ORIGINAL ARTICLE

EFFECTIVENESS OF dIMCI TRAINING IN DISTRICT ABBOTTABAD, KHYBER PAKHTUNKHWA: AN EXTERNAL PILOT STUDY

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Background: Five million deaths per year in under-five children are reported to be due to preventable and treatable causes. IMCI strategy targets these causes through improvement in the case management skills of health care workers. The objectives of this study were to identify eligible clusters and identify & rectify any process, resources, and management-related issues for the main trial. **Methods:** This study was conducted in two phases. Phase 1 was conducted for eligibility of Basic Health Units from which sample can be drawn for the main cluster randomized control trial. A single-page proforma was sent to all 54 BHUs of Abbottabad through registered mail service and replies received were analysed through SPSS-V25 and MS Excel-2016. Afterward a sample of 26 BHUs was drawn for the definitive trial. In phase 2, four BHUs were conveniently selected from the remaining sampling frame; one in the control arm while three in the intervention arm. From each BHU, a health care worker responsible for under-five consultations was trained; control arm in standard IMCI while intervention arm on distance learning IMCI. Ten observations in the form of cases managed were assessed at each BHU by a gold standard IMCI master trainer after a specific period. Descriptive summary measures and 95% CI were calculated using SPSS-V25. **Results:** Out of 54 BHUs, 3 were nonrespondents while 36 were identified as an eligible sampling frame. The mean index of integrated assessment was found to be 0.90 and 0.89 for the control and intervention arm respectively. Discrepancies in filled forms were noted as 60% in control while 63.3% in intervention arm. **Conclusion:** Modifications in the plan for the main trial based on the findings of pilot study can ensure credibility and rigor in the definitive trial.

Keywords: Pilot; Feasibility; Eligibility; IMCI; dIMCI

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INTRODUCTION

According to World Health Organization, about 5 million deaths were recorded for under-five children in the world in 2019.[1] These deaths were predominantly due to treatable and preventable causes including pneumonia, diarrhoea, malaria, malnutrition and measles.[2–4] In the majority of cases, children are not properly managed where simple interventions could have saved their lives.

Keeping the above facts in view, WHO, UNICEF devised the strategy of Integrated Management of Childhood Illness (IMCI) in the year 1995[5,6], which was renamed by some countries through introducing the component of neonatal health in 2003[7]. Thus it became Integrated Management of Childhood and Neonatal Illness (IMNCI) in those countries, including Pakistan.[8] IMCI strategy aims at improvement in the case management skills of health care workers, improvement in the community and household practices and strengthening of health care system for the improvement of child health and survival.[9–11] Improvement in the case management skills of health care workers is accomplished through an eleven days extensive training schedule including both classroom and hospital-based clinical work.

Case management skills of health care workers are the direct outcome of IMCI training in the form of assessment, classification, treatment, counselling of caretakers and follow-up while dealing with under-five children.[12] Whole algorithm of IMCI is based on these five sequential steps. Studies have shown that IMCI reduces child mortality[7,13] but unfortunately, IMCI coverage is low due to financial constraints and the length of time[14]. It was in 2014 when WHO and other technical partners introduced the idea of distance learning IMCI to improve coverage of IMCI.[14] This training is spread over three months and has only three face-to-face sessions. All protocols are of the standard IMCI except for the course duration and frequency of contact sessions. Modules' contents are the same but are re-arranged into different self-study booklets and a log book having exercises is an extra addition. There is a sufficient gap between two contact sessions that enables health care workers to study and practice self-study modules at their pace in their respective health facilities. All facilitators are required to be

available to the trainees through appropriate services (Cell phone, WhatsApp etc) for their guidance during self-study periods.

In Pakistan, IMCI is in place since the year 2000[15], and almost all the districts of the country have adopted the strategy by the year 2012. Abbottabad and Multan were selected for the pilot study before full fledge implementation of this strategy.[8] Despite the implementation of the IMCI strategy, Pakistan is third among the top ten countries having high under-five mortality.[1] Despite continuous decline in child mortality[16,17], more efforts are needed to achieve the target of Sustainable Development Goal 3 by the year 2030 that is reducing under-five mortality to 25/1000 live births.[18] World Health Organization has pointed out some advantages of dIMCI over the standard IMCI training methodology, including being inexpensive, effective, flexible and feasible.[14] Limited published literature is available globally on dIMCI[19] and almost none in Pakistan. Globally published literature is based on data prior to official launching of dIMCI in 2014 and there is no published study that compares both training methodologies applied concurrently.

In an attempt to generate evidence-based information about dIMCI, a clustered randomized control trial was planned to evaluate the effectiveness of dIMCI in comparison with standard IMCI. This trial was registered in WHO recommended trial registry under ID ChiCTR 1900027201, prior to the commencement of current study. The definitive trial has two independent components and that is why, it is not labelled as mixed-method approach. First component is based on the objective to evaluate the effectiveness of distance IMCI training regarding improvement in case management skills of health care providers compared with the standard IMCI training. The second component is based on the objective to explore perceptions of health care providers after receiving distance and standard IMCI trainings. This pilot study was done in two phases; first phase was to identify eligible clusters while second phase was for the feasibility of the definitive trial. The objective of the second phase was to identify and rectify any process, resources and management related issues for the main trial.

