

Use of a pneumonia management tool to manage children with pneumonia at the first level health care facilities

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Abstract

Objective: To describe the application and evaluation of Pneumonia Management Tool (PMT) to manage children with non-severe pneumonia (NSP) at the first level health care (FLHC) facilities according to the standard case management (SCM) guidelines for acute respiratory infections (ARI).

Method: The ARI SCM guidelines were simplified to a PMT and used by health workers at 14 FLHC facilities to assess, manage and monitor children with NSP and to educate caretakers on home care and follow-up visits. The district supervisors provided on the job support to various cadres of health workers of both public and private facilities.

Results: Of 949 children with NSP, 940 (99%) were successfully treated at FLHC facilities. Caretakers found PMT useful and of 1888 follow-up visits: 1872 (99.2%) brought PMT copy; 1627 (86.2%) brought their children to the facility; 1799 (95.3%) were on time and; 1857 (98.4%) had maintained antibiotic compliance. Using PMT, health workers adherence to SCM guidelines improved from 14% at baseline to 29% after training and 65% with on the job support. The practices remained similar among various cadres of health workers.

Conclusions: Health workers used PMT in managing children with NSP, counselling caretakers on home care, follow-up visits and monitoring the treatment outcome. District level supervision helped to maintain a uniform skill enhancement.

Keywords: Pneumonia Management Tool, Non-severe pneumonia, First level healthcare, Acute respiratory infections (JPMA 61:481; 2011).

Introduction

Acute respiratory infections (ARI), particularly pneumonia, are responsible for more than 2 million deaths annually.¹ The World Health Organisation (WHO) developed ARI standard case management (SCM) guidelines to manage children with pneumonia,² which when used appropriately have demonstrated substantial decrease in pneumonia-specific and overall childhood mortality.³ In Pakistan, pneumonia is a leading cause of childhood death and the use of ARI SCM at the tertiary care hospital⁴ and at community level⁵ contributed to rational antimicrobial use, improved treatment success rates and lowered the ARI case fatality, however, due to lack of application of ARI SCM guidelines through the district health care system has hampered its implementation and coverage.⁶

In Pakistan, the health care workers at the first level health care (FLHC) facilities are the initial point of contact for children with cough and cold, but due to limited knowledge of ARI SCM guidelines results in misdiagnosis and irrational prescription practices,⁷ which has been observed with both public and private practitioners.⁸ The caretakers are usually unable to identify the early signs of pneumonia and change health care providers and medications by the second day if no improvement is observed.⁹ and fail to

return for the follow-up visits.¹⁰ Hence the health workers ability in counseling and actively involving the caretakers for home care is important.¹¹ According to the evaluation of the ARI programmes at the FLHC facilities, as compared to simply providing a one time training,¹² on the job supervision improves health worker adherence to SCM guidelines.¹³

This study looked into the process of applications of ARI SCM guidelines at the FLHC facilities by using a simplified Pneumonia Management Tool (PMT). The primary objective was to describe the application of the Pneumonia Management Tool (PMT) to manage children with non-severe pneumonia according to the standard case management (SCM) guidelines for acute respiratory failure (ARF) at first level health care (FLHC) facilities (NSP). The secondary objective was to assess health workers and caretakers feedback of using Tool PMT and maintaining compliance with SCM guidelines.

Patients and Methods

This study was conducted from October 2000 to April 2001 in Chitral, a remote district in Northern Pakistan. Fourteen health facilities, seven from each sub district were selected keeping in view geographical distribution and distance for facilitating weekly follow-up visits by

supervisors. Public health facilities included 3 basic health units (BHUs), 2 rural health centres (RHC) and 2 dispensaries. Private facilities managed by the Aga Khan Health Services, Pakistan (AKHSP) included 7 maternal and child care centres. Standardized supplies at each facility included stethoscopes, thermometers, tongue depressors, timers to count respiratory rate, weighing and height measuring scales and oral syrup form of cotrimoxazole, amoxicillin, paracetamol and salbutamol. Various cadres of health workers included: doctors, community health nurses (CHN), medical technicians (MT) and lady health visitors (LHV). Health workers of public facilities were all male including 5 doctors, 2 MTs and one supervisor. AKHSP staff included 6 females (5 LHVs and 1 CHN) and 2 males (1 doctor and 1 supervisor).

