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Utilisation of Health and Nutrition Community Interventions to Reach Every Last One of the Most Vulnerable Children: Evidence from A Lifesaving Three-Year Project in Fragile Somalia

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Abstract

Objectives: Somalia has some of the worst infant, child and maternal mortality ratios in the world and was unable to achieve its Millennium Development Goals of health and nutrition. This study aimed to examine whether the project achieved its intended outcome in fragile Somalia.

Design: The study adopted a quantitative and analysis method.

Setting: Data collection involved household surveys and anthropometric measurements. A pre-and post-intervention data collection and analysis was conducted aimed at comparing the performance of the priority indicators, determining if the change was significant with a 95% confidence interval.

Participants: It was with caregivers, mainly women of reproductive age (15-49 years) and children 0-59 months as the main participants.

Main Outcome Measures: The focus was on Baseline compare to end line, End line Puntland Vs Somaliland and Key indicators to National Targets. Descriptive and inferential statistical analysis of the household questionnaires was conducted using SPSS data analysis software. Cross-tabulation using the McNemar's Chi-square test was used to compare key outcomes.

Results: From baseline to end line, there was statistically significant improvement breastfeeding practices, mothers practice for health timing and spacing of pregnancy, mothers practicing the recommended child birth practices care for children under five when sick and a reduction in the utilization of pregnancy care services and practice of vaccination of children. Comparison of Key indicators to National Targets revealed that the project achieved more in appropriate treatment of childhood illnesses, delivery practices, contractive use, infant and young child feeding, but fell short in the immunization services and ANC services.

Conclusions: The health and nutrition care system in Somalia remains weak, poorly resourced and inequitably distributed with the root causes being multipronged. However, the results from this study show that if interventions are appropriately funded, there will always be improvement in the key health and nutrition indicators.

Keywords

Infant Feeding Practices, Reproductive Health, Vaccination Services, Child Birth, Childhood Illnesses

Background

Somalia has some of the worst infant, child and maternal mortality ratios in the world [1], and the country was unable to achieve its Millennium Development Goals (MDGs) related to health and nutrition by the end of 2015 [2]. For instance, the maternal mortality ratio was strikingly high at 732 maternal deaths per 100,000 live births in 2015, down from 1210 in 1990 [3]. Childbirth remains one of the greatest risks in the lives of Somali women given the life-time risk of dying due to pregnancy related causes is approximately 1 in 12 [4]. The average fertility rate is 6.6 children per woman [5] and yet access to maternal health services is low. Access to maternal health services is low with 33 percent of births in Somalia being attended by skilled birth attendants [6].

The Under-Five Mortality rate in Somalia is amongst the highest in the world; one out of every seven Somali children dies before their fifth birthday (137 deaths/1,000 live births) [7]. The leading causes of infant and child mortality are illnesses that include pneumonia (24 per cent), diarrhoea (19 per cent), and measles (12 per cent), as well as neonatal disorders (17 per cent) [8]. Under nutrition is an underlying factor in over a third of the deaths [9].

Somali children and their mothers continue to suffer from multiple nutritional deprivations which deny them opportunity to thrive and reach their full developmental potential [10]. There are high levels of acute malnutrition, underweight and stunting combined with a high prevalence of micronutrient deficiencies and suboptimal breastfeeding and complementary feeding practices [11].

The number of affected children remains high with an estimated 307,750 children under the age of five acutely malnourished [12]. This includes 55,780 who are severely malnourished at any one moment in time and who carry a high mortality risk and require lifesaving therapeutic nutritional support [12]. Young children are likely to suffer multiple episodes of acute malnutrition [13] with the frequency being as high as 3 times in a given calendar year.

With an estimated 307,750 in (insert period) children under the age of five acutely malnourished, the number of affected children remains compared to (number of children) in (insert period).

Additionally, Somalia is characterized by some of the worst Infant and Young Child Feeding (IYCF) and micronutrient indicators in the world [14]. Accordingly, the prevalence of exclusive breastfeeding in Somalia is 5.3% while the prevalence of early initiation is 23.4% [15]. Nearly three quarters (73%) of children under two are anaemic, almost half of all women and 60% of under-fives [15].

The median Global Acute Malnutrition (GAM) prevalence has remained Serious (10–14.9%) for the past three consecutive assessments [16]. High levels of acute malnutrition continue to persist driven by several factors, including high morbidity, below sphere immunization and Vitamin-A supplementation, poor childcare practices, inadequate access to clean/safe drinking water and acute food insecurity [17].

