. She followed their advice, but when she became nauseous from the iron tablets she stopped taking them. Many women reported being anemic; this tribal group is known to have high rates of sickle cell anemia[29]. The women reported being aware of the high rates and the risk of sickle cell anemia. They knew that it was even more important for then to be checked for anemia at the hospital because of this condition. In the situations where health barriers presented, further complications often arose that were addressed later.

The three major barriers of the environmental constraints, social norms, and health issues limited women from following through with the preventative health practices that they were advised to do. These barriers did not always correlate with future complications, but in some situations further complications arose as a result of these barriers. It can be noted, that by disregarding advice given did not directly correlate to a complication, but the women associated these barriers with increased risk of complications.

## How Complications were Overcome

When complications did occur, the 'care team' worked together to overcome the complications. The 'care team' used three different approaches to overcome the complications. They addressed issues that involved the environment, they used their social support system to provide care, and they used the medical resources to address health issues.

"They should send us the jeep when we are pain, and during pregnancy we will not go to the hospital so, they have to send the nurse to our door."

The major method that the 'care team' overcame in regards to environmental issues was by providing transportation. All three groups of people comprising the

'care team' helped in this process. The hospital provided a jeep/ambulance that on occasions transported a woman to the hospital. Neighbors and community members would help by phoning for the jeep to come and get the laboring mother. In other situations, family members would help in overcoming this transportation issue by taking a laboring mother to the hospital. In some extreme cases, this included going to a hospital that was very far away. It should be noted that even though all three components of the 'care team' worked to overcome this barrier, the jeep not coming was amongst the top complaints. Another suggestion was that more home visits be provided to the community to also help with transportation issues.

"At the time of delivery, when I was in pain, they called the ambulance and took me to the hospital and admitted me."

"During difficulty my in-laws and husband were taking care of me."

The community members and the families of mothers were the major contributors in overcoming complications through their social support system. These issues as described by the women included: caring for them physically when they were facing health issues, providing emotional support, and giving financial support for medical procedures that were needed to save their lives. Interviewees often referenced their family members taking care of them and taking on responsibilities of the mother so the mother did not jeopardize her health. They also provided emotional support and strength through this care

"They were wishing my child's wellbeing, they were asking me to take good food, they were asking me not to go anywhere, and they were not allowing me to do more work. They were telling me to take a walk in the home. They used to come to my house, they were telling me to go to hospital."

and encouragement. All of this support and care was referenced in terms of family members or community members; there was very little detail on the care received while at the hospital.

> "During my earlier pregnancy I was anemic and there was no facility for giving blood at home so it was very problematic, I was taken to (city name) for blood transfusion. There they gave me good treatment. Spending money also was difficult we didn't had enough money."

The hospital and health system also played a part in helping women to overcome complications. The skills, medicines, knowledge, and resources that were available to healthcare workers were utilized to help save these women's lives. However, the tone of the interaction at the hospital was very different from the care received from the community. Statements were brief and non-descriptive about the care received at the health center in comparison to the thankful tone from the care received at home. Interviewees had more complaints about the care or lack of care from the healthcare workers compared to the care received from community members or family. For some of these women, their family members had to go to larger level hospital to get treatment. This meant a financial burden and journeying far away from their culture both geographically and emotionally. Despite the complaints, the health system did work to save these women's lives, but areas for improvement are present.

> "I was taken to (city name) for blood transfusion. There they gave me good treatment."

## Maternal Survival

Though there were not any reports of maternal morality from the hospital records, the data showed instances of maternal morbidity and life threatening complications. There were many cases in which family members went to extremes to save a mother's life. The data showed that life of a woman was valued in the community, and many

people aided in keeping her healthy (see Figure Six). However, the women gave many suggestions about how to make the 'care team' partnership more cohesive and described methods to better service the Soliga mothers. The majority of the advice given and the preventative actions that were described in the data are recommended by medical science. Therefore, the current method of knowledge translations and care are a functioning foundation that can be further built upon. Working on improving this partnership of community members, family members, and healthcare workers will help to improve The Safe Motherhood program and the maternal health among the Soliga.