This was a descriptive study to describe the applications of a simplified PMT to manage children with NSP according to the ARI SCM guidelines at the FLHC facilities. The study proposal was approved by the strategic committee of AKHSP, the District Health Department, Chitral, and the WHO ethical review committee, Geneva. The WHO ARI SCM guidelines were simplified and adopted to create a PMT to record demographic information, history, clinical findings, diagnosis, management, follow-up assessment and treatment outcome. Health workers received one week training in ARI SCM guideline and the use of the PMT with exercises, video clips and patient examination. In liaison with the District Health Officer, two trained supervisors were assigned and stationed at the sub-district level to ensure regular contacts with health workers and provide technical and logistic support. Two hospitals with trained paediatricians, one at each sub-district, provided referral level support.

While enrolling children, health workers explained the purpose of the study to caretakers in the local language and obtained witnessed verbal informed consent. Children 2-59 months presenting to health facilities with cough, difficult or fast breathing were assessed and those with NSP were treated and followed up. Details of clinical management have been published elsewhere.¹⁴

At each visit, a copy of the PMT completed by health workers was given to caretakers with instructions on home care written on the back side. Health workers properly explained and ensured that caretakers correctly understood home care instructions and a translation in the local Urdu language was also provided. Caretakers were encouraged to bring the PMT at follow-up visits. Children were considered lost to follow-up if contact could not be made by day 4 for the first follow-up, day 7 for the second follow-up and day 10 for the third follow-up.

During the study period, district supervisors maintained weekly contact with health workers to provide on the job support, reviewed the completeness of data and ensured the uniformity and consistency of standard practices. Monthly meetings were held at the district level with health workers, supervisors and paediatricians to interact and share learning, experiences and qualitative information which was recorded by using PMT in the treatment process. Feedback about PMT merits were obtained through a structured questionnaire from health workers at the monthly meetings and from the caretakers at exit interviews when treatment was completed in the children enrolled. Responses were recorded on a 1-4 scale and were graded as 1 = 'not at all'; 2 = 'not very much', 3 = 'yes, somewhat', and 4 = 'yes, very much'.

For the sampling first, 14 FLHC facilities were selected with a defined criteria to have a representative sample of administrative, geographical, public and private facilities. Second, sample size was calculated to enrol 460 children using a single proportion formula assuming cotrimoxazole treatment failure rate of 20%, a power of 80%, confidence level of 95% and a likely loss to follow-up rate of 20%.¹⁴

To assess improvements of health workers knowledge and practices of ARI SCM guidelines a three level data was obtained by the supervisors. First, prior to training health workers, a pre-intervention data was obtained from health workers in managing 28 children with ARI. Second, after training health workers on the use of PMT, a one month pilot study was conducted, allowing health workers to use the PMT at their respective health facilities to manage 95 children with ARI. Third during the study period while providing continued on the job support, to assess whether ARI SCM guidelines were followed properly, supervisors randomly selected and re-examined at least 97 (10%) children already examined by health workers.

Data were recorded on triplicate auto-copy forms. At the completion of treatment of each child, the supervisor had to collect the form, check for accuracy and consistency of information and submit to the study coordination office. Data were entered and validated using EPI INFO. For analysis, simple proportions were calculated to show distribution of patients registered, use of the PMT at follow-up visits and adherence to SCM guidelines.

Results

The various cadres of health workers at 14 health facilities attended 9247 children, of which 3796 (41%) had ARI. Of 3796 children with ARI, 949 (25%) had NSP, 228 (6%) had severe pneumonia, 2619 (69%) had cough and cold and 2202 (58%) were female. Excluding 5 lost to follow-up, 944 patients were seen by various health workers. Doctors attended 214 (22.7%), LHVs 428 (45.3%), CHN 197 (20.9%)

Table-1: Non-Severe pneumonia patients attended by health personnel, follow-up visits and treatment outcome.

Patients attended by the health personnel (n=944)	Number (%)
Lady health visitor	428 (45.3 %)
Medical technician	105 (11.1%)
Community health nurse	197 (20.9%)
Doctors	214 (22.7%)
A. Follow-up visits (n=1888)	
Follow-up at Health facility	1627 (86.2)
Follow-up on schedule	1799 (95.3)
Caretaker produced PMT at follow-up visit	1872 (99.2)
Caretaker maintained antibiotic compliance.	1857 (98.4)
B. Treatment outcome	
Resolved on cotrimoxazole	839 (88.9%)
Failed on cotrimoxazole and resolved on amoxicillin	90 (9.5%)
Failed on cotrimoxazole and resolved on parenteral ampicillin	15(1.6%)

Table-2: Supervisor assessment of health workers adherence to ARI SCM guidelines and improvements observed with training, supervision and use of PMT.