In the midst of these unfortunate statistics, the country is facing a triple threat of desert locusts (insert direction of disaster (in the north)), flooding in the south and the COVID-19 pandemic. Consequently, the country is facing a Triple Threat of Desert Locust, flooding's and the pandemic COVID-19 contributing towards the deterioration of production outputs, social economics increasing vulnerabilities of households [18]. These crises exacerbate the situation leaving Somalia with poor maternal, infant and young child health and nutrition outcomes.

The common causes of morbidity and mortality in Somalia are (1) diarrhoeal diseases, including cholera; 2) Tuberculosis; 3) malaria, affecting mainly pregnant women and children under five; and 4) measles. Fortunately, there have been no confirmed polio cases in Somalia since 2002. However, this significant achievement needs to be sustained throughout via

repeated special immunization activities, strengthened routine immunization, and improved surveillance [19].

World Vision (WV) Somalia implemented a four-year project that was aimed at contributing to improved health and nutrition status of women and children, and reduction of under-5 and maternal morbidity and mortality by 2020. Through the design and implementation of a Village Health Worker Program, along with WV methodologies (Channels of Hope, ttC (Timed Targeted Counseling), Citizen Voice and Action) and the establishment of Gender Based Violence committees, WV hoped to impact the critical health problem in Somalia.

This study aimed to determine the comparison analysis of socio-demographic information of the communities in the targeted areas, examine whether the project achieved its intended outcome and how it has impacted the lives of targeted households and highlight key lessons learnt alongside implementation of the health campaign project in a fragile Somalia.

Methods

Study Design:

The study adopted a quantitative and analysis method. The quantitative data collection involved household surveys and anthropometric measurements with caregivers, mainly women of reproductive age (15-49 years) and children 6-59 months as the main participants. A pre-and post-intervention data collection and analysis was conducted. This was aimed at comparing the performance of the priority indicators, determining if the change was significant with a 95% confidence interval and documenting the impact of the interventions.

Study Area:

This study was conducted in five districts distributed across Puntland (Garowe, Burtinle and Eyl) and Somaliland (Baki and Lughaya). Puntland is one of the five member states of Federal Republic of Somalia. The age structure of the household members is typical of a society with a young population. Geographically located in the north-eastern part of Somalia, one of the greatest challenges faced by Puntland State is very high mortality rates [20]. This is characterized by low uptake of antenatal care, postnatal care and low skilled and facility-based birth attendance among the mothers. In Puntland, the skilled birth attendance only stands at 35%, with an overwhelming 81% of the children mainly delivered at home. The health and nutrition situation in Puntland has generally remained impulsive.

Since the onset of the civil war in 1991, Somaliland declared autonomy and has mainly been independent. Nearly half (48%) of Somaliland's population is under the age of 15 years. Also, 48% of the population is within the productive and working are of 15-64 years, with an average household size of 6 members. Despite the gains made in the maternal and newborn child health services, under half (40%) of deliveries were performed with the help of trained health care providers. 67% of births are delivered at home. 47% of women in the reproductive age of 15-49 years who had a live birth received antenatal care services during the last birth. On the other hand, 80% of the mothers did not receive postnatal care in the first two days after birth [21].

Project Models:

To contribute to an improved health and nutrition status of women and children, reduce maternal mortality and morbidity; the project implemented a number of models and interventions across target districts. The key project models included.

Timed and Targeted Counseling (ttC) [22]:

This is a timed set of messages during pregnancy and early childhood that are presented not too early that they can be forgotten, but not too late to be effective. Messages are targeted to reach women and their supporters, including; male partners, mothers, mothers-in-law, and grandmothers who might be key decision-makers and enablers of positive behaviour changes. This focused on counselling families in the specific barriers to improved health and nutrition and using the available services.

Integrated Community Case Management (iCCM) [23] Model:

This is a specialized model to train, support, and provide supplies to community health workers to offer

diagnostic and treatment for illnesses such as pneumonia, diarrhea, and malaria among sick children. This provided the required treatment for the conditions that cause most child deaths and served children in communities that are hardest to reach.

Community Based Management of Acute Malnutrition (CMAM) [24]:

This model encourages home-based treatment with proper follow-up and educating families on healthy feeding practices for infants and young children. This model significantly reduces medical complications and deaths from acute malnutrition in young children.