**Figure Six**

| Quotes | |
|---|---|
| Care Team | "The villagers here stand by our side in trouble times, and the doctors in the hospital help us during the delivery time, since the community people give a helping hand, we need their help in those times." |
| | "I want the cooperation of doctor, nurse, people in my community, and elders at my house, my parents, and my husband everybody. I want all of them." |
| | |
| Advice Giving | "When I was pregnant our neighbors and elders in the podu used to come and tell me, don't lie down always then your legs will swell... They were telling whatever I do not know." |
| | "My in-laws were telling all these things. My parents especially my mother used to teach me these things. Nurse and doctor also used to teach me these things. Asha worker also used to tell." |
| | "This has been followed from ages, my parents and my parents in law, their parents, everybody will tell us, and even the doctors will give us some education." |
| | |
| Diet | "We should not eat vegetables and sambhar, and we should not have food which is hard to digest." |
| | "If we eat greens we will catch cold, so we used to eat pepper and ragi balls, that is all, nothing else." |
| | "I will eat nutritious food like vegetables and greens so that the baby will be healthy inside." |
| | |
| Medications | "When I was pregnant I used to go to the hospital, and they used to give me tablets." |
| | "We will take the tablets regularly... And take home made medicines made of roots and plants." |

| | |
|---|---|
| | |
| Giving birth at a Hospital | “Next time, I want to go to hospital for delivery. This time I delivered at home." |
| | "There is danger in home delivery, in hospital they will do smooth delivery." |
| | "There is difference in a home delivery and institutional delivery, in home delivery, there may be danger for either mother or the child, if we go to the hospital, they know about the health care of both mother and the baby, and we also know that they will protect us, for this reason we go to the hospital, we know they will do a safe delivery." |
| | |
| Temple | "During the time of difficulty I was going to temple." |
| | "I believe in God. I was visiting temples. I used to do what God says. I had full faith in God. I had faith in hospital also. I had believed both and everything went on well." |
| | "We will also go to the temple if we feel bored." |
| | |
| Traditional Practices | "People at home were advising me not to go out, because the eclipse will catch us." |
| | "I used to never move out of the house, because of the fear of some evil effect. And if it was solar eclipse they were not sending me out." |
| | "I was not going outside, they used to scare me that the ghost will catch me." |
| | |
| Environment Barriers | "We cannot go to the hospital through the forest full of elephants, even if we go in the bus, still elephants are there too, every where there is elephants, if we go this side to (town name), that is very far, it is not near to us, we have to be very careful and watchful." |
| | "I went to hospital for delivery in jeep, even sending jeep is very difficult, it may come or may not, we have to carry the pregnant women physically and take her to hospital, if the jeep does not come, they used to carry her to hospital get the delivery done and bring her back." |
| | |
| Societal Barriers | "Why you won’t go if there is male doctor?" "My family won’t send me." |
| | "The doctor was a male doctor. So I didn’t go to hospital, I feel shy." "Who took the decision?" "My husband was telling that." |
| | |
| Health Barriers | "Why you had to take blood?" "I was not taking tablets properly." "Why you were not taking medicine properly?" "I was taking medicine but I used to vomit." |
| | |
| Transportation | "They should visit houses and give information and they should educate people who do not know about these things." |
| | "They should send us the jeep when we are pain, and during pregnancy |

| | |
|---|---|
| | we will not go to the hospital so, they have to send the nurse to our door." |
| | "At the time of delivery, when I was in pain, they called the ambulance and took me to the hospital and admitted me." |
| | |
| Social Support | "I will listen to whatever my husband says." |
| | "During difficulty my in-laws and husband were taking care of me." |
| | "They were wishing my child's wellbeing, they were asking me to take good food, they were asking me not to go anywhere, and they were not allowing me to do more work. They were telling me to take a walk in the home. They used to come to my house, they were telling me to go to hospital." |
| | |
| Medical Support | "During my earlier pregnancy I was anemic and there was no facility for giving blood at home so it was very problematic, I was taken to (city name) for blood transfusion. There they gave me good treatment. Spending money also was difficult we didn't had enough money." |
| | "I was taken to (city name) for blood transfusion. There they gave me good treatment." |

Figure Six: This figure shows quotes that demonstrate ideas portrayed in the data. The quotes have been translated from Kannada to English.

# Discussion

## Key Messages

The Soliga mother's maintain their health throughout pregnancy, during delivery, and after birth with the help of a team of people called a 'care team'. The 'care team' works together to teach women how to stay healthy and assists them with preventative care. When complications arise the 'care team' works to overcome issues through transportation, medical resources, and social support. Barriers that prevent women from taking preventative actions that aid in maintaining their health include: environmental, social, or health issues. The 'care team' is essential to maintaining the maternal health among the Soliga.