MATERIAL AND METHODS

Same methodology as that of the definitive trial was adopted for this pilot study, except for the sample size and duration. In Phase one, which was a preliminary assessment for eligibility of Basic Health Units (BHU), all the BHUs of District Abbottabad were included. Any health facility for which permission was not granted by either the District Health Officer or by the respective Incharge Medical Officer, was considered excluded. Health facilities not willing to provide preliminary data despite repeated requests were also excluded. Health facilities without a health care worker or with a trained health care worker (who received IMCI training within the previous three years either as primary training or refresher) were also excluded. A single-page proforma including variables like number, designation, IMCI training and under-five consultation status of health care workers, availability of IMCI resources, estimated under-five catchment population and number of under-five consultation per working day, was sent to every BHU through registered Pakistan Post Mail Services in the mid of July 2019. Addresses were obtained from the office of the district health officer. Instructions for filling proforma were printed on its back along with a WhatsApp number for guidance and communication. A pre-paid postage self-addressed envelope was also sent with the *pro forma* for sending back filled proforma in it. Phase one data collection completed on 22nd October 2019. After completion of Phase one, data was analysed for identification of eligible BHUs. Out of those eligible BHUs, 26 were selected for definitive trial based on the sample size calculator of Aberdeen university for cluster randomized trials.[20] These 26 health facilities were selected through stratified random sampling from two Tehsils; Abbottabad and Havelian in the ratio of the total numbers of BHUs, i.e., 35:19 and were randomly allocated to one of the two groups, i.e., control and intervention.

Out of the remaining eligible BHUs in the sampling frame,4 clusters were conveniently selected for Phase two which was feasibility study. Out of those 4, three were trained on dIMCI while one was trained on standard IMCI. In each of those BHUs a single health care worker responsible for under five consultation was trained. The control arm was trained from October 25, 2019 till November 4, 2019, i.e., for eleven consecutive days on standard IMCI while intervention arm was trained on dIMCI on Oct 25, 2019 & Nov 3, 2019 & Nov 21, 2019 for three interrupted days. On December 7, 2019, assessment for evaluation was performed by four teams using the same tools as those decided for the definitive trial. Each team included a helper for guiding care takers, a paramedic for registration of cases, an IMCI trained observer for observing consultation of under-five children, a paramedic for conducting exit interview with care taker and an IMCI master trainer for the gold standard re-examination of the under-five child.

Individual's level data analysis was immediately performed and results were made available before commencement of the definitive trial. SPSS version 25 and MS Excel 2016 were used for analysing data and 95% confidence intervals were used along with other descriptive summary measures.

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and training materials was sought through emails. Approval of the Institutional Review Board of the Health Services Academy Islamabad was granted on June 24, 2019 under F.No.01-07/2014/PhD. Permission of Director General Health Services, Khyber Pakhtunkhwa and District Health Officer Abbottabad were obtained under letters no:11041/DGHS dated July 2, 2019 & 14929-30/Estab/D/Circ. dated July 10, 2019 respectively.

RESULTS

Out of total BHUs, 51 responded timely while three BHUs did not respond. Out of respondent BHUs, 36 were found eligible according to the set criteria. Figure-1displays data as reported by the respective incharge of BHUs.

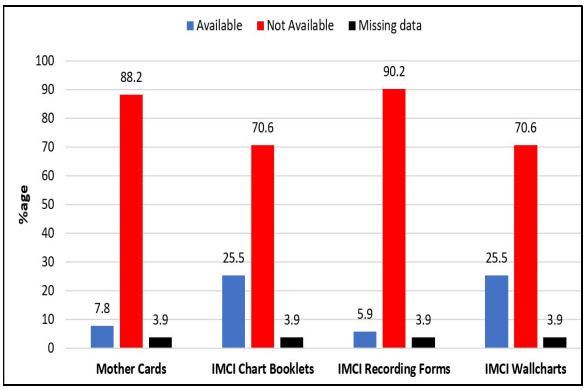

Figure-1: Status of IMCI resources at BHUS (k=51)

Table-1: Description of all basic health units of district Abbottabad

Variables	Abbottabad	Havelian	Total
All BHUs	35	19	54
Did not Respond	1	2	3
Responded	**33**	**18**	**51**
No HCW	1	0	1
Having trained HCW (at least 3 years back)	0	0	0
Having less than 4 under five OPD/day	8	6	14
Eligible BHUs	**24**	**12**	**36**
Refused participation officially	0	0	0
Sampling frame	**24**	**12**	**36**
Sampled BHUs	**17**	**9**	**26**
Remaining in the frame	**7**	**3**	10
Selected for Pilot study	**3**	**1**	**4**