Sampling and Sample Size Determination:

Indicator prioritization approach was used to determine the sample size. In particular, sample size computation took into consideration the estimated baseline and evaluation values, confidence interval of 95%, statistical power of 80%, design effect of 2 and non-response rate of 10%. Other non-statistical considerations included, the budget, stunting indicator and population demography. **Table-1** presents the sample distribution during the pre-and post-intervention assessments.

A 2-stage stratified cluster sampling design with probability proportionate to population size was used to sample the clusters. Random number generator application was sued to select households. To minimize intra-cluster correlation, only 20 households were selected from each cluster-resulting in 40 clusters selected.

Data Collection:

The quantitative data was collected from 769 at baseline in 2017 and 809 at end line in 2020 from caregivers of children under 5 years. The data collection team administered the questionnaires to the respondents in Somali. The questionnaire was deployed on Kobo mobile data collection platform.

Data Analysis and Presentation:

Descriptive and inferential statistical analysis of the household questionnaires was conducted using SPSS data analysis software. The results have been disaggregated by district and sex. The results have been presented using tables, graphs and charts. Cross-tabulation using the McNemar's Chi-square test was used to compare the percentage of the key outcome variables before and after implementation, and comparing at the end line between Puntland and Somaliland. p-values < 0.05 were considered statistically significant. The study measures are explained in **Table-2**.

Ethical Approvals:

Puntland Government of Somalia, Ministry of Health, Directorate of Planning and Policy Development, Puntland Ethics and Research Committee approved this study. Further still the University Ethics Committee, Venda University (SARDF/20/IRD/02/0704), provided the ethical approval. All participants were given the freedom to voluntarily respond or decline to do so without any consequences by seeking an informed consent.

Table-1: Distribution of the Sample at Baseline and Endline

District	Number of households estimated at baseline[a]	Baseline sample	Estimated population of the project[b]	Endline sample
Baki	8500	105	4944	187
Lughaya	12046	149	5808	203
Somaliland-total		254		390
Garowe	19330	239	2419	148
Burtinle	11558	143	4070	208
Eyl	10781	133	914	63
Puntland-total		515		419
TOTAL	62215	769	18155	809

[a]*Population estimates over the projects period has not remained static due to the drought and floods.*

[b]*Population estimates provided by project. These estimates were very different from baseline. No other reliable sources found*

Table-2: Study Measures and Variables

Study Variables	
Independent	**Dependant**
Improved breastfeeding Practices	Mothers who ever breastfed their youngest child
	Mothers who initiated breastfeeding within the hour of birth
	Mothers who exclusively breastfed their youngest child for 6 months
Increase health timing and spacing practices at the household level	Women of reproductive age in union, who use a contraceptive method
	Mothers accompanied by birth partner for counselling – HTSP
Increased utilisation of pregnancy care services	Mothers who had access to IFA during previous pregnancy
	Pregnant women who received 2TT
	Mothers who had at least 4 ANCs by qualified provider when pregnant with their youngest child
Child birth Practices	Mothers who gave birth to their youngest child at a health facility
	Mothers who had their most recent delivery assisted by a skilled attendant
Increased protection from Infection for child <5	Children receiving anthelminthic medication in the 6 months prior to the survey
	Children who had diarrhoea in the 2 weeks preceding the survey, who were given ORS
	Children with ARI in the 2 weeks preceding the survey who were taken to an appropriate provider
	Children with fever in the 2 weeks preceding the survey who were taken to an appropriate provider
Increased childhood immunization	Children 12-23 months who had a measles vaccination
	Children 12-23 months who had three DPT vaccinations
	Children 12-59m fully immunized
Incidence of Childhood illnesses	Children who had diarrhoea in the 2 weeks preceding the survey
	Children with ARI in the 2 weeks preceding the survey
	Children with fever in the 2 weeks preceding the survey
Care seeking at the Health Facility for sick child	Mothers of children with diarrhoea who sought treatment outside the home
	Children with ARI in the 2 weeks preceding the survey who were taken to an appropriate provider
	Children with fever in the 2 weeks preceding the survey who were taken to an appropriate provider
Malaria Prevention at Household level	Households with children with ITTN available
	Mothers and children who slept under an ITTN the day preceding the survey
Essential Newborn care	Mothers whose newborns were given essential newborn care at birth
	Mothers of children aged 0-23m who had a post-natal visit within 6 weeks of their previous birth