The results clearly emphasize that Soliga mothers want and need the 'care team' to stay healthy. This is demonstrated by interviewee's response to the question: who do you feel is responsible for the health of a Soliga mother? All participants unanimously stated that more than one person is responsible by listing several people including: nurses, doctors, their family members, neighbors, and elders. This 'care team' concept was also present when participants were asked how they learn maternal health information and who helps in making sure the practices are carried out. When complications were present, it was due to the efforts of those on the 'care team' that the mother survived.

The study sought to examine the cultural, social, and environmental factors that influenced the maternal health of the Soliga. Through the discovery of the 'care team' and its importance to maternal health, many cultural, social, and environmental factors were determined. The technique of advice giving as the primary knowledge translation

method was shown to be vital to the maternal health process. Preventive actions that were recommended by the community, family members, and the hospital were also said to be essential to maternal survival. The social support of the 'care team' described by the mothers, shows a vital social factor that affects maternal health. The traditional advice and beliefs that translate into action are key insights into the cultural factors that influence maternal health. The transportation issues and the impact of the surrounding forest on accessing healthcare as well as the herbal medication show the environmental factors that influence maternal health. This study determined the many social, cultural, and environmental factors that influence maternal health among the Soliga.

## Context of Study in Regards to Other Literature

Other literature that has specifically examined maternal health and the Soliga is not plentiful, but the few studies that do exist are mostly consistent with the findings of this study. Other studies that look at factors that influence maternal health in India and worldwide showed similar findings and a few additional factors that were not present in this study[12,30,31,32]. A study investigating the how advice influences maternal health in the Soliga showed that advice giving was a vital part of the culture and influences maternal health outcomes[1]. This studied showed a similar importance of advice giving and demonstrated the specific roles of 'care team' members in terms of the topics of advices. The previous study also showed that family members, women of the community, and healthcare workers were involved in the giving of advice[1]. However, they reported that men were rarely involved in the giving of advice[1]. In the current study, Soliga men, particularly husbands, fathers, father-in-laws, and elders, were reported to give advice to Soliga mothers. Diet was also a common topic of the advice giving[1], which mirrors the finding in this study and further expanded upon the specific food used during certain

times and why.

The original idea of this study was to determine which social, cultural, and environmental factors were beneficial towards maternal health and which ones led to maternal mortality. Previous research described high rates of maternal mortality in Scheduled Tribes and rural, impoverished areas[2]. However, the hospital records did not report any maternal deaths among the Soliga in the past two years. This shifted the context of the study to investigating why women were surviving. The results showed a unique care system that led to high maternal survival. The researcher felt that it is important to highlight the factors leading to maternal survival to show a model that can be emulated and contrasts the typical research that identifies only negative factors. It should be noted that the hospital data on location of birth was found to contradict personal reports. Personal reporting of birth location was inconsistent with hospital reports 31% of the time. The other demographics including village, age, and number of births were consistent with the hospital records. The lack of maternal deaths as reported by the hospital may not be reliable, but community members gave no indication that this was incorrect.

Bruce et al. 2015 listed several factors that influenced maternal health and location of delivery as reported by women in Northern Karnataka[30]. Factors included: geographic location in regards to health facilities, financial cost of delivery, social and cultural acceptability of healthcare staff and facilities, and safety and efficiency of health centers. The findings on the effects of the geographic location echo the transportation issues reported by Soliga women. The geographic location influences, as reported in Bruce et al. 2015, were said to affect the women's access to healthcare and the

availability of the ambulance[30]. Soliga women also reported having trouble getting to the hospital and a need for the ambulance to take women to the hospital. The Soliga also had the added challenge of wild and dangerous animals that were not reported in Northern Karnataka[30]. Also, the Soliga did not attribute the ambulance/jeep not showing up to the environment; they just indicated that the need for it was due to the environment. The barrier of transportation in maternal health and has been reported by many women around the world[21,32]. Accessibility is part of a framework called the Five As of Access developed by Penchansky et al. 1981[12,31]. One of the As, accessibility, discusses the impact that transportation and proximity to healthcare and can be applied to maternal health[21,31]. Distance to healthcare has also been shown to be a factor in maternal health in other cultures around the world[32]. Lori et al. 2013 reported that women had difficulties seeking care in rural Liberia due to the distance from the health center[32]. Closer proximity to health centers was predicted to increased institutional care[32].