Supervisor assessment of health workers adherence to ARI SCM guidelines.	Baseline assessment without PMT N=28	Post-training assessment using PMT N=95	Assessment with use of PMT and on the job support N=97
A. Clinical management at the FLHC facility.			
1. appropriate and according to the SCM guidelines	4 (14.3%)	28 (29%)	63 (65%)
2. minor mistakes not influencing treatment outcome.	17 (61%)	52 (55%)	32 (33%)
3. major mistakes influencing treatment outcome.	7 (25%)	15 (16%)	2 (2%)
B. Involvement and counselling of caretakers			
1. written instructions on home care provided	2 (7.2%)	54 (57%)	91 (94%)
2. properly explained the instructions.	1 (4%)	32 (34%)	87 (90%)
3. maintained compliance with follow-up visits.	3 (11%)	38 (40%)	94 (91%)

and MTs 105 (11.1%), of the children enrolled.

Of 1888 first and second follow-up visits, 1627 (86.2%) caretakers brought their children to the facility, 1799 (95.3%) were on time, 1872 (99.2%) brought their copy of the PMT and 1857 (98.4%) had maintained antibiotic compliance (Table-1). For the follow-up at the facility, a relatively higher proportion of children 996/1066 (93.4%) were brought to the paramedics as compared with 631/822 (76.8%) to the doctors; a higher proportion of 853/944 (90.4%) were brought at the first follow-up as compared to 774/944 (82.0%) at the second follow-up. The follow-up rate was similar at public 1025/1250 (82%) and private 591/638 (81.3%) health facilities.

Of 949 enrolled children, 839/944 (88.9%) resolved clinically on co-trimoxazole, 824 (87.3%) resolved by day 5 and 15 (1.6%) who were non-compliant resolved by day 7. Of 110/944 (11.6 %) children who failed therapy, 5 were lost to follow-up, 90 resolved on oral amoxicillin and 15 who became worse were successfully treated on parenteral ampicillin. The treatment success rate had minor difference among children treated by paramedics 485/533 (91.0%) as compared to doctors 354/411 (86.1%) but it was consistent with private facilities 558/625 (89.3%) and public facilities

281/319 (88.1%). Further details on clinical results are published elsewhere.¹⁴

According to supervisor assessment of health workers using the PMT, their adherence to ARI SCM guidelines improved to 65%, as compared to the pre-intervention situation of only 4% and post training situation of 29% (Table-2). Similarly the mistakes causing a mismatch between the diagnosis and management reduced from 25% at pre-intervention to 2% during study period. The involvement and counselling of caretakers for home care and follow-up visits improved from less than 10% in pre-intervention period to nearly 90% during the study period. These improvements were related to the staff training and on the job support ensuring appropriately using the PMT and maintaining uniformity of practices among various cadres of health workers.

Table-3: Feedback of health workers and caretakers about the monitoring tool.

Questions asked: Coding for 1-4 scale: 1) Not at all, 2) Not very much, 3) Yes somewhat, 4)Yes, very much so	Response (mean score)
A: Health worker feedback (n=14)	
1. Was the time spent to fill a tool for each child manageable?	3.0
2. Were the contents of the tool clearly understandable?	3.5
3. Was the tool a useful guideline for pneumonia management?	3.6
4. Did the tool help to ensure follow-up on time?	3.5
5. Did the tool help to re-assess the child and need to change the antibiotic?	3.7
6. Did the tool help to monitor drug compliance?	3.7
7. Did the tool help in assessing treatment outcome?	3.6
8. Did the tool help in timely referral?	3.8
Average score	3.6
B: Caretaker s feedback (n=944)	
1. Were the instructions by the health workers easily understandable?	3.8
2. Did the tool help to maintain drug dose, frequency and duration of treatment?	3.8
3. Did the tool help you to know how to manage the child at home?	3.8
4. Did the tool help you keep follow-up dates?	3.8
5. Did the tool help reduce waiting time at the clinic?	3.7
6. Did the tool help you communicate with the health worker on follow-up visits?	3.8
7. Did the tool help you to communicate with doctor at the referral facility?	3.6
Average score	3.8

During the study period, while using the PMT at enrolment and during follow-up visits health workers and caretakers provided feedback about the feasibility and comfort level of using the PMT (Table-3). According to the response gathered on 1-5 scale the average response for health workers was 3.6 and for caretakers it was 3.8, which means the PMT was helpful in maintaining compliance with the treatment guidelines.