Table-3: Social Demographics Data

Characteristic	Respondent category	Baseline (N=768)	Edline (N=814)
Age of respondents	Less than 20yrs	3.20%	5.00%
	20-35yrs	74.80%	75.90%
	More than 40yrs	19.60%	20.40%
Marital Status	Never married	2.20%	0.10%
	Married	91.40%	94.10%
	Not married	6.50%	5.80%
Educational Status	No formal education	67.10%	84.80%
	Primary Education	29.70%	13.60%
	Secondary Education	3.30%	1.60%

Results

Social Demographic Data:

At the baseline, 769 respondents were interviewed of these, 67% were from Puntland while 33% were drawn from Somaliland. Results indicated that most of the respondents 74.8% were aged between 20-35 years old while the age category with the least respondents was less than 20 years at 3.2%. In terms of marital status, the majority of the respondents 91.4% were married with only 2.2% having never been married and 6.5% no longer in a marriage for one reason or another. The educational levels in the project during the baseline was low with 67.1% of the respondents having no formal education, and only 3.3% having gone up to secondary level of education.

Of the 814 respondents at the end line, (94.1%) were currently married while 0.1% where never married with 5.8% got out of marriage for one reason or another. Of the respondents, 75.9% were in the age category of 20-35 years while only 5.0% were less than 20 years old. Almost all (84.8%) of the respondents had no formal education with only 1.6% having managed to have secondary school education. **Table-3** is a summary of the respondents' characteristics in the project areas.

More ANC visits throughout pregnancy. This was so even when 19.4% of women claimed they did have access to iron-folic acid and 8.3% more women received at least two doses of TT.

Comparison of Practices from Baseline to End Line:

Child Birth:

There was a 13.2% statistically significant increase in mothers practicing the recommended child birth practices by the project closure. This was attributed to the great performance of the two practices that contribute to this. For example, skilled birth attendance increased by 17.5% while delivery at the health facility by a 9.4%.

Protection from Childhood Illnesses:

There was a 12.9% statistically significant improvement in the care for children under five when sick. This increase is attributed to the quick access to care for all the childhood illness to an average 60.9%. notable to say is the care of children with diarrhea with a 38.4% access improvement.

Expanded Program on Immunization:

There was a 12.7% reduction in the practice of vaccination of children. This reduction was statistically significant. Even though there was visible improvement in the vaccination for measles, uptake of three DPT doses suffered a 12.8% reduction while complete vaccination by 1 year suffered a 30% reduction. **Table-4** is a summary of the of these results in the project area.

End Line Puntland Vs Somaliland:

Breastfeeding Practices:

By the close of the project, there was a 0.3% more mothers practicing appropriate breastfeeding in Puntland than it was in Somaliland. The significant difference was attributed to the 10.4% more mothers who initiated complementary feeding timely at the 6 months to the child in Puntland.

Antenatal Services:

There was a 6.5% more pregnant women accessing and utilizing pregnancy care services in Somaliland than there was in Puntland. This was visible in almost all contributing practices and services. Noticeably, there were 19.2% more pregnant women receiving two TT vaccines in Somaliland than in Puntland. The other significant milestone was a 6.5% more pregnant women accessing IFA in Somaliland than in Puntland.

Family Planning Services:

There was a 14.5% more women in Somaliland practicing appropriate health timing and spacing of Pregnancy at the household in Somaliland than in Puntland. This was due to having more (20.5%) using modern contraceptives in Somaliland than in Puntland. Further still, there was another 8.7 more mothers accompanied by birth partner for contraceptive uptake in Somaliland than in Puntland.

Child Birth:

The performance of Somaliland in child birth practices was 9.4% more than Puntland. This was statistically significant attributed to a 9.3% more

births happening in a health facility and 9.8% skilled attendance in Somaliland than in the Puntland area.

Care for the Newborn:

Somaliland provided 22.5% more acceptable essential newborn care practices than Puntland. The significant practices were attributed to a 23.4% more newborns benefiting from postnatal care and 21.7% more babies benefiting from birth specific ENC in Somaliland then in Puntland.

iCCM:

Even though there were 4.7% more children in Somaliland suffering from the common three childhood illnesses than in Puntland, there was a 40.3% more children being taken to seek care for the illnesses in Somaliland than in Puntland. When at the health facility, results show that 7.5% more children in Somaliland were treated appropriately for the illness in Somaliland than in Puntland.

