



## Effect of Nutrition Education Intervention on Knowledge Attitude and Practice of Mothers/caregivers on Infant and Young Child Feeding in Shabelle (Gode) Zone, Somali Region, Eastern Ethiopia

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### Abstract

Optimal Infant and Young Child Feeding is very important for their health, growth and development. The impact of long term nutrition education intervention on child feeding in underprivileged community is not well documented. Therefore, this study was designed to document the effect of nutrition education intervention on knowledge, attitude and practice of mothers/caregivers towards optimal infants and young child feeding in Shabelle Zone of Somali Region. With regards to the materials and the methods, a randomized controlled trial study was conducted in August, 2015. Data were collected from 404 participants, after eight months of nutrition education intervention. SPSS version 20 software were used. A Chi-square and Fishers exact tests for categorical variables, and t-test for continues variables were used. Out of the total 415 participants assessed at baseline study, 404 were secured in the post intervention study. The majority (>80%) of the participants in both groups were illiterate, and housewives. The intervention group had shown statistical significant improvement in knowledge, attitude and practice of the mothers/caregivers ( $p < 0.05$ ) compared to control group in all tests; independent sample t-test mean score difference of the difference ( $p < 0.001$ ), and paired sample t-test mean score in intervention group ( $p < 0.001$ ). At the end, the nutrition education intervention was found effective in improving mothers/caregivers behaviours related to child feeding practices. Therefore, nutrition education intervention should be further scaled up and adapted to other areas in the Region.

**Keyword:** Nutrition education intervention, Knowledge, Attitude, Practice, Somali Region

### Abstrak

Makanan bagi bayi optimal dan kanak-kanak sangat penting untuk kesihatan, pertumbuhan dan perkembangan. Impak intervensi pendidikan pemakanan jangka panjang terhadap pemakanan kanak-kanak di komuniti miskin tidak didokumenkan dengan baik. Oleh itu, kajian ini direka bentuk untuk mendokumenkan kesan intervensi pendidikan nutrisi terhadap pengetahuan, sikap dan amalan ibu/penjaga terhadap bayi optimal dan pemakanan kanak-kanak di Shabelle Zone of Somalia Region. Berhubung dengan bahan dan kaedah, kajian percubaan kawal rawak telah dijalankan pada bulan Ogos, 2015. Data dikumpul dari 404 peserta, selepas lapan bulan intervensi pendidikan pemakanan. Perisian SPSS versi 20 telah digunakan. Ujian tepat Chi-square dan Fishers untuk pemboleh ubah kategori, dan ujian t untuk pemboleh ubah berterusan digunakan. Dari jumlah 415 peserta yang dinilai pada kajian dasar, 404 telah diperolehi dalam kajian intervensi selepas itu. Majoriti (> 80%) peserta dalam kedua-dua kumpulan adalah buta huruf, dan suri rumah. Kumpulan intervensi menunjukkan peningkatan statistik dalam pengetahuan, sikap dan amalan ibu/penjaga ( $p < 0.05$ ) berbanding kumpulan kawalan dalam semua ujian; Ujian t-ujian sampel bebas mempunyai perbezaan ( $p < 0.001$ ), dan skor pasangan ujian t-sampel yang bersamaan dengan kumpulan intervensi ( $p < 0.001$ ). Pada akhirnya, intervensi pendidikan pemakanan adalah berkesan dalam memperbaiki tingkah laku ibu/penjaga yang berkaitan

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dengan amalan pemakanan kanak-kanak. Oleh itu, intervensi pendidikan nutrisi perlu ditingkatkan dan disesuaikan dengan kawasan di wilayah lain.

**Kata kunci:** *Intervensi pendidikan nutrisi, pengetahuan, sikap, amalan, Wilayah Somalia*

**Introduction**

Proper and good children feeding practices are important for their health, growth, and development. Children have the right to adequate nutrition and good health (UN Children’s Rights Alliance, 2010; WHO, 2007; WHO & UNICEF, 2003). An optimal Infant and Young Child Feeding (IYCF) with adequate nutrition is very important for their health, nutrition, growth and development (Kliegman, Behrman, & Station, 2011; Manikyamba D., Vidyaa D.L., Satyavani A., Krishna Prasa A., & Tulasi Deepthi K., 2015; Pan America Health Organization and WHO, 2001; Salama, Elhawary, & El-Nmer, 2014; WFP, 2009; WHO, 2008, 2014; WHO & UNICEF, 2003). Low exclusive breastfeeding, and giving infants additional feed like; animal product, blood, and herbals were reported in same pastoralist community (Chege, Kimiywe, & Ndungu, 2015).