Only one Soliga mother mentioned the financial influence on maternal health. This was in regards to cost that were accrued when being treated for life threating anemia. Other women did not mention money as a factor in maternal health. This is not in line with the perspective of women in Northern Karnataka. An explanation for this difference could be the impact of poverty on the community. Forty to fifty percent of the Northern Karnataka women who participated in the Bruce et al. 2015 study were of the lowest caste and the majority of participants were living in poverity[30]. The specific financial situations of the Soliga women who participated in the study was not a part of the data collection, however all of the participant were from a Scheduled Tribe, which was part of the lowest caste. The difference could have also been due to the reported

corruption in the Northern Karnataka study that increased the price of childbirth and medical treatment[30]. The Soliga women did not report any corruption at the hospital, but they were not asked about this directly. Financial constrictions is another one of the five As termed affordability[17]. The lack of care due to the affordability of care is seen in women throughout the world and the women of Northern Karnataka[21, 30]. Lori et al. 2013 also reported financial barriers when trying to access maternal care[32]. Even though the healthcare in Liberal for deliveries is free, external cost of food, transportation, and time lost for a job were reported to influence the maternal health decision-making process[32]. Further exploration into the view of money in maternal health decision making with the Soliga would be interesting, but this lack of reporting about finances could be due to the fact that the local hospital is run by VGKK, a non-profit organization.

The social and cultural acceptability of healthcare was the premise for this study and many factors were uncovered including: the gender of the doctor, societal roles of women, and the expectation of home visits. Bruce et al., 2015 describes the social and cultural factors in terms of the discrimination and treatment of patients at health centers[30]. Only one Soliga woman commented on how women should be treated by hospital staff. While the strong impact of social and cultural factors that influence maternal health was present in both studies, the nuances of these factors differed in the impact of the factors on maternal health. This also echoes the Five As framework, one of the As is accommodation and refers to the healthcare staffs' ability to meat the needs and preferences of patients[21]. The accommodation factor that have affected women of many different backgrounds is a theme in maternal health[21], one that this study was trying to address to better incorporate culture into the local health system. The idea that trust in

the healthcare providers influences maternal health is seen in other studies investigating maternal health in rural areas[33]. Mohen et al. 2015 suggests that repeated interactions with healthcare workers can help to increase levels of trust[33]. This information is important when considering the recommendations of the study (see Figure Seven).

Soliga women did not question the safety and efficacy of the hospital. Even when women had home births or faced issues with the recommendations of the hospital they still advised others to go to the hospital. This is very different from the perceptions of women in North Karnataka who questioned the safety of the health centers and whether it was worth it to give birth at the health center. This idea is considered under the Five As framework as acceptability[21]. This refers to how comfortable patients are and the degree of trust they have in their healthcare providers[21]. Soliga women expressed feelings of dissatisfaction with the healthcare providers, but never feeling of endangerment due to their care provider. It would be interesting to further investigate if the Soliga women felt comfortable with healthcare providers. Kurk et al. 2010 reported that the quality of care was a determining factor for women to seek institutional care in a study involving rural women[34]. The suggestion of the study was to improve quality care at first level clinics as well as communicate with the community that these improvements had been made and can be expected to increase intuitional maternal care[34]. This is important when looking at the women's suggestions to be treated nicely by the healthcare workers (see Figure Seven).

The environment was a barrier when accessing healthcare for both the Soliga and women in Northern Karnataka[30]. However, the Soliga also spoke of the benefits that their environment can provide for them and their symbiotic relationship with the forest.

Financial consideration, safety of the health centers, and the efficacy of the hospital were not factors that influenced maternal health of the Soliga unlike women of Northern Karnataka[30]. The social and cultural factors that effected maternal health among the Soliga varied in comparison to the women in Northern Karnataka, but social, cultural, and environmental factors were a big influence on maternal health in both studies[30]. This study mirrors themes found in women throughout the world that are shown in the Five As framework[21]. Accessibility, affordability, accommodation, and acceptability were discussed in many studies, but the impact of each of these factors on maternal health varied within each study.

## Limitations

The study was comprehensive, but was limited by cultural nuances, and environmental barriers. Cultural nuances included: the relationship between men and women, the lack of conversation around maternal health, neighborhood segregation, maternal visits after birth, and postnatal restrictions. Environmental barriers include, impassible roads, forest department regulations, and wild animals.