Table-4: Comparison of Practices from Baseline to End Line

Indicator	Baseline	End line	P Value
Improved breastfeeding Practices	**515(67.0%)**	**727(91.7%)**	**<0.001**
Mothers who ever breastfed their youngest child	677(88.1%)	752(92.4%)	
Mothers who initiated breastfeeding within the hour of birth	608(79.1%)	711(94.6%)	
Mothers who exclusively breastfed their youngest child for 6 months	259(33.7%)	717(88.2%)	
Increase health timing and spacing of pregnancy practices at the household level	**213(27.7%)**	**247(30.3%)**	**<0.001**
Women of reproductive age in union, who use a contraceptive method	52(6.8%)	192(23.6)	
Mothers accompanied by birth partner for counselling - HTSP	373(48.5%)	247(30.3%)	
Increased utilisation of pregnancy care services	**373(48.5%)**	**345(46.9%)**	**<0.001**
Mothers who had access to IFA during previous pregnancy	404(52.5%)	586(71.9%)	
Pregnant women who received 2TT	371(48.3%)	418(56.6%)	
Mothers who had at least 4 ANCs by qualified provider when pregnant with their youngest child	345(44.8%)	31(5.3%)	
Child birth Practices	**342(44.5%)**	**472(58.0%)**	**<0.001**
Mothers who gave birth to their youngest child at a health facility	351(45.6%)	448(55.0%)	
Mothers who had their most recent delivery assisted by a skilled attendant	333(43.3%)	495(60.8%)	
Increased protection from Infection for child <5	**342(44.5%)**	**255(60.9%)**	**<0.001**
Children receiving anthelminthic medication in the 6 months prior to the survey	369(48.0%)	419(51.5%)	
Children who had diarrhoea in the 2 weeks preceding the survey, who were given ORS	320(41.6%)	176(80.0%)	
Children with ARI in the 2 weeks preceding the survey who were taken to an appropriate provider	335(43.5%)	167(65.0%)	
Children with fever in the 2 weeks preceding the survey who were taken to an appropriate provider	343(44.6%)	256(66.7%)	
Increased childhood immunization	**337(43.8%)**	**253(31.1%)**	**<0.001**
Children 12-23 months who had a measles vaccination	411(53.4%)	495(60.8%)	
Children 12-23 months who had three DPT vaccinations	304(39.5%)	217(26.7%)	
Children 12-59m fully immunized	297(38.6%)	46(5.7%)	