Table-2: Results of the feasibility study

Attributes	**Control (IMCI trained)** (k*=1, m*=10, n*=10)	**Intervention (dIMCI)** (k=3, m=10, n=30)	**Total** (k=4, n=40)
Duration of training	Oct 25, 2019 till Nov 4, 2019	Oct 25, 2019 & Nov 3, 2019 & Nov 21, 2019	Oct 25 till Nov 21, 2019
Assessment for evaluation	Dec 7, 2019	Dec 7, 2019	--
Knowledge & Skills acquired were applied for:	33 days	16 days	--
Mismatched or misplaced assessment forms n (%)	6 (60)	19 (63.3)	25 (62.5)
95% CI of the proportion	-	-	(47.5, 77.5)
Time (in minutes) consumed during assessment of cases for evaluation Mean	44.7	43.9	44.1
STDEV	5.2	4.4	4.5
Coefficient of variation	11.6	10.0	10.2
95% CI of the mean	-	-	42.7,45.5
Median	45	43	43
Mode	45	42	42
Range	57-39	57-42	57-35
****IMCI Index of Integrated Assessment** (0-1)			
Mean	0.90	0.89	0.89
STDEV	0.12	0.12	0.12
Coefficient of variation	12.8	13.3	13.0
95% CI of the mean	-	-	0.85, 0.93
Median	0.95	0.90	0.90
Mode	1	1	1
Range	1-0.7	1-0.6	1-0.6
Patients with THREE main Symptoms (cough, diarrhoea, fever)	4 (40%)	13 (43.3%)	17 (42.5%)

*"k" represents the number of clusters, "m" represents cluster size, and "n" represents number of cases
**It is the average of ten assessment tasks for each case.

DISCUSSION

Sampled clusters used for this study were not used for definitive trial and that is why this pilot study is termed as external pilot study.[21] However results of this study were used to introduce minor modifications in the main study. It is not uncommon in pilot studies to emphasize the statistical significance and ignore feasibility, which should be the prime focus of a pilot study.[22] Selection of sample from the same sampling frame as that of the main trial provides this study a representativeness of the main trial.

Phase one of this study was an attempt to assess the inclusion and exclusion criteria set for the main trial. Table-1 shows utilization of the final sampling frame based on eligibility criteria and no changes were made to this criteria for definitive trial. However, measures in Figure-1 were found to be a bit dubious. As no IMCI training was conducted in the previous three years for all health care workers in the respondent BHUs, even then some BHUs reported availability of IMCI resources like recording forms and chart booklets. A possible reason might be a misinterpretation of these terms. However, all relevant IMCI resources were provided to the sampled BHUs irrespective of their reported availability.

Findings of phase two are displayed in table-2. Index of Integrated Assessment is the average of ten assessment tasks performed for each child and is regarded as the primary indicator of the quality of care {WHO, 2003 #168. These ten tasks are checking for THREE general danger signs (ability to drink or breastfeed, vomits everything and convulsions), three main symptoms (cough & fast/difficult breathing, diarrhoea and fever), palmar pallor, vaccination status, weighing and last one whether weight checked against a growth chart. Each of these tasks was given one point and total score for each child was divided by 10 to get an average called Index of Integrated Assessment. Comparing the mean values of this index for both groups, there seems to be very negligible difference between the two. A possible reason could have been the previous knowledge of the IMCI trained team member observing and recording consultation of trained health care workers. Therefore, an IMCI untrained paramedic was suggested for end-line observation of consultation of main trial.

Enrolment card, observation checklist, exit interview form and re-examination form were separately available at four stations. More than half of these filled assessment forms were misplaced during assessment (Table-2). It led to discard that data and observe new cases. Keeping in view wastage of resources, it was suggested that all forms should be in the form of a booklet and handed over to the caretaker after registration.

Mean time for the whole process of assessment was more than forty minutes per case (Table-2). To reduce this time, it was recommended that both exit interviews and re-examination should be conducted by the gold standard IMCI master trainer.

Standard IMCI is an eleven days training that completes earlier than the prolonged three months dIMCI. Starting both trainings at the same time and evaluating at the same time as well provided more time to practice for standard IMCI (Table-2). It was suggested for the main trial that dIMCI should start first and when eleven days are left to its completion, then standard IMCI should start. This will ensure the same time to practice for both groups.

In the protocol for main trial, only cases with three main symptoms were supposed to be assessed. These main symptoms were found in less than half of the observations and important IMCI conditions like measles, malnutrition and ear problems were missed. Cases with conditions other than IMCI conditions could also be assessed, classified and counselled according to IMCI protocol. That is why symptoms other than cough, diarrhoea and fever were also suggested to be included for evaluation of the main trial.

During non-participatory observation of health care workers' and care takers' responses to the performance of health care workers, it was suggested that an extra word covering these responses should be added to the second objective that could cover all these findings during observation.

CONCLUSION

Study for eligibility and feasibility is an important prerequisite of cluster randomized control trial that enables the researcher to conduct the trial as per the original plan without modifications or with major or minor modifications. Hence efficient use of resources, streamlining the process and filling management gaps could be addressed timely to ensure credibility and rigor in research.

AUTHORS' CONTRIBUTION

SA, AH, MNK: Conception and design of the work; data acquisition, data analysis, interpretation of data, writing the manuscript

MZH, AK: Conception and design of the work; data acquisition, data analysis, interpretation of data, revising and writing the manuscript

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