
ABSTRACT

Background and aim: In May 2012, the 65th World Health Assembly (WHA) endorsed a Comprehensive Implementation Plan on Maternal, Infant and Young Child Nutrition that included six global targets which were considered in the development of the 2030 development agenda and are referred to in target 2.2 of the Sustainable Development Goals, to “end all forms of malnutrition”. Recent figures indicate that India is still facing a major malnutrition crisis (Global Nutrition Report, 2018, UNICEF 2018, WHO 2018, NFHS 2015-16, RSOC 2013-14) and, to reach the SDGs, we need to work together with several stakeholders. The present study focused on improving the nutritional status of the children under five years of age attending ICDS in Surat city (Gujarat State, India) covered by the Surat Municipal Corporation (SMC) with the following specific objectives :-

1) To understand the situational analysis of anganwadi functionaries of ICDS in Surat city, 2) To map the prevalence of undernutrition among children under 5 years enrolled in ICDS in Surat city, 3) To strengthen the functioning and infrastructure of ICDS through public-private partnerships (PPP) and assess its impact on the nutritional status of children under five years enrolled in ICDS in Surat city.

Methods and Materials: Following necessary permission from the SMC, the study was planned in 3 phases across Surat city covering, its seven zones and five ghataks (Ethical clearance No. IECHR/2015/17). **Phase I:** Cross-sectional study, with blanket coverage of all ICDS workers of SMC ICDS; *anganwadi workers* (n = 931), *anganwadi helpers* (n = 662), and *link/ASHA workers* (n = 145). Data were elicited on the knowledge, attitude and practices (KAP) of the workers related to the objectives of ICDS, service delivery, operational challenges, and infrastructure issues at the *anganwadi centers* (AWC) using a semi-structured questionnaire. **Phase II:** Cross-sectional study which involved assessment of the nutritional status (SES, anthropometry including weight, height and MUAC) of children under 5 years (n = 968) enrolled in purposively selected AWC (n=20) representing various zones of the Surat city. **Phase III:** Community intervention trial wherein the 20 AWC were randomly divided into the experimental group (EG), n=10 and control group (CG), n=10, and all children under 5 years enrolled in the ICDS were covered for the study EG (n = 486) and CG (n = 482).

Ten local Rotary clubs of Surat were identified as partners for the “*Adopt and Anganwadi Scheme*” following which several activities such as additional supplementation, infrastructure strengthening with respect to basic amenities and need-based requirements per AWC, capacity building for anganwadi workers as well as mothers with regards to IYCN practices and service delivery and utilization respectively enrolled in the study, goodies distribution and celebration of various days to increase the participation of children beneficiaries enrolled in the study were conducted for a period of 18 months in the experimental group whereas the control group received the standard services. The impact was assessed in terms of KAP of AWWs and AWC infrastructure, KAP of mothers related to IYCN and Nutritional status of children under 5 years enrolled in selected AWCs under ICDS, Surat city.

Appropriate data analysis was done using WHO Anthro software, MS Excel and IBM SPSS version 20 package.

Results: *Phase I* highlighted the knowledge, attitude and perception of AWWs, the problems and operational challenges faced by them and the status of AWCs by the anganwadi workers under ICDS, Surat city who responded, major issues were NHE delivery, lack of regular home visits, acceptability of *balbhog*, insufficient coverage and community support and lack of proper infrastructure like availability of toilet, electricity, stove and drinking water supply.

The results showed poor (< 10%) coverage of topics like vaccination and referrals, timely GM practiced only by 39.8% AWWs, fewer (40%) conducting home visits for SAM children less than thrice a week, lack of time to deliver NHE complained by 39.6% AWWs and community support was unavailable to 27.5% AWWs and coverage issues raised by 34.5% workers. AWWs also raised issues regarding vaccination practice (16.1%), lack of infrastructure (18.3%) and failed delivery of non-formal education was raised by 26.9% AWWs.

Phase II results indicated the presence of poverty reflected by the below poverty line (BPL card) with less than Rs.3.20/day/person in all the households and only 20.4% of mothers were literate. Overall, among 970 mother-child pairs, 38.9% were stunted (HAZ<-2SD), 21.2% were wasted (WHZ<-2SD), and 39.1% were underweight (WAZ<-2SD).

Results of *Phase III* indicated that an integrated effect of interventions had a positive impact on KAP of the EG workers with regards to early BF practices ($p < 0.05$), GM practices ($p < 0.05$) in terms of scale attachment and plotting the growth chart whereas improved ($p < 0.001$) in terms of scale placement at eye level, calibration and using GM chart information to sensitize mothers, acceptance of *balbhog* improved by 30% in EG ($p < 0.05$), attendance during spot

feeding and using standardized cups increased by 80% and 100% respectively ($p < 0.001$), Correct record maintenance of home visits showed an improvement by 20% ($p < 0.05$) among EG. Post-intervention, the mean shift in accreditation score for AWCs among EG was 5.5 whereas that in CG was 0.44 and attendance of children beneficiaries enrolled increased by 11.7% in EG. An increase in initiating BF within 1 hour (7.5%), decrease in prelacteal feeding (9.1%), increase in colostrum feeding (7.9%) and continuation of BF above two years (30.6%) was observed. Complete immunization increased by 30% and morbidity reduced by 24.1% in EG.

The nutritional status of children among EG showed improvement by a reduction in moderate wasting by 7.7% and severe wasting by 1.9% in EG whereas there was an increase of 1.3% and 2.3% respectively seen among CG. Moderate stunting decreased by 7.1% and severe stunting by 4.9% among EG participants whereas, in CG, there was no change observed in moderate stunting while there was an increase observed in severe stunting by 0.3%. As far as underweight was concerned, moderate underweight (UW) decreased by 8.2% and severe UW decreased by 7.6% among EG compared to an increase of 3.6% moderate UW and a decrease of 0.9% severe UW among CG.

Conclusions: *Adopt an anganwadi* scheme by the local Rotary clubs brought in an increase in the nutritional status of the children attending the ICDS and this study can be treated as a pilot study to improve the infrastructure as well nutritional status of the vulnerable children attending the ICDS centers across the country. Such efforts of community participation and PPP engagements need to be promoted and extended as a part of corporate social responsibility.