Researchers showed that appropriate nutrition education intervention (NEI) can enhance maternal knowledge and attitude on IYCF practice on both exclusive breastfeeding and complementary feeding (Guldan et al., 2000). This plays a central role on improving the health, growth and development of the children. Moreover, the reverse lead to impairment of child linear growth and undernutrition (Saleem, Mahmud, Baig-ansari, & Zaidi, 2014). The impact of long term NEI on child feeding in underprivileged community (people living below the poverty line and food insecure) are not well documented (Bhutta et al., 2013). Despite the higher knowledge of

mothers/caregivers in this study area, poor child feeding practice were abundant (Guled, Mamat, Belachew, Abu Bakar, & Assefa, 2016), that could lead to the risk of malnutrition and infection(s).

Under nutrition is mainly due to poor breastfeeding and complementary feeding practice that is accompanied by a number of infectious diseases, household food insecurity, inadequate health and sanitation services and inappropriate food type and mix, and also limited time for mother available for her care during pregnancy, and care or feeding for infants, and children. Hence, it is essential to equip the mothers/caregivers with appropriate knowledge, attitude and practice regarding IYCF to maintain adequate and balanced supply of nutrients to promote the health, and nutritional status of the children and themselves (Kliegman et al., 2011; Pan America Health Organization and WHO, 2001; Sawaya, 2006; UNICEF, 2011; WFP, 2009; WHO, 2008; WHO & UNICEF, 2003).

Figure 1 shows the appropriate target time for child feeding, and timely initiation of specific feeding practices, that could be put into consideration when doing community NEI over the life course as proposed by WHO. However, for the purpose of this study we adapted interventions from pregnant to the age of 5 years of the child, and modified to local condition. The main activities carried out were; mother’s nutrition and care during pregnancy, delivery, and breastfeeding, infant care from birth to six months, child care from six months to 5 years, as well as hygiene and basic services.

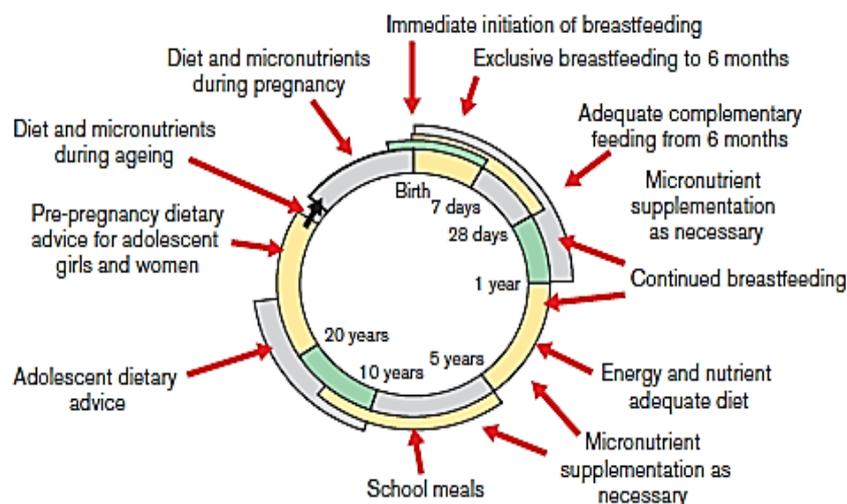


Figure 1: How community based nutrition education intervention can be effectively delivered in an integrated manner with timely initiation of specific feeding practices (WHO, 2013)

Globally, one of the main indicators to measure the health and wellbeing of the community is child mortality. Although, the Millennium Development Goal 4 (MDG) target of reducing child mortality rate (CMR) by two-third, was not achieved, there were a remarkable decline of CMR by almost half for the last two decades from 91 in 1000 live births in 1990 to 43 in 2015. Despite this remarkable progress, the child survival is still the top urgent concern by the international community. Sixteen thousands children dies every day in 2015, urging to setting of new target in Sustainable Development Goal (SDG) three, where target 3.2 mentioned of ending preventable new born and child deaths (UN, 2015; UNICEF, 2014, 2015a, 2015b, 2016).

