A SURVEY OF KNOWLEDGE IN THE CASE MANAGEMENT OF ACUTE RESPIRATORY INFECTIONS (ARI) IN CHILDREN UNDER THE AGE OF 5 YEARS, AMONGST DOCTORS AND CLINICAL NURSE PRACTITIONERS (CNPS) IN THE KHAYELITSHA DISTRICT OF WESTERN CAPE PROVINCE.

BY

DAVID OPEDUN

SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIRMENTS FOR THE DEGREE OF MASTER OF PHILOSOPHY IN MATERNAL AND CHILD HEALTH - MPHIL (MCH)

UNIVERSITY OF CAPE TOWN

1996 / 1997

SUBMITTED BY

DAVID OPEDUN

STUDENT REGISTRATION No: OPDDAV001-MPHIL (MCH)

UNIVERSITY OF CAPE TOWN

1996/1997

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1.0 DECLARATION

I, ---------- Signed by candidate ---------- hereby declare that the work on which this dissertation is based is my original work (except where acknowledgements indicate otherwise) and that neither the whole work nor any part of it has been, is being, or is to be submitted for another degree in this or any other university.

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2.0 ACKNOWLEDGEMENTS

The following people and organisations are gratefully acknwowledged for their contributions and respective roles during the various stages of the project which led to this dissertation.

1. Prof. Marian Jacobs, Prof. Greg Hussey, Dr. Michael Hendricks, Dr. Heather Zar, and Mrs Denise Brown of Child Health Unit – University of Cape Town.

2. My supervisor, Dr George Swingler of the Red Cross Childrens' Hospital, for his encouragement, support and belief in the project that led to this dissertation.

3. The entire research and facilitating teams for the MPhil (MCH) course – 1996/1997.

4. The managements of:
   (i) The Community Health Services Organisation (CHSO)
   (ii) The Cape Metropolitan Council (CMC) clinics and
   (iii) The School Health Service, for permission to conduct the study.

5. The 34 Doctors and 34 Clinical Nurse Practitioners in Khayelitsha district who participated in the study.

6. My family for being so supportive.

7. The Library Staff, Medical Library, University of Cape Town for all the assistance that was rendered.

David Opedun

1996/1997 MPhil (MCH).

3.0 DEDICATION

This dissertation is dedicated to all the children, parents, families and health care providers who stand to benefit through the awareness and subsequent impact that this work will create on the management of acute respiratory infections in children.

4.0 ABSTRACT

OBJECTIVE

To assess the knowledge of Doctors and Clinical Nurse Practitioners (CNPs) with regard to the case management of AR1 in children under the age of 5 years in the Khayelitsha District of Western Cape Province.

METHODS

The study was a descriptive survey of all the doctors and CNPs in Khayelitsha district. A questionnaire with closed and open-ended questions was self-administered. The international WHO case management guidelines were used as the gold standard except where the Paediatric Handbook was used as the reference with respect to questions on tuberculosis, bronchiolitis and croup. A comparative analysis was carried out on the knowledge scores of the doctors in the public sector, the private General Practitioners (GPs) and the CNPs. Correlation between years of experience and scores were measured. A further comparison was performed between doctors with and those without a post-graduate qualification in Paediatrics. The association of the use of WHO/ARI/90.5 manual and the Red books (University of Cape Town Paediatric handbooks) with the knowledge scores was also evaluated.

RESULTS

34 Doctors and 34 CNPs participated in the study. All the questionnaires administered were returned – 100% response rate. The median percentage scores of the doctors and the CNPs were 68.5% and 63.0% respectively, $p = 0.007$. Twenty six percent of CNPs scored less than 50%. The median scores of the doctors with and of those without a post-graduate qualification in Paediatrics were 78.5% and 67.0% respectively, $p = 0.005$. The median scores of the doctors in the public sector and the private GPs were 71.0% and 65.0% respectively, $p = 0.03$. The median scores of participants who had seen and made use of the WHO/ARI/90.5 manual and of those who had not were 68.5% and 66.5% respectively, $p = 0.13$. The median scores of participants who had seen and made use of the University of Cape Town Paediatric handbooks and of those who had not were 67.0% and 64.0%, respectively, $p = 0.37$. The rank correlation co-efficients of doctors' and CNPs' scores with years of experience were 0.26 ($p = 0.13$) and -0.01 ($p = 0.94$) respectively.