One of the major restrictions to this study is that it is from the female perspective. As women are the ones who experience maternal health this was the first logical place to begin, but upon learning that men played a role in maternal health it would have been interesting to hear their perspective. This was not possible because the female research assistants, that were chosen based off of their gender so they could relate better to the mothers, would not interview men due to cultural restrictions.

Another cultural distinction that impacted the study was the lack of open discussion of maternal health. Interview answers were often short and very general. The visual probes were developed to increase the length and depth of the responses, but the

visual probes were only effective in increasing the length of the response. Interviewees were often unsure of how to answer a complex questions, and they struggled with the hypothetical and reflective questions. It was not a cultural norm to discuss maternal health in such detail and this is often reflected in the data.

The focus groups were limited in the geographic diversity due to a cultural rule that women from one village cannot go to another village. The study was only able to bring together women from different village when it was located on neutral territory and with female leaders that had more cultural freedom. Other focus groups were limited to specific village.

A cultural tradition is to go stay with ones maternal family after giving birth. This affected the recruitment of the study because several of the women eligible for interviews were not at their home, but away visiting their mothers. Due to time and finances it was not possible to send the research team to their location. Thus the data was restricted to those who had stayed at their paternal homes, already returned from their maternal home, or whose maternal homes were located with in the study zone.

A final cultural restriction that affected the focus group discussions was that women cannot leave their home for three to six months after giving birth. This made gathering women who had recently given birth into one location challenging. This in combination with the cultural rule that women could not go to other pudos made for very small and un-diverse focus groups.

An environmental barrier that restricted the study to more developed areas was the conditions of the roads. The study was conducted during rainy season and this made many roads impassible. The opinion and perspectives of those deep in the forest are not

included in this study, but within the reachable population there is variation on geographic distance from the health center. There is not enough information or records to know exactly how many women this omitted from the study. The perspective of these unreachable women may have differed due to their decreased interaction with the hospital, however accessibility to the hospital did not result in nuances within the data that was gathered in the study.

Even if the roads were better, the restrictions of the forest department required special permission to drive deep into the forest. A few permissions were granted to visit certain villages, but further access was not granted.

Animals also posed an issue to accessing remote villages. Some remote villages were reachable by foot, but the trek was considered too dangerous because of the wild animals that are in the forest. This once again limited the study to more accessible areas.

The study limitations were primarily a lack of diversity in participants including gender, and geography. The cultural nuances and environmental barriers that restricted access to certain mothers made the perspective of the study from that of the Soliga women who live in more centralized areas. However, there was not any variation in the data based on the geographic location and access to the hospital that segregated out geography as a determining factor for a specific perspective. Though these limitations were present, they did not likely impact the data to the extent that would discredit the information gained from the study. However, the women who were unreachable most likely face challenges with access to healthcare, possibility at higher rates than the women who participated. Despite the limitations of the study, many important factors that dictate the maternal health of the Soliga were revealed.

## Strengths

The strengths of the study include having a local field team that were familiar with the language and the culture, interviewing as many women as possible to reach saturation, and the iterative approach that allowed for the development of a new method. The field assistances that collected the data were Soliga women who were well integrated into their community and very knowledgeable about the culture and beliefs. The participants felt more comfortable speaking with them because they could speak in the local dialect and were familiar with the women. The field assistances were invaluable to the data collection process because they help to reframe questions and schedule focus groups and interviews in accordance with social convention. They were also able to explain specific results and quotes that needed a cultural context to for the researcher to understand fully. Saturation was determined to be achieved by all team members due to the repetition of ideas and the lack of new ideas. The study interviewed all the possible women that were accessible to the research team to ensure that diversity was a part of the data and saturation was met. The iterative approach was used, which was vital to the study. When women were not very forthcoming in their maternal health communication, the researcher was able to design a new method called visual probes that increased word count in the women's responses. Previous data helped to inform the visual probes so it was specific to this study. Overall, the study has many strengths that impacted and improved the quality of the data and local relations with the Soliga.

## Recommendations

The objective behind this study was to identify the social, cultural, and environmental factors that influence maternal health in order to adapt The Safe Motherhood Program to be more culturally inclusive. Through this study, a list of

recommendations has been provided from the participants as well as a based off of the data analysis. Recommendations provided by the Soliga were mostly addressed towards the hospital and the hospital staff. Participants were asked: what they would change if they had another child, in an ideal situation how they wanted to be cared for, and what they hope for future Soliga women in regards to their family, community members, and hospital staff (see Figure Seven).