In developing countries, out of the globally reported 5.9 million under five deaths, about 87% were in low and low-middle income countries. In sub-Saharan Africa CMR is high, with one child in every 12 children died, before the celebration of their fifth birthday. In 2015, three percent of all under five deaths had occur in Ethiopia. Children from poorest family, living in rural areas, having less educated mothers, lack of access to clean water and sanitation are more likely to die before their fifth birthday compared to their counterparts. Almost 50% of child mortality is due to

infectious diseases which is preventable and treatable (UNICEF, 2015a).

Finally, some studies have documented the behaviour of the mothers/caregivers in the other regions of Ethiopia. But, such studies are scanty in this community. Whereas, in this specific area of study, there is no single study conducted. Therefore, this study was designed to document the effect of NEI on KAP of mothers/caregivers towards optimal infants and young child feeding practices in Shabelle (Gode) Zone of Somali Regional State Eastern, Ethiopia.

### Materials and Methods

Following a baseline study conducted in August, 2014 in Gode and Adadle Districts, Shabelle (Gode) Zone, Somali Regional State (figure 2), 415 paired child-mothers/caregivers were enrolled. Eight months of NEI were carried out in Adadle district. Meanwhile, Gode district remained as control, getting only the routine health services activities. The post interventional study was conducted in August, 2015. Data were collected from 404 paired child-mothers/caregivers, with retention rate of 97.3%. Detail of methods and sampling procedure is presented elsewhere (Guled et al., 2016).

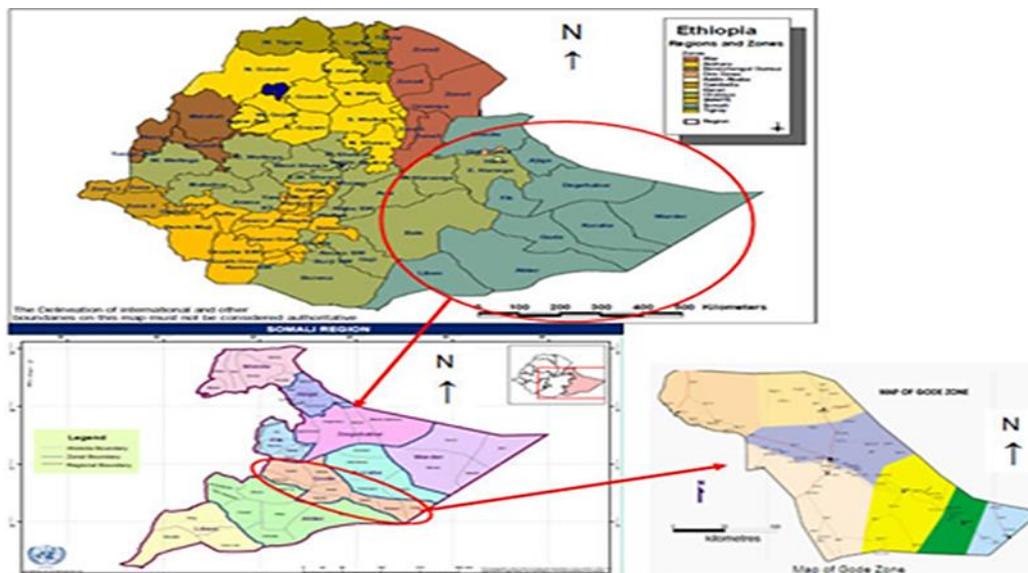


Figure 2: Map of Ethiopia showing the study site ([https://commons.wikimedia.org/wiki/Atlas\\_of\\_Ethiopia](https://commons.wikimedia.org/wiki/Atlas_of_Ethiopia))