CONCLUSIONS AND RECOMMENDATIONS

(i) There was a wide range in knowledge scores, with approximately one quater of CNPs scoring less than 50%. Training in management of ARI is therefore necessary.

(ii) The poor correlation between years of experience and knowledge indicates that experience is not by itself associated with improvement in knowledge, and supports the need for a service - oriented training programme.

(iii) The impact of the recommended training programmes should be evaluated using this study as a baseline for comparison.

(iv) There is a need for similar Knowledge, Attitude and Practice (KAP) studies on ARI in other areas to inform local trainers and to enable prioritisation of training.

5.0 TITLE

A survey of knowledge in the case management of Acute Respiratory Infections (ARI) in children under the age of 5 years, amongst health service providers in the Khayelitsha district of Western Cape Province.

6.0 INTRODUCTION

Acute respiratory infections are one of the principal causes of illness and death in children in developing countries. The development and implementation of control programmes through introduction of improved systems of standard case management is an essential component of the primary health care approach.[1]

Mortality attributable to acute respiratory infections in children is unacceptably high. The initiation of ARI control programmes is justified by the recognition of the importance of bacteria in the causation of severe acute lower respiratory infections in developing countries and the established effectiveness of antimicrobial and supportive treatment in averting death. This should be spearheaded by ARI service-oriented activities, delivered through primary health care and backed up by well-coordinated health systems research.[2]

6.1 THE MAGNITUDE OF THE ARI PROBLEM GLOBALLY

Acute respiratory infections account for four of the estimated fifteen million deaths that occur each year in children under the age of 5 years in developing countries world wide. Two thirds of these deaths are in infants .[3]

Results from twelve studies conducted in developing countries to investigate the aetiology of pneumonia in children who had not received previous antibiotic treatment indicated a bacterial cause in 453 (56%) of the 808 children examined. Bacteria were found in at least 50% of the children in all the studies. These studies also demonstrated that Streptococcus pneumoniae and Haemophilus influenzae were the most frequently isolated bacteria, being identified in 70-80% of the cases. Even in developed countries, 5-15% of radiologically diagnosed pneumonia is likely to be caused by bacteria.[3]

Risk factors that increase the incidence and severity of lower respiratory infections in developing countries include; large family size, lateness in the birth order, crowding, low birth weight, malnutrition, vitamin A deficiency, lack of breastfeeding, pollution and young age.[4] Lack of immunisation, specifically measles immunisation and HIV infection are other risk factors that are associated with a high incidence and severity of ARI.[5,6]

6.2 THE MAGNITUDE OF THE ARI PROBLEM IN SOUTH AFRICA

Acute respiratory infections are a leading cause of death among children in South Africa.[7] Most of these deaths are due to pneumonia and are potentially preventable. ARIs are the single most important cause of childhood morbidity in South Africa and are a major drain on ambulatory and inpatient health resources. ARIs account for approximately, 40% of childhood consultations in both the private and public health sectors.[8] In addition, it is estimated that about 13,000 South African children require hospitalisation for pneumonia each year.[7]

Many will have permanently impaired lung function and may be at risk of chronic obstructive lung disease in adulthood. Effective treatment of childhood pneumonia may thus also decrease debilitating lung disease among adults.[10]

A study on national mortality data from ARI children in South Africa was conducted by Von Shirnding et al during which national data was examined for the period 1968-1985 and data from the greater Cape Town for 1987.[7]

Almost 90% of ARI deaths were attributed to pneumonia. In Cape Town, pneumonia was recognised as the most important cause of death among white and coloured children while it ranked with diarrhoea as a cause of death in black children. In all South African population groups, death rates from ARI were from 7 to 270 times greater than those recorded in Western European Countries.[7]