**Figure Seven**

**Recommendation for improvements in maternal health given by Soliga Mothers**

- Home visits by hospital staff to reduce the transportation issues of the mothers.
- Hospital staff should send the jeep/ambulance when women are in labor so they can get to a health facility and community members should call hospital staff to alert them to send the jeep/ambulance.
- Reinstate the community outreach of maternal health education by community health workers.
- Deliver at a hospital
- Hospital staff should treat women nicely.
- The community should be involved in letting the hospital know if there are any issues with the healthcare system by coming together as a community and writing a letter expressing the issues.

Figure Seven: This figure lists the recommendation that Soliga mothers gave to improve the maternal health in their community.

The major complaint was that the nurse was not coming on home visits. In general, the women felt as thought the hospital should be more involved in the community and had better resources for the hospital staff to come to them instead of pregnant women having to travel to the hospital. One participant also mentioned that the hospital staff should treat them nicely. Participants requested more community maternal health education by hospital workers, home prenatal and postnatal consultation, and sending the jeep when a woman was in labor. Everyone agreed that women should

deliver at the hospital, but Soliga mothers felt as through the hospital should play more of a role in helping them arrive to the hospital.

*"They were taking good care. Health center should provide all facilities. Because we cannot get facilities ourselves. We cannot go and ask them. They should provide it."*

In years past, the hospital played a more pivotal role in the community and did more health education and home visits. The expectations of the community have not changed and they still want this outreach. If this is not possible for the hospital staff, then the community expectations need to be addressed because many women said they waited for the nurse to come to them, and only when the nurse did not arrive did they finally go to the hospital. These time delays can increase the risk of complications. The unmet expectations also provided an opportunity for the community to loose trust in the hospital. One woman expressed this loss of trust after her experience of unmet expectations.

*"Nurse used to visit the house, she was giving the medications and asking me to get the scanning done. She was advising me to go to the hospital. Now the nurse is not coming regularly, they are not taking proper care, we are having problems now. I feel for my delivery also I face problem. Nurse is not taking proper care now a days. She is not coming home at all. Earlier it was better, I was visiting hospital and I used to believe in God. I had faith in the nurse also, she took me to hospital and took good care of me."*

The concept of relying on the hospital and wanting to be included in the maternal care process was very apparent in the data, but there was also displeasure with the services. If these unmet expectations persist then more women will feel a loss of faith in the hospital and turn more toward the community and family for care. The 'care team' is

a very special arrangement that the Soliga used to receive many different types of care that address a variety of issues. Many of the stories of overcoming life threatening complications can be attributed to this collaboration of the 'care team'. However, if one part of the 'care team' is no longer trusted and utilized than there will be a gap in care and this can have detrimental effects on this delicate partnership.

## Future Directions

The data answers many questions, but also gives rise to many more questions that further studies can investigate including the impact of the medicinal plants, the feeling of autonomy in the mothers, the reasons behind the inconsistencies in the hospital records, the financial impact of maternal health, and the trust of the information sources.

The herbal medications were described to be part of maternal care and their importance was shown in this study. However, the specific herbal that were used, the preparation, utilizations, and applications were not described. A further study that examines the medicinal plants used by the Soliga and uses medical science to confirm or deny the believed effectiveness of these plants could be further beneficial to the Soliga. If the plants are harmful, then the hospital staff can work with community leaders to prevent this practice from continuing. If the plants are effective, then the hospital can recommend these herbal medication and work towards further incorporating Soliga beliefs into the health system.

The women expressed feelings of obedience towards their husbands and a lack of autonomy in health decisions that affected their body. Though these feelings were consistent throughout the data the impact of a female or wife's opinion was not explored. There were not any complaints or recommendations that included addressing how men interacted with their wives. A study that further explored the effect and magnitude of the

Soliga women's voice would also help to identify the extent in which women can make their own health decisions.

There was a 31% difference of reporting by the participant and the hospital records for birth location. It would be interesting to know why this difference is occurring and who is reporting it incorrectly and why. Determining if the women are misreporting birth locations or if it is the hospital could show the benefits or giving birth in a certain location either socially or financially. This information would further impact the 'care team' relationship and would help with future maternal health interventions.

The financial impact of maternal health for the Soliga was rarely discussed in the data. This was contrasting to other studies that reported money to be a major factor in maternal health decision-making[32]. A further explanation into why money was not mentioned would help to resolve whether it is an integral part of maternal health for the Soliga.