The NEI was designed and conducted using social cognitive theory (SCT), which “plays in the adoption, initiation, and maintenance of health behaviours” (Luszczynska & Schwarzer, 2005). This NEI program was intended to improve the KAP of mothers/caregivers regarding the child feeding practices, with the end result of improvement of the

child nutritional status. Topics related to mothers and children nutrition were taught to intervention group by presentation, role play, and demonstration by trained nurses, health extension workers, and primary health care workers for over eight consecutive months, two sessions per week. In addition, display of key messages on the health centres, clinics and health posts were

done. Community social mobilizers and religious leaders were also involved in the NEI on religious prospective. The main topics given were nutrition for pregnant and delivery, correct breastfeeding (time initiation of breastfeeding (TIBF), time of exclusive breastfeeding (EBF), and the duration of breastfeeding), complementary feeding (initiation, type, food hygiene & safety, and preparation) including snacks and feeding during sickness, food pyramid including fruits and vegetable, and specific health services like; vaccination, de-worming, vitamin A, Insecticide treated nets (ITNs) usage, environmental sanitation, and treating sick child. Each topic was taught for at least 60 minutes.

### **Data collection and measurement**

Data were collected by degree and diploma nurses after two days training and one day pilot test, in the pre and post intervention period. During post-intervention data collection, continuous monitoring and checking on daily basis were done by the principal investigator.

### **Data analysis**

The data were coded, double entered, checked for missing values and outliers, and analysed using SPSS (SPSS Inc. version 20). A descriptive and inferential statistics were used. The specific statistical analysis used include; Chi-square and fishers exact tests for categorical variables, and t-test for continuous variables (independent and dependent paired -repeated measure- t-tests) after checking the assumptions. Ethical clearance was obtained from the International Islamic University Malaysia Research Ethical Committee (IREC). A written support letter was also obtained from Ethiopia Federal Ministry of Health (FMOH), Somali Regional Health Bureau (SRHB) and Shabelle Zone administrative office. Confidentiality was assured by keeping all information in a proper place. In addition, if a sick and/or malnourished child is seen, the team would send to the nearest health facility for assistance.

## **Results**

### **Impact of NEI on KAP of participants on child feeding behaviour**

From a total of 415 mothers/caregivers interviewed at baseline study, 404 were secured in post nutrition education intervention study, giving retention rate of 97.3%. Seventy two percent in Adadle and 66% in Gode were from rural residence in both baseline and post intervention period. The mean family size, mean number of under five children in the family, and mean age of the mothers were all similar in baseline and post intervention period for both intervention and control

groups. The majority of the participants in both groups were illiterate, and housewives. The main sources of drinking water remain unprotected in both groups, but there were 12% improvement after NEI in intervention group, compared to no change in control group (Table 1). Table 2 presented independent t-test analysis of mothers/caregivers knowledge attitude and practice by comparing the intervention and control group. The intervention group had shown statistically significant improvement in all items ( $p<0.05$ ), compared to control group, which reported the same or little improvement. For instance, knowledge of time initiation of complementary feeding, knowledge of indigenous fruits/vegetables, and either this indigenous fruits/vegetables can be given to the children in intervention group were significantly improved ( $p<0.05$ ) after nutrition education intervention, compared to control group. Similarly, the attitude and practice of the mothers/caregivers all items were significantly ( $p<0.05$ ) improved in intervention group compared to non-intervention group.

The KAP of mothers/caregivers mean score were shown statistically significant change after NEI. The paired sample t-test showed that, mothers/caregivers knowledge before and after intervention increased by almost 50% mean score. In addition, attitude and practice of the mothers/caregivers were also significantly ( $p<0.001$ ) increased at post intervention. Likewise, mothers/caregivers knowledge and practice in control group were also reported statistically significant ( $p<0.05$ ) raise of mean score. However, attitude of mothers/caregivers remain unchanged in control group. The independent sample t-test of mean difference of the difference (DOD), showed that the intervention group were having significantly higher mean score ( $p<0.001$ ) in all three variables (knowledge, attitude and practice) compared to control group (Table 3).