In an exploration of infant mortality in Cape Town, an analysis of verbal histories provided by the caregivers of 70 infants in the course of obtaining police death certification indicated ARI and diarrhoeal disease to be the major causes of death. [11]

Infants with a respiratory problem were more likely to have been taken for medical attention prior to death. By contrast, the parents of infants with diarrhoeal disease were less likely to have sought medical care, these infants typically being found dead in bed or dying enroute to hospital or clinic. [11]

A descriptive study on age-specific ARI mortality, and disease patterns among blacks and coloureds on the basis of registered deaths collected for the whole of the Republic of South Africa from 1978 to 1985 provided the following data:

In Black children;

Males	< 1 year	16% of deaths
Females	< 1 year	16% of deaths

Both rank third in the main international classification of disease (1CD) codes.

Males	(1-4) years	19% of deaths
Females	(1-4) years	21% of deaths

The total number of deaths examined for each of the above groups were:

Males	<1 year	26, 481 deaths
Females	<1 year	24, 566 deaths
Males	(1-4) years	9, 397 deaths
Females	(1-4) years	8, 972 deaths

The annual age specific death rate (per 1000 of the population) among the coloured population group from the study above is as follows:

Males	<1 year	79.32
Females	<1 year	70.62
Males	(1-4) years	7.16
Females	(1-4) years	6.56[12]

7.0 THE IMPORTANCE OF ARI CASE MANAGEMENT GUIDELINES

Clinical experience and intervention studies in developing countries have indicated that early treatment with antibiotics can reduce mortality from pneumonia. Many pneumonia deaths occur at home, some after only a few days of illness. The key to reducing ARI mortality is to ensure better access to and timely use of correct case management of pneumonia. This requires the strengthening of health services to enable them to provide early treatment with antibiotics, based on clinical signs that are easily detectable.[3]

Assessment, diagnosis and management can be improved by using simple clinical protocols which help to identify serious problems early, reduce reliance on investigations and overuse of antibiotics, and emphasize involvement of the mothers and the community in the management of their sick children.[13]

The management of the child with cough or difficult breathing is depicted in the WHO ARI case management guidelines which are intended for use in children under the age of 5 years, the target age group for the WHO ARI control programme.[14]

In developing these guidelines, clinical signs or symptoms were sought that would:

1. identify children who should be examined for possible pneumonia ("entry criteria"): namely, children with an acute illness with cough or difficult breathing;

2. amongst these children, identify all (or almost all) cases of pneumonia, in order to ensure antibiotic therapy for possible bacterial pneumonia;

3. identify severe cases of pneumonia at higher risk of death who would benefit from hospital care (parenteral antibiotics, oxygen , greater clinical expertise, and better nursing care).

Tachypnea has been identified as the most useful indication for antibiotic therapy and poor feeding or chest indawing for admission to hospital for infants older than 2 months. In infants younger than 2 months of age, tachypnea or wheezing are indications for hospital referral.[3]

8.0 LITERATURE REVIEW OF STUDIES CONDUCTED INTERNATIONALLY ON THE APPLICATION OF THE WHO ARI CASE MANAGEMENT GUIDELINES

A number of studies have been conducted internationally on the application of the WHO ARI case management guidelines. The following serve as motivation for use of the guidelines as the gold standard in this study:

8.1 A community-based study was conducted in four rural villages in Pakistan, during which 617 cases of ARI in children under 5 years of age were assessed, classified and managed according to the WHO ARI case management guidelines. [15]

Of these, 509 (82.5%) had cough and cold without clinical evidence of pneumonia. 95 had pneumonia and 11 had otitis media.

Of the 509 without clinical evidence of pneumonia, 491 (96.5%) were successfully treated without antibiotics and only 18 (3.5%) of the children needed antimicrobial therapy on follow up.