Discussion

This study provides a district model of applications of the ARI SCM guidelines at the first level health care (FLHC) facilities. We simplified and adapted the ARI SCM guidelines as a Pneumonia Management Tool (PMT) by taking into consideration the local context and the level of education of the health workers. The health workers, in the early stage of the study reported some difficulty in using PMT and recording history, child weight, height, pulse, respiratory rate, temperature, any danger signs and the management plan. On the job support and feedback of supervisors gradually helped in translating the knowledge into practice and spending adequate time for child examination and improving adherence to the SCM guidelines, which is consistent with earlier reports of improvements with emphasis on the process of health care delivery and supervision.¹⁵ With the district level support system we promoted a public private partnership approach and maintained a consistent standard of practices improving services at FLHC facilities¹⁶ and their utilization.¹⁷

Supervisors used PMT to provide on the job support and to monitor the treatment outcome of children enrolled with ARI at each health facility and collectively at the district level. Supervisors during visits to the FLHC facility used PMT assessing health workers adherence to SCM guidelines, providing immediate feedback and organizing formal training sessions to address the weaknesses. The data compiled at the district level helped supervisors to monitor the treatment success rate, referrals to the next level facility and to plan the procurements and availability of essential drugs at the FLHC facility.¹⁸ The process of collecting forms, data entry and analysis required some additional resources, but use of this information for planning and feedback mechanism positively influenced the district support system.

The health workers effectively used PMT to communicate with caretaker on home care including feeding, fluids and when to return for the follow-up visits.¹⁹ Due to timely follow-up health workers were able to identify children who didn't improve and had not consumed adequate antibiotic dose and children who required justified change of antibiotic. Our data showed that children registered with paramedics as compared to those registered with physicians were more likely to return for follow-up at the facility and on

the scheduled date. This could be due to comfort level of caretakers with the paramedics, who were mostly females and had better counseling skills to involve and motivate caretakers who were primarily mothers.²⁰ As reported in other studies, the compliance to follow-up increased due to a better attention at first visit and the period for first follow-up was not longer than 2 days²¹ and counseling caretakers with simple and limited key messages.²² Our study approach relates to the WHO-defined Integrated Management of Childhood Illness (IMCI) guidelines that emphasize on improvement in household and community practices by empowering caretakers about child health, nutrition and development.

According to our data most of the children were treated at FLHC facilities and only fewer of them required injectable form of antibiotic and were referred to the next level facility. The availability of simple guidelines at FLHC facilities has helped in addressing the delayed care seeking, difficult access and inadequate disease treatment and reducing the unjustified referrals,²³ reducing complications and mortality²⁴ and protecting the remotely placed poor against major expenditure on child illness.²⁵

This study had several limitations. First, lack of study design to collect data to compare the pre study situation with the improvements during the study period. We have compared the study improvements with the information collected by supervisors at their convenience in the beginning and during the study period and without the statistical validations of the results. Second, the ARI SCM guidelines in Pakistan were used as training modules to treat four categories of ARI. The use of PMT tool is the first effort to facilitate and monitor the application of ARI guidelines at the FLHC facilities. Therefore, the results of this study should be considered a baseline information. Further studies, would be useful to assess and differentiate improvement in health worker adherence to treatment guideline due to each intervention related to training, supervision, and use of a PMT. Third, the feedback on the use of the PMT was obtained from caretaker by health workers and supervisors recorded the feedback from health workers, which might have resulted in a bias. Fourth, the study inclusion criteria were limited to a distance within 5 km around health facility to ensure easy follow-up at health facilities, otherwise drop out rate might have increased. Fifth, we couldn't collect data explaining the reasons for the caretakers who failed to return for follow-up and health workers had to visit them at home. Last, due to fewer referrals the feedback received by the paediatrician at the referral facility was not adequate to assess the feasibility of PMT.

Conclusion

Health workers used PMT for the management of

children with NSP and involvement of caretakers for follow-up and home care. The district level support facilitated a participatory approach involving both public and private FLHC facilities and uniform skill enhancement among workers of various cadres. Further studies may be useful to assess feasibility of this approach for implementation of other treatment guidelines to address common childhood illnesses.

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Conflict of Interest:

Dr Shamim Ahmed Qazi is the employee of the Department of Child and Adolescent Health and Development, World Health Organization, Geneva.

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