## **Discussion**

The data conducted after eight months NEI focusing on locally acceptable, available, affordable and accessible resource, has demonstrated a statistically significant improvement in all items of mothers/caregivers KAP. Unlike control group which reported a very little improvement or no differences within the same period. This is in line with other study that reported improved KAP of the participants after NEI (Jalambo, Sharif, Naser, & Karim, 2017).

### **Mother's/caregiver's knowledge**

At baseline only 58.5% of mothers/caregivers in intervention group had knowledge of correct time (at six months) of initiation of complementary feeding

(ICF), this was significantly increased to 93.6%, after 8 months of nutrition education. This is alike to studies conducted in India, Saudi Arabia, and China that reported 62%, 16.7%, & 73.8% of the participants at baseline had knowledge on correct time of ICF and this has been climbed to 93.4%, 72.2%, and 90.8% at post intervention, respectively (Hanafi, Shalaby, Falatah, & El-Ammari, 2014; Manikyamba D. et al., 2015; Zhang, Shi, Chen, Wang, & Wang, 2013). Similarly, knowledge of mothers/caregivers on need of the child snacks has increased from 65.9% at pre intervention to 93.6% at post intervention. But, this was not seen in control group. The knowledge of mothers/caregivers of indigenous fruits/vegetables availability, and whether this available indigenous fruits/vegetables can be given to their children were improved in intervention group from 32.7%, and 17.1% at baseline to 92.6% and 79.3% at post intervention, respectively. But, not in the control group where the knowledge of the participants in this issues slightly declined within the same period (82.9% and 68.6% to 80.1% and 69.7%, respectively). The overall knowledge of mothers/caregivers mean score of the intervention group improved significantly after NEI. This is comparable with other studies (Inayati et al., 2012; Jalambo et al., 2017; Keshani et al., 2016; Savita, Nath, & Sharan, 2013; Shariff et al., 2008; Sukandar, Khomsan, Anwar, Riyadi, & Mudjajanto, 2015).

### **Mother's/caregiver's attitude**

Regarding the positive attitude of the mothers/caregivers, almost all items improved significantly after NEI, compared to control group. For example, initiation of breastfeeding in the first one hour of delivery was 4.9% at baseline, and increased to 90.1% at post intervention. In the other hand, control group remained almost the same from 71.4% to 73.1% within the same period. Our study result was comparable with study conducted in Saudi Arabia that showed 41.7% at baseline to 85% at post intervention. Similarly, the attitude of the mothers/caregivers towards exclusive breastfeeding up to six months of life, where positively improved from 38.5% at baseline to 95.1% at post intervention. While, the control group, remained as 82.4% and 83.1% within the same period. Our study result was equivalent with study conducted in Saudi Arabia that showed 12.2% at baseline to 82.8% at post intervention (Hanafi et al., 2014). The overall attitudes of mothers/caregivers mean score of the intervention group were improved significantly. This is comparable with other studies (Jalambo et al., 2017; Shariff et al., 2008; Sukandar et al., 2015).

### **Mother's/caregiver's practice**

Concerning the practice of the mothers/caregivers almost all items improved significantly after NEI, compared to control group. For example, initiation of breastfeeding for the first one hour of delivery was 47.3% at baseline and 90.6% at post intervention. Nevertheless, the control group, remained almost the same from 52.4% to 55.7% within the same period. Our study result was comparable with study conducted in India that showed 23% at baseline to 100% at post intervention (Sethi, Kashyap, & Seth, 2003). Likewise, practice of the mothers/caregivers on exclusive breastfeeding, and continuation of breastfeeding up to two years of life and above were significantly improved after NEI from 2.4% and 67.3% to 81.3%, and 87.7%, respectively, compared to control group from 27.6% and 71% to 30.8% and 74.6% respectively within the same period. This was corresponding to study carried out in India, which showed 30% and 36.6% at pre-test to 86.6% and 76.6% at post-test for EBF and continuation of breastfeeding up to 2 years of age respectively. The overall practices of mothers/caregivers mean score improved significantly after NEI. This is comparable with other studies (Inayati et al., 2012; Jalambo et al., 2017; Shariff et al., 2008; Sukandar et al., 2015). This clearly indicates the effectiveness of appropriately designed and implemented nutrition education program on mothers/caregivers behaviour change, regarding infant and young child feeding in improving the KAP of mothers/caregivers on child feeding practices in the community.