8.2 As an integrated part of Primary Health Care, control of ARI was implemented in the rural Bagamoyo District of Tanzania. Community supported village health workers visited each family at their homes every six to eight weeks, giving health education on recognition and prevention of ARI and treating children with pneumonia on the spot with oral co-trimoxazole or referring them to the next higher level of care. [16]

Within a two-year period, the total under five mortality was reduced by 27.2% from 40.1 to 29.2/1000 children aged under five, per year. The disease specific mortality rate for pneumonia was reduced by 30.1% from 14.3 to 10.0 per 1000 under fives per year, contributing 40% to the overall mortality reduction.

The conclusion from this study was that an active health service outreach programme within primary health care, can efficiently reduce high child mortality rates from ARI and other diseases.

8.3 A study was conducted on 5,535 rural pre-school children in India. The primary health centre (PHC) staff and local practitioners (drug distribution centres) were identified and trained in the recognition of moderate and severe ARI, the indications for referral and drug administration. Education of the community was also instituted and emphasised. [17]

Functional ARI classification as recommended in the WHO programme was followed. There was significant reduction in moderate (42% reduction) and severe (89% reduction) ARI episodes from the year 1985 to 1987. Both ARI (27.8%) and non-ARI (18.3%) deaths showed reduction. The moderate and severe ARI related morbidity and mortality was significantly reduced in immunised compared to unimunised children.

The study indicated that strategies of national ARI control programmes should involve health education, standard case management and strengthening of immunisation.

8.4 A community-based case management programme for acute lower respiratory infections (ALRI) was conducted in a rural district of northern Pakistan between 1985 and 1987. The impact on infant and child mortality of this programme, which included active case finding and maternal health education was evaluated. [18]

In 1985 - 1986, the ALRI – specific mortality rate among children under 5 years old was 6.3 deaths per 1 000 children per year compared with 14.4 in seven control villages ($p = 0.0001$).

Within one year of the interventions being extended to the control villages in 1987, the ALRI-specific mortality rate in these villages dropped by 55% to 6.5 per 1000 children per year ($p = 0.06$). The total child mortality rate in 1985 - 1986 was 29.0 per 1000 children per year in the intervention villages and 39.4 per 1000 children per year in the control villages, a difference of 26% ($p = 0.01$).

This study dermonstrated that the case management of acute respiratory infections by village-level community health workers backed by local health centre staff appeared to significantly reduce both ALRI-specific and total infant and child mortality in this setting.

8.5 A prospective study was conducted in a rural community of the hill region of Nepal to determine the magnitude of the morbidity and mortality due to ALRI among children under 5 years of age and to assess the feasibility of the use of community health workers. [19]

The study group of 1019 children under the age of 5 years was followed up for 3 years.

During the first year, baseline information on ARI was collected. During the second and third years, intervention measures (health education, immunization and antibiotics for children with signs suggesting pneumonia) were instituted and their effect assessed.

There was a 59% reduction in the ARI-specific death rate among study group children between the surveillance year and the first intervention year and a further 25% reduction in the ARI-specific death rate between intervention years one and two.

8.6 A targeted programme designed to treat children with ALRI was implemented in 1988 in a primary health care project in rural Bangladesh. In the 2 years preceding the introduction of the programme (1986-87), non-ALRI-specific services were provided including promotion of oral rehydration therapy, family planning, immunization of children and mothers, distribution of vitamin A, referral of severely sick children to field clinics and nutritional rehabilitation of malnourished children.[20]

The targeted ALRI programme, which was in place in 1988-1989 was based on systematic ALRI case detection and management by community health workers who were linked to a referral system for medical support. The two levels of intervention were evaluated by comparing the ALRI-specific mortality in the programme area and a neighbouring control area during the two periods.

During the first phase (1986-1987), the ALRI mortality among under 5 year-olds was 28% lower in the intervention than in the comparison area ($p < 0.01$). During the second phase (1988-1989), the ALRI mortality was 32% lower in the intervention area than during the preceding phase (1986 – 1987).

These findings suggest that in the study region, the combination of specific and non-specific interventions can reduce ALRI mortality among under 5-year-olds by as much as 30%.