Table-5: End line Puntland Vs Somaliland

Indicator	Somaliland	Puntland	P Values
Improved breastfeeding Practices	**286(73.2%)**	**300(73.5%)**	**<0.001**
Mothers who ever breastfed their youngest child	363(90.8%)	389(94.0%)	
Mothers who initiated breastfeeding their youngest child within the hour of birth	343(94.5%)	368(94.6%)	
Mothers who exclusively breastfed their youngest child for 6 months	367(91.8%)	351(84.8%)	
Mothers of children aged 6-59 months continuing to breastfeed	247(61.8%)	232(56.0%)	
Mothers who initiated complementary feeding at 6 months	112(28.0%)	159(38.4%)	
Increased utilization of pregnancy care services	**173(46.5%)**	**146(40.0%)**	**<0.001**
Mothers who had at least 4 ANCs by qualified provider when pregnant with their youngest child	13(3.3%)	30(7.3%)	
Mothers who had access to IFA during previous pregnancy	301(75.3%)	285(68.8%)	
Pregnant women who received 2TT	206(65.4%)	123(46.2%)	
Increase health timing and spacing practices at the household level	**137(34.3%)**	**82(19.8%)**	**<0.001**
Women of reproductive age[1] in union, who use a contraceptive method	134(34.0%)	56(13.5%)	
Mothers accompanied by birth partner for counselling - HTSP[3]	139(34.8%)	108(26.1%)	
Child birth Practices	**251(62.8%)**	**221(53.4%)**	**<0.001**
Mothers who gave birth to their youngest child at a health facility	239(59.8%)	209(50.5%)	
Mothers who had their most recent delivery assisted by a skilled attendant	263(65.8%)	232(56.0%)	
Essential Newborn care	**279(69.8%)**	**196(47.3%)**	**<0.001**
Mothers whose newborns were given essential newborn care at birth	338(84.5%)	260(62.8%)	
Mothers of children aged 0-23m[2] who had a post-natal visit within 6 weeks of their previous birth	220(55.0%)	131(31.6%)	
Appropriate medications for CU5	**159(61.4%)**	**139(53.9%)**	**<0.001**
Children receiving anthelminthic medication in the 6 months prior to the survey	224(56.0%)	195(47.1%)	
Children who had diarrhoea in the 2 weeks preceding the survey, who were given ORS[5]	93(78.8%)	83(81.4%)	
Incidence of Childhood illnesses	**154(38.5%)**	**140(33.8%)**	**<0.001**
Children who had diarrhoea in the 2 weeks preceding the survey	132(33.0%)	110(26.6%)	
Children with ARI in the 2 weeks preceding the survey	124(31.0%)	133(32.1%)	
Children with fever in the 2 weeks preceding the survey	206(51.5%)	178(43.0%)	
Care seeking at the Health Facility for sick child	**130(87.2%)**	**61(46.9%)**	**<0.001**
Mothers of children with diarrhoea who sought treatment outside the home	107(91.5%)	43(55.1%)	
Children with ARI in the 2 weeks preceding the survey who were taken to an appropriate provider	106(85.5%)	61(45.9%)	
Children with fever in the 2 weeks preceding the survey who were taken to an appropriate provider	178(86.4%)	78(43.8%)	
Malaria Prevention at Household level	**288(72.0%)**	**322(77.8%)**	**<0.001**
Households with children with ITTN available	305(76.3%)	356(86.0%)	
Mothers and children who slept under an ITTN the day preceding the survey	270(67.5%)	287(69.3%)	
Increased childhood immunisation	**155(38.7%)**	**135(32.6%)**	**<0.001**
Children 12-23months who had a measles vaccination	274(68.5%)	221(53.4%)	
Children 12-23months who had three DPT vaccinations	159(39.8%)	170(14.0%)	
Children 12-59m fully immunized	32(8.0%)	14(3.4%)	

Malaria Prevention:

There were 5.8% more households in Puntland practicing appropriate malaria prevention than in Somaliland. This was because there were 9.7% more households with a mosquito net, and 1.8% more children who slept under a mosquito net in Puntland than in Somaliland.

EPI:

There were 6.1% more children contributing to increased vaccination in Somaliland than Puntland. Even though there were 15.1% more Measles vaccinated children and 25.8% more DPT vaccinated children in Somaliland than Puntland, fully immunization in the two states was at its lowest. **Table-5** is a summary of the of these results in the project area.

Comparison of Key indicators to National Targets [25]:

EPI:

The Project area is 5% below reaching the national level achievement for full vaccination but 15% more children vaccinated for DPT than the national level achievement. Further still the project vaccine 38% more children against measles than the national level status.

iCCM:

As far as access to appropriate treatment of childhood illnesses is concerned, the project performance far supersedes the current national status. For example, there was a 60% more access to appropriate malaria treatment, 61% more access to antibiotics and a 75% more access to ORS than the national level achievement.

Delivery Practices:

The project performed well in this practice compared to the National achievement. For example, 34% more women delivered at the health facility, and 29% more women's delivery were facilitated by the skilled birth attendant in the project site than the national achievement.

ANC Services:

Even though project failed to measure up to the National achievement for 4 or more ANC visits by 19%, the project area provided IFA to 60% more women during pregnancy than the national status.

Family Planning:

The project performed well in contraceptive use, with a 17% more women using modern contraceptives than the national average of 7%.

IYCF Practices:

The Project contributed well to the key optimal IYCF for example there was a 54% more women who practiced exclusive breastfeeding, 25% more women who initiated breastfeeding within one hour after birth and a 2% more women who have ever breastfed than the national averages. More details are in the **Fig-1**.

Discussion of Results

At the onset of the project, there was a deliberate aim to change key major health and nutrition behavioral and services update outcomes for the mother and child. This was in order to contribute to Somalia's country Scaling up interventions through the 1000 days' principle which promotes low cost interventions with an expected high impact [26]. With the implementation of these interventions, it was anticipated that there would be visible indication towards the accelerated reduction of morbidity and mortality for mothers and their infants in Somalia [27]. The quantitative study therefore deliberately compared, baseline to after implementation, the state of Puntland to Somaliland and finally on how the project faired in comparison to the entire Somalia.