The tone differed when women talked about the three different components of the 'care team'. It would be interesting to further explore why women felt a certain way towards specific caregivers and the history behind the trust of one caregiver over another. This would be helpful for future work among the Soliga because it would reveal what the Soliga trust most and how they determine if advice or people are trustworthy. It would also be interesting to know more about why everyone recommended giving birth at the hospital and the history behind what appeared to be an automated response when asked where should one give birth.

Overall mores studies that identify how to better integrate Soliga culture into the healthcare system would benefit the Soliga people. The information gained from the

studies would need to be linked to programs that would work towards implementing the learned information and evaluating its effectiveness.

## Conclusion

This study aimed to determine the social, cultural, and environmental factors that influence maternal health among the Soliga. The study showed that the 'care team' is essential to maternal health, and this 'care team' influences the social, cultural, and environmental issues that impact maternal health. The advice giving as a method of knowledge was a key element of the maternal process and is consistent with prior research. The 'care team' helps to translate knowledge, implement preventative health actions, and overcome complications that arise. Overall, this study offers a fresh view on positive factors that influence maternal health and gives insight into the complex nature of maternal health among the Soliga. With the information provided, VGKK will be able to incorporate recommendations and culturally specific practices into the health systems that serve the Soliga.

## References


1. Seshadri, T., & Prachanth N.S., (2014). *Participation for local action: Implementation research with indigenous communities in southern India for local action on improving maternal health services. A Research Protocol.*
2. Barnagarwala, T. (2014, May). India has highest number of maternal deaths. *The Indian Express.* Retrieved February 18, 2015 http://indianexpress.com/article/india/india-others/india-has-highest-number-of-maternal-deaths/
3. Adamson, P. C., Krupp, K., Niranjankumar, B., Freeman, A. H., Khan, M., & Madhivanan, P. (2012). Are marginalized women being left behind? A population-based study of institutional deliveries in Karnataka, India. *BMC Public Health, 12*, 30.
4. Prashanth, N.S., Marchal, B., Kegels, G., & Criel, Bart., (2014). Evaluation of capacity building programme of district health managers in India: a contextualized theoretical framework. *Frontiers in Public Health*, 2.
5. Saroha, E., Altarac M., & Sibley L.M. (2008). Caste and maternal health care service use among rural Hindu women in Maitha, Uttar Pradesh, India. *J Midwifery Womens Health*, 53(5), 41-47.
6. Madegowda, C. (2013). A Study on the life style of Soliga tribes at Biliiri Rangaswamy Temple Wildlife Sanctuary – A social work perspective (Doctoral Dissertation).
7. (1991) List of notified Scheduled Tribes: The Constitution (Jammu & Kashmir) Scheduled Tribes Order, 1989 and The Constitution (Scheduled Tribes) Order (Amendment) Act, 1991. (Retrieved March 1, 2015, from http://censusindia.gov.in/TablesPublished/SCST/ST Lists.pdf
8. Agbakwuru,, C., & Beswick, J. (2009). Janani Suraksha Yojana. Retrieved February 21, 2015,from http://sihp.brandeis.edu/ighd/PDFs/Safe-Motherhood-Initiative-Kerala-India-2009.pdf
9. (2015) *The Millennium Development Goals of 2015*. New York, NY: United Nations. 1-75.
10. Berkwits, M., & Inui, T. S. (1998). Making use of qualitative research techniques. *Journal of General Internal Medicine*, *13*(3), 195–199.
11. Hodges, S. (2006). *Introduction. In Reproductive health in India-history, politics, controversies*. Himayatnager, Hyderabad: Orient Longman Private Limited.
12. Sharma, B., Giri, G., Christensson, K., K, V., R., & Johansson, E. (2013). The transition of childbirth practices among tribal women in Gujarat, India - a grounded theory approach. *BMC Int Health Hum Rights, 13*, 41.
13. Moore A. M., Singh, S., Ram, U., Remez, L., & Audam, S. (2009). Adolescent Marriage and Childbearing in India: Current Situation and Recent Trends, New York: *Guttmacher Institute.*
14. Seshadri, S. R., Parab, S., Kotte, S., Latha, N., & Subbiah, K. (2015). Decentralization and decision space in the health sector: a case study from Karnataka, India. *Health Policy Plan*.