Non-specific Maternal and Child Health and Family Planning (MCH-FP) interventions reduced ALRI mortality among under - 5 - year olds by one fourth and the additional community-based ALRI treatment programme reduced it further by one third.

The impact of the targetted intervention was particularly marked in post-neonates (age 1-11 months), in view of the importance of ALRI as a cause of death among this age group.

8.7 A comunity-based trial to reduce childhood mortality from pneumonia included 58 villages in the intevention area and 44 villages in the control area in Gadchiroli India. [21]

The interventions included mass education about childhood pneumonia and case management of pneumonia by paramedics, village health workers, and traditional birth attendants (TBAs) who were trained to recognise childhood pneumonia and treat it with co-trimoxazole.

Parents sought treatment and coverage was 76% without active case-detection efforts. The case-fatality rate among the 612 cases treated by health workers was 0.8%, compared with 13.5% in the control area.

After a year of intervention, pneumonia-specific childhood mortality was significantly lower in the intervention than in the control area (8.1 vs 17.5 deaths per 1000 children under 5 years); the difference between the areas was greatest in children under 1 year.

8.8 The feasibility of introducing a case management programme for acute respiratory infections among low-birth weight infants at the primary health care level was investigated in 37 villages in the Indian state of Haryana.[1]

All low-birth-weight infants born in the two areas between January 1982 and September 1983 (199 in the intervention area and 211 in the control area) were included in the study.

Primary health care workers were consulted in 38% of episodes of acute respiratory infections in the intervention area, in contrast to only 1% of episodes in the control area. Also the mean duration of infections in the intervention area was significantly lower ($p < 0.01$), while the case fatality was approximately 33% of that in the control area.

9.0 A META-ANALYSIS OF SIX WHO INTERVENTION TRIALS ON PNEUMONIA CASE MANAGEMENT

To appraise the effectiveness of the pneumonia case management strategy in improving child survival, a meta-analysis of six published intervention trials was performed. The studies were conducted in Bangladesh, Pakistan, India (2 studies), Nepal and Tanzania.

A meta-analysis entails critical review and statistical combination of results of independent studies so as to obtain a reliable estimate of the intervention effect and resolve the uncertainty of conflicting results.

The studies were conducted in settings with infant mortality rates (IMR) of at least 90 per 1000 live births. A higher IMR implies poorer access to health care and less prompt recognition of illness and care seeking by families. Areas with high IMR may therefore require more intensive education and a longer period of intervention to achieve a substantial effect.

The reduction in mortality rate (control group minus intervention group) was estimated for each study and for all the studies together. The reduction in ALRI-specific infant mortality ranged from 4.7 to 40.3 per 1000 live births. The pooled odds ratio estimates are consistent with a reduction of 53% in ALRI-specific mortality among 1 - 4 year old children.

Oral rehydration therapy has been shown to reduce mortality by 1 – 14% and measles immunisation by 20%. Thus by comparison, pneumonia case management should rank high on the list of child survival interventions.[22]

10.0 STUDIES CONDUCTED INTERNATIONALLY ON THE KNOWLEDGE AND PRACTICE OF ARI CASE MANAGEMENT

10.1 A healthy facility survey conducted in Simbu, Papua New Guinea had the purpose of evaluating how the ARI programme actually works in an everyday non-research setting. 33 Clinics and aid posts, 223 children with ARI and 104 health workers were surveyed.[23]

In this primary health care setting, health workers diagnosed 37% of ARI cases as pneumonia compared to 69% in the same children assessed independently by trained ARI surveyors using Papua New Guinea case management guidelines. Agreement between both health workers and surveyors was reasonably good (kappa ≥ 0.6) for the history and symptoms but was poor (kappa < 0.3) for the diagnoses, treatment and signs such as respiratory rate (RR) and chest indrawing. Health workers counted the RR in only 14% of cases.