### **Conclusion**

A nutrition education intervention (NEI) targeting mothers/caregivers KAP on child feeding behaviour, anaemia, nutritional status and contributing factors of the children below five years of age were performed. This NEI was found effective in improving the nutritional status of the children. The NEI towards mothers/caregivers behaviour related to child feeding practices with optimal IYCF approach using the accessible, available, acceptable, and affordable resources; such as animal source foods, indigenous fruits and vegetable. In addition, promoting child immunization, de-worming, vitamin A, and iron supplementations, proper ITNs utilization, dietary diversity score (DDS), and health seeking behaviour was effective and improved nutritional status of the target children. A combination of these have significantly improved the mothers/caregivers KAP on child feeding practice and nutritional status of the children.

Table 1. Baseline and post intervention background characteristics of the study participants in Gode and Adadle districts, 2015

| Variables                      | Baseline <sup>®</sup>   |                    | Post intervention <sup>®</sup> |                    |
|--------------------------------|-------------------------|--------------------|--------------------------------|--------------------|
|                                | Intervention<br>(n=205) | Control<br>(n=210) | Intervention<br>(n=203)        | Control<br>(n=201) |
|                                | (%)                     | (%)                | (%)                            | (%)                |
| Residence                      |                         |                    |                                |                    |
| Urban & Semi-urban             | 27.3                    | 33.8               | 27.6                           | 33.8               |
| Rural                          | 72.7                    | 66.2               | 72.4                           | 66.2               |
| Family size                    |                         |                    |                                |                    |
| 1-3                            | 12.2                    | 15.2               | 9.4                            | 6.5                |
| 4-6                            | 57.1                    | 50.5               | 53.2                           | 54.2               |
| ≥7                             | 30.7                    | 34.3               | 37.4                           | 38.3               |
| Mean ± SD                      | 5.64 ± 1.91             | 5.87 ± 2.26        | 5.95 ± 1.91                    | 6.2 ± 2.15         |
| Number <5 children<br>family   |                         |                    |                                |                    |
| 1                              | 21.5                    | 27.1               | 22.2                           | 17.4               |
| 2                              | 61.5                    | 51.4               | 59.1                           | 61.2               |
| ≥3                             | 17.1                    | 21.4               | 18.7                           | 21.4               |
| Mean ± SD                      | 1.98 ± 0.67             | 1.95 ± 0.72        | 1.98 ± 0.68                    | 2.1 ± 0.65         |
| Mother/caregiver age           |                         |                    |                                |                    |
| ≤18                            | 4.9                     | 4.8                | 0.5                            | 1.5                |
| 19 – 25                        | 29.8                    | 38.1               | 25.6                           | 33.3               |
| 26 - 35                        | 52.7                    | 40.5               | 57.1                           | 43.3               |
| >35                            | 12.7                    | 16.7               | 16.7                           | 21.9               |
| Mean ± SD                      | 28.2 ± 5.9              | 29.2 ± 9.4         | 29.2 ± 5.9                     | 29.9 ± 9.1         |
| Mother/caregiver<br>education  |                         |                    |                                |                    |
| Illiterate                     | 82.0**                  | 92.9               | 81.8**                         | 92.5               |
| Literate                       | 18.0                    | 7.1                | 18.2                           | 7.5                |
| Mother/caregiver<br>occupation |                         |                    |                                |                    |
| Housewife                      | 84.4                    | 84.8               | 84.2                           | 84.6               |
| Farmer & others <sup>^</sup>   | 15.6                    | 11.4               | 15.8                           | 15.4               |
| Wealth index (tertile)         |                         |                    |                                |                    |
| Poor                           | 26.8**                  | 40.0               | 25.6**                         | 40                 |
| Middle                         | 32.7                    | 35.7               | 36.9                           | 31.8               |
| High                           | 40.5                    | 24.3               | 37.4                           | 27.4               |
| Source of income               |                         |                    |                                |                    |
| Livestock/farm                 | 52.2**                  | 36.7               | 67.0***                        | 36.8               |
| Others <sup>§</sup>            | 47.8                    | 63.3               | 33.0                           | 63.2               |
| Source of drinking<br>water    |                         |                    |                                |                    |
| Protected                      | 0.5***                  | 23.8               | 12.8**                         | 23.4               |
| Unprotected                    | 99.5                    | 76.2               | 87.2                           | 76.6               |

\* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ , <sup>®</sup>Intervention = Adadle, Control = Gode

<sup>^</sup> Government employee, small scale trading, and daily labourer

<sup>§</sup> Salary, small scale trading, and Daily labourer

Table 2. Baseline and post intervention of independent t-test of KAP of mothers/caregivers about optimal IYCF in Gode and Adadle districts, 2015

| Variables  | Baseline             |                     | Post intervention    |                 |
|--|----------------------|---------------------|----------------------|-----------------|
|  | Intervention (n=205) | Control (n=210)     | Intervention (n=203) | Control (n=201) |
| <b>Knowledge (%)</b>   |                      |                     |                      |                 |
| Knew the importance of colostrum   | 100 <sup>***</sup>   | 92.4                | 100 <sup>**</sup>    | 95.0            |
| Knew TIBF after delivery   | 97.6 <sup>**</sup>   | 90.5                | 98.5                 | 95.5            |
| Knew the duration for EBF  | 97.6 <sup>***</sup>  | 86.7                | 98.5 <sup>***</sup>  | 85.1            |
| Knew the time to start complementary feeding   | 58.5                 | 90.5 <sup>***</sup> | 93.6 <sup>*</sup>    | 87.1            |
| Knew the recommended duration of BF  | 97.6                 | 96.2                | 98.0 <sup>*</sup>    | 93.0            |
| Knew the need for giving snacks to the children  | 65.9                 | 82.9 <sup>***</sup> | 93.6 <sup>*</sup>    | 86.1            |
| Knew the indigenous fruits and/or vegetables   | 32.7                 | 82.9 <sup>***</sup> | 92.6 <sup>***</sup>  | 80.1            |
| Knew indigenous fruits/vegetable can be given to child   | 17.1                 | 68.6 <sup>***</sup> | 79.3 <sup>*</sup>    | 69.7            |
| <b>Practice (%)</b>  |                      |                     |                      |                 |
| Continue BF $\geq$ 24 months   | 67.3                 | 71.0                | 87.7 <sup>**</sup>   | 74.6            |
| Started BF within one hour after birth   | 47.3                 | 52.4                | 90.6 <sup>***</sup>  | 55.7            |
| Breastfeed $\geq$ 8 times in 24 hours for 1 <sup>st</sup> months   | 75.6 <sup>***</sup>  | 56.7                | 85.7 <sup>***</sup>  | 60.2            |
| Started any additional food in the 1 <sup>st</sup> 6 months  | 99.0                 | 85.2 <sup>***</sup> | 12.3 <sup>***</sup>  | 79.1            |
| Started complementary feeding at 6 months  | 2.4                  | 27.6 <sup>***</sup> | 81.3 <sup>***</sup>  | 30.8            |
| A child ate $\geq$ Three times in a day  | 86.6                 | 94.3                | 98.5                 | 96.0            |
| Snacks given to the child  | 57.1                 | 73.3 <sup>***</sup> | 85.2 <sup>*</sup>    | 77.1            |
| <b>Attitude (%)</b>  |                      |                     |                      |                 |
| BF should start within 1 hour after delivery   | 4.9                  | 71.4 <sup>***</sup> | 90.1 <sup>***</sup>  | 73.1            |
| Babies should not be given anything except breast milk up 6 months                                       | 38.5                 | 82.4 <sup>***</sup> | 95.1 <sup>**</sup>   | 83.1            |
| A child can be given butter, sugar, water at birth to 6 months   | 84.4                 | 79.5                | 1.0 <sup>***</sup>   | 73.6            |
| CF should be started at six months   | 79.0                 | 85.7 <sup>**</sup>  | 91.6 <sup>*</sup>    | 84.1            |
| BF should continue up to 2 years of age  | 78.0                 | 86.2 <sup>**</sup>  | 94.1 <sup>**</sup>   | 84.6            |
| A child should breastfeed $\geq$ 8 times/24 hours  | 62.4                 | 88.6 <sup>***</sup> | 94.6 <sup>**</sup>   | 88.1            |
| Food the child eats one time should include: Starchy, protein, vegetables, fruits, sugar, salt, and fat. | 73.2                 | 74.3 <sup>*</sup>   | 86.2 <sup>**</sup>   | 72.6            |
| Snacks should be given to the children between meals   | 73.7                 | 77.6 <sup>**</sup>  | 92.1 <sup>***</sup>  | 77.1            |
| A child should eat fruits & vegetables $\geq$ 3 times a week   | 77.1                 | 71.0 <sup>**</sup>  | 94.6 <sup>***</sup>  | 69.7            |
| Serving balanced foods prevents malnutrition   | 78.0                 | 80.0                | 94.6 <sup>***</sup>  | 79.6            |
| Serving only starchy foods prevents malnutrition   | 85.9                 | 79.5 <sup>*</sup>   | 2.0 <sup>***</sup>   | 75.6            |
| Serving indigenous fruits/vegetables can keep children healthy   | 87.3 <sup>***</sup>  | 71.4                | 97.0 <sup>***</sup>  | 71.6            |
| Malnutrition can be due to disease like diarrhoea and malaria  | 97.6 <sup>***</sup>  | 85.2                | 100.0 <sup>***</sup> | 83.6            |