15. Nandan, D. (2010). National Rural Health Mission: Turning into Reality. *Indian Journal of Community Medicine : Official Publication of Indian Association of Preventive & Social Medicine*, *35*(4), 453–454.
16. An untouchable subject. (2001, August). *National Public Radio*, (Retrieved February 10, 2016, from http://www.npr.org/programs/specials/racism/010828.caste.html
17. (2015). *Maternal mortality ratio (modeled estimate, per 100,000 live births)*. Retrieved February 10, 2016, from http://data.worldbank.org/indicator/SH.STA.MMRT
18. Nair, H., & Panda, R. (2011). Quality of maternal healthcare in India: Has the National Rural Health Mission made a difference? *J Glob Health, 1*(1), 79-86.
19. Battala, M., Raj, A., Ghule, M., Nair, S., Silverman, J., Dasgupta, A., Donta, B., & Saggurti, N. Association between tribal status and spacing contraceptive use in rural Maharashtra, India. *Sexual & Reproductive Healthcare, 7*, 78-80.
20. Vora, K. S., Mavalankar, D. V., Ramani, K. V., Upadhyaya, M., Sharma, B., Iyengar, S., Gupta, V., & Iyengar, K. (2009). Maternal health situation in India: a case study. *J Health Popul Nutr, 27*(2), 184-201.
21. Griffiths, P., & Stephenson, R. (2001). Understanding users' perspectives of barriers to maternal health care use in Maharashtra, India. *Journal of Biosocial Science, 33*(03), 339-359.
22. Samal, J., & Dehury, R. K. (2015). Family planning practices, programmes and policies in India including implants and injectables with a special focus on Jharkhand, India: A Brief Review. *J Clin Diagn Res, 9*(11), 01-04.
23. Guin, G., Sahu, B., Khare, S., & Kavishwar, A. (2012). Trends in Maternal Mortality and Impact of Janani Suraksha Yojana (JSY) on Maternal Mortality Ratio in a Tertiary Referral Hospital. *J Obstet Gynaecol India, 62*(3), 307-311.
24. Ng, M., Misra, A., Diwan, V., Agnani, M., Levin-Rector, A., & De Costa, A. (2014). An assessment of the impact of the JSY cash transfer program on maternal mortality reduction in Madhya Pradesh, India. *Glob Health Action, 7*, 24939.
25. Iyengar, K., Iyengar, S. D., Suhalka, V., & Dashora, K. (2009). Pregnancy-related deaths in rural Rajasthan, India: exploring causes, context, and care-seeking through verbal autopsy. *J Health Popul Nutr, 27*(2), 293-302.
26. Karade, J. (2008). *The Development of Scheduled Tribes and Scheduled Castes in India*. New Castle, UK: Cambridge Scholar Publishing.
27. Kumar, A., & Singh, A. (2015). Explaining the gap in the use of maternal healthcare services between social groups in India. *J Public Health (Oxf)*.
28. (2013, June) *Success: Soliga tribe's forest rights upheld in court*. Retrieved February 10, 2016, from http://www.survivalinternational.org/news/9328
29. Veena N., & Prashanth N.S. (2006). *Our Forest, Our Lives*. BR. Hills Vivekananda Girijana Kalyana Kendra.
30. Bruce, S. G., Blanchard, A. K., Gurav, K., Roy, A., Jayanna, K., Mohan, H. L., Avery, L. (2015). Preferences for infant delivery site among pregnant women and new mothers in Northern Karnataka, India. *BMC Pregnancy and Childbirth*,*15*, 49.

31. Mohan, D., Gupta, S., LeFevre, A., Bazant, E., Killewo, J., & Baqui, A. H. (2015). Determinants of postnatal care use at health facilities in rural Tanzania: multilevel analysis of a household survey. *BMC Pregnancy and Childbirth*, *15*, 282.
32. Lori, J. R., Wadsworth, A. C., Munro, M. L., & Rominski, S. (2013). Promoting access: The use of maternity waiting homes to achieve safe motherhood. *Midwifery*, *29*(10), 1095–1102.
33. Mohan, D., Gupta, S., LeFevre, A., Bazant, E., Killewo, J., & Baqui, A. H. (2015). Determinants of postnatal care use at health facilities in rural Tanzania: multilevel analysis of a household survey. *BMC Pregnancy and Childbirth*, *15*, 282.
34. Kruk, M. E., Rockers, P. C., Mbaruku, G., Paczkowski, M. M., & Galea, S. (2010). Community and health system factors associated with facility delivery in rural Tanzania: A multilevel analysis. *Health Policy, 97*(2), 209-216.