Despite better overall ARI knowledge and practice by nurses, an impact of the ARI training programme could only be demonstrated on community health workers (CHWs). In order to improve ARI clinical practice, it was recommended that the ARI programme in Papua New Guinea should initiate regular on-site clinical supervision at health centres.

10.2 To help determine whether reduction of unnecessary antibiotic use might be achieved through a combination of refresher training for family physicians and

public education campaigns, two 1991 interventions were carried out in four health areas (designated A, B, C and D) in the city of Havana, Cuba. In each area, 10 clinics staffed by family physicians were selected through simple random sampling.[24]

In two areas (A and B), a refresher training program on ARI for health personnel was instituted at each clinic, while in areas A and C, a community education programme was set up. No intervention was carried out in area D.

Simultaneously from January through to December 1991, trained individuals visited and administered a standard questionnaire every 15 days to 160 families (40 per clinic), selected by systematic sampling.

The aim of the procedure was to record the number of ARI episodes occurring among children under 5 years old, the treatment chosen in these cases and whether antibiotics were prescribed.

The results showed that when the two interventions were initiated, antibiotics were prescribed for 26%, 20%, 11% and 19% of mild ARI cases occurring in areas A, B, C and D respectively ($p > 0.05$).

In the period immediately following the interventions, antibiotic prescription rates declined by 26% and 63% in areas A and B, while increasing by 20% and 48% in

areas C and D. Overall, the prescription of antibiotics in the intervention areas A and B combined, decreased by 54% (95% CI: 31-39%).

These data suggest that a refresher training program for health personnel can rapidly reduce the unnecessary prescribing of antibiotics for ARI cases but public education alone does not appear effective.

10.3 For training purposes, a baseline study on two indicators of acute respiratory infections; the respiratory rate (RR) and chest indrawing were assessed independently by ministry of health physicians in Egypt using a WHO test video-tape.[25]

Chest indrawing as defined by the WHO ARI programme was not widely recognised by the health personnel. Viewing a WHO training video-tape led to significantly more correct assessments of chest indrawing compared with a group that had not viewed the video-tape.

This study indicates that, careful training of primary health workers in the assessment of RR and chest indrawing is therefore essential if these clinical findings are to be used as reliable indicators in pneumonia treatment algorithms.

10.4 A community-based intervention trial was conducted with the aim of reducing severe acute respiratory infections in children in Kelantan Malaysia. Interventions included health education of mothers and training of health staff on case management.[26]

In a house-to-house survey, 1382 and 1107 children under 5 years of age in the intervention and control areas respectively, were followed up every 2 weeks over a 62-week period.

The reduction in the incidence of severe ARI cases in the intervention area was significantly greater than in the control area ($p < 0.05$). The ARI mortality rates were low in both the intervention and control areas (< 0.1%).

The results indicate that with relatively inexpensive methods and simple interventions, reduction of severe ARI may be effectively achieved.

10.5 A community based prospective surveillance study of the case management of ARI was conducted in Pakata, a semi-urban community in Ilorin Kwara State Nigeria, on children aged 2-60 months over a 12- month period.[27]

A cohort of 481 children was followed by trained community health assistants with thrice weekly home visits to record all symptoms and signs of ARI and to institute treatment based on the WHO recommendations.

Health worker decisions were considered appropriate, although there was a tendency towards over treatment with antibiotic drugs. These data indicated that a system of case management using trained community workers can improve case management of ARI and may prevent ARI related disease and deaths.

10.6 The PRICOR project sponsored by the United States Agency for international development, has designed and implemented methods for quality assessment and problem solving in the health systems of Less Developed Countries (LDCs).[28]

Seven child survival interventions were studied including case management of acute respiratory infections.

A systems analysis of ARI case management, conducted in four countries and yielding 588 observations of health worker performance, was focused on identification of presumptive pneumonia.

While health workers routinely performed some type of general clinical assessment, they often neglected ARI-specific clinical assessment tasks. In the Philippines health workers asked about cough in 85% of cases, but they counted respirations in only 16% of cases and checked for cyanosis in only 1% of cases.

Health workers also needed improvement in