There was progressive improvement from baseline to end of project, in the health timing and spacing of pregnancy, appropriate child birth practices, breastfeeding uptake, and protection of children from childhood illnesses. The improvement in contraceptive use and acceptance can be linked to the projects role to ensure families were aware of the importance of contraceptive methods and pick keen interest in child spacing, household dialogue to eliminate systemic and socio-cultural barriers that hinder access to contraception [28]. The removal of the barriers which prevent women from receiving their desired form of contraception has important public health

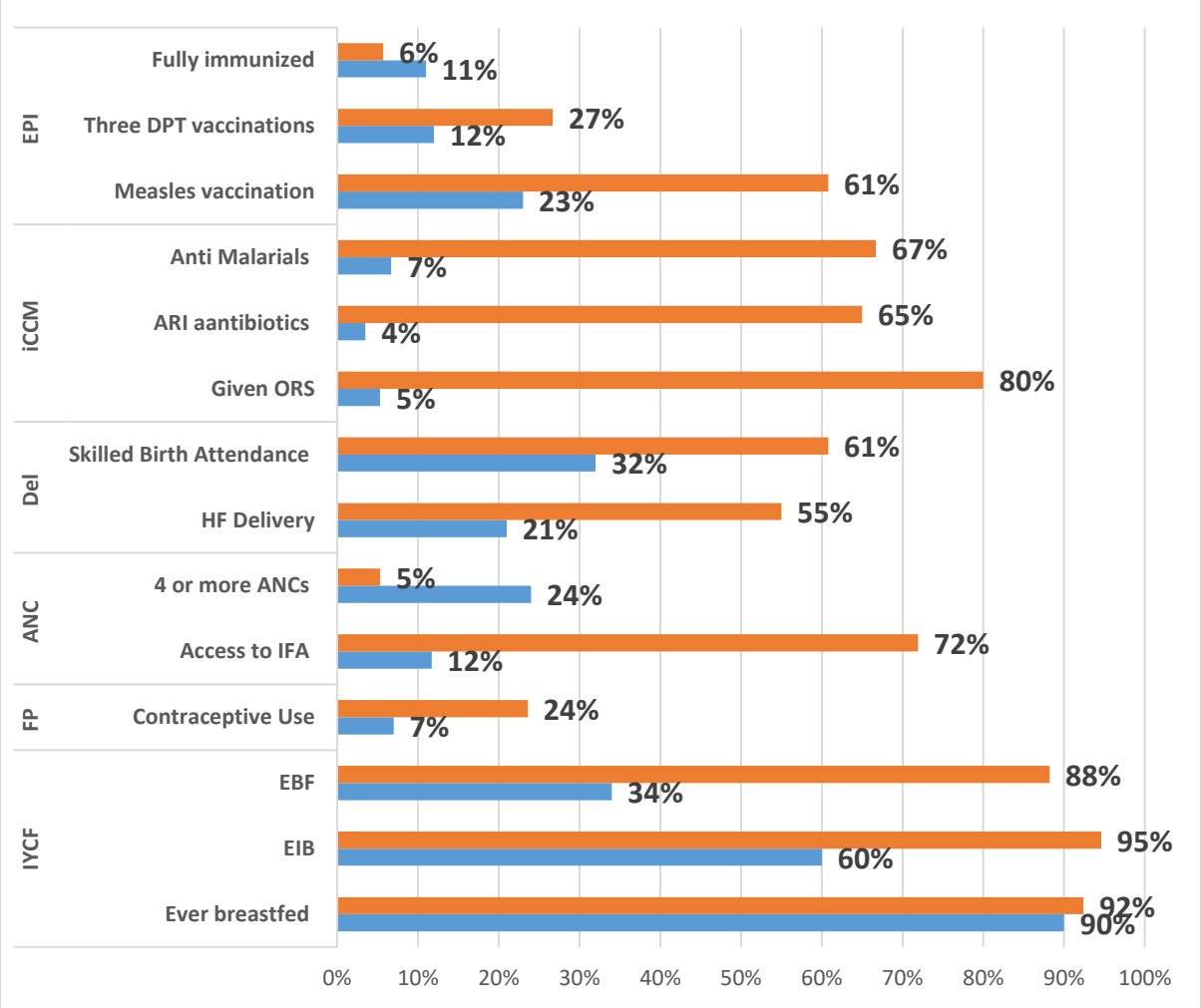

Fig-1: Comparing with National Standards

Key

Project end line data

Somalia Health and Demographic data [25]

implications, including lengthening inter-pregnancy intervals, and fewer unplanned pregnancies [29].