\*\*\*  $p < 0.001$ , \*\*  $p < 0.01$ , \*  $p < 0.05$ . Intervention= Adadle, Control= Gode, TIBF = Time initiation of breastfeeding, BF = Breastfeeding, EBF =Exclusive breastfeeding

Table 3. Mean and mean differences of baseline and post intervention KAP of mothers/caregivers about optimal IYCF in Gode and Adadle districts, 2015

| Variables       | Paired samples t test   |                         | Independent samples t test                 |
|-----------------|-------------------------|-------------------------|--|
|                 | Intervention            | Control                 | Mean difference of the difference (95% CI) |
|                 | Mean ± SD with (95% CI) | Mean ± SD with (95% CI) |  |
| Knowledge score |                         |                         |  |
| Pre-test        | 5.837 ± 1.445           | 7.508 ± 1.514           | 3.019 (2.724,                              |
| Post-test       | 9.429 ± 0.757***        | 8.080 ± 1.324***        | 3.314)***                                  |
| Attitude score  |                         |                         |  |
| Pre-test        | 18.359 ± 3.725          | 21.045 ± 2.618          | 4.784 (4.260,                              |
| Post-test       | 23.098 ± 1.579***       | 21.000 ± 2.631          | 5.308)***                                  |
| Practice score  |                         |                         |  |
| Pre-test        | 6.074 ± 0.660           | 6.498 ± 1.136           | 1.137 (0.945,                              |
| Post-test       | 7.330 ± 1.002***        | 6.617 ± 1.182*          | 1.328)***                                  |

\* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$

Finally, this intervention showed promising outcome, and could be further scaled up and adapted to other districts in the Zone or other areas in the Region. It can therefore, bring a dramatic change in improving maternal KAP on child feeding behaviours. These can be tackled by behaviour change communication (BCC), increasing the KAP of mothers/caregivers on the production and utilization of locally available, accessible and affordable nutritious items. We strongly suggest to strengthen and extend the community based nutrition education programme to the lower level and remote communities. Refresher training should be given to the health workers on NEI and optimal IYCF programmes. Furthermore, the relationship between the health professionals and community should be strengthen, especially religious leaders, they are highly influential and respected by the community. Mobilizing them has been very effective and fruitful. Other people that can also be used include; mothers (mother to mother, and one to five developmental arm network), women, and youth associations, teachers, school children etc.

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#### Competing Interest:

The authors declare that they have no competing interest

#### Authors Contribution:

RAG brought the inception of the study, designed the proposal, managed data collection, analysis and write up. NM, TB, WM and NA worked closely with RAG in the refinement of the proposal, field work, analysis, and write up. All authors read and approved the submission of this paper.

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