Improvement in appropriate childbirth contributed to the Essential newborn care practices and interventions provided to a newborn immediately after birth recommended to be available at the primary health care level and to be provided by trained providers [30]. All newborns require essential newborn care to minimize the risk of illness and maximize their growth and development. The large majority of newborn deaths (80 per cent) are due to complications related to preterm birth, intrapartum and immediate post-partum events [31]. Thus, the project put emphasis to the time around birth with proven high impact interventions and quality care for newborns to contribute to the prevention of these death. The suggested interventions were further in line with Somalia's "Every Newborn Action Plan" that strategically calls for an increased focus on the time around birth with targeted high impact interventions [32].

It is important to point out that there was a reduction in uptake of ANC services and those of the expanded program on immunization. During project implementation, there was deliberate effort put towards eliminating any anticipated barriers to seeking ANC care. Access was promoted through removal of any lack of knowledge about ANC attendance benefits, availability of female midwives, how to negotiate for husband's approval and permission at household level, availing the full ANC services package, and medical supplies [33].

With such low ANC uptakes, the mothers missed out on good quality ANC in order to decrease the chances of suffering from anemia, pregnancy induced hypertension, and preterm labor. These pregnant mothers therefore stood a very high chance of increased risk of low birth weight and preterm babies, maternal complications and poor perinatal outcome are highly associated with non-utilization of antenatal services [34].

The project worked closely with caregivers to eliminate any barriers to immunization. The community mobilization strategy implemented aimed at recognition and removal of lack of knowledge on immunization, shortening the long distances to access points through mobile teams, and ensuring an equitable distribution of the vaccines throughout the Health care centers. However as seen in the results, the project did not perform well at by the end of the project. Since the project tried to address some barriers, studies in the region show that other associated factors like the number of off-springs, lifestyle, migration, occupation and parent's forgetfulness, inconvenient time and language barrier could be the cause for this results [35].

Of the 8 services focused on during the project, Somaliland performed better in 6 (Antenatal, family planning, child birth, care for the newborn, iCCM and EPI). However, Puntland performed better in 2 (breastfeeding and malaria prevention). The slow uptake and utilization of health services in Puntland in comparison to Somaliland is due to the high levels of conflict, being fragile and insecurity [36]. This therefore means that Puntland is more likely to be unable to perform basic functions such as maintaining security, enabling economic development, and ensuring the essential social and health needs of the population are met appropriately [37]. This therefore means that even when supporting organizations offer an equitable health care approach, the state is supposed to be responsible for shaping and implementing the delivery of health care services to ensure equitable health access for all without fear for life [38].

Of the 6 service packages used to compare the project achievements to national achievements, the project managed to achieve 4 (iCCM, Delivery services, Family planning and IYCF) more than the national achievement. On the other hand, the project failed to measure up to 2 (EIP and ANC services). This should not be surprising since the project aimed at improving access to better nutrition, and basic health care for pregnant women, mothers and children. The project team also provides training for the staff of health centres. These implementations ensured that the project yields the expected results exceeding those at national level.

The study presented some strength and weakness as follow: unlike the usual surveys where data collection is at a single point in time, and difficult to measure changes in the population, this had two points of measurements, baseline and end line and therefore at different points in time and therefore measureable. The weakness is that this was not a randomized control trial and therefore there was no co-founders control meaning its challenging to entirely attribute the results to the project interventions alone.

Conclusions

The health and nutrition care system in Somalia remains weak, poorly resourced and inequitably distributed. The root cause of the current status is multipronged. However, the results from this study show that if interventions are appropriately funded, there will always be improvement in the key health and nutrition indicators.

Contributors

GB and AS: conceptualization, VO and AS: methodology, VO: software, GB, VO and AS: formal analysis, GB: writing the original draft, AS: project administration, VO and AS: data curation, GB, VO and AS: writing review and editing.

Ethics Approval

Puntland Government of Somalia, Ministry of Health, Directorate of Planning and Policy Development, Puntland Ethics and Research Committee approved this study. Further still the University Ethics Committee, Venda University (SARDF/20/IRD/02/0704), provided the ethical approval.

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Conflict of Interest

The authors have read and approved the final version of the manuscript. The authors have no conflicts of interest to declare.

Patient Consent for Publication

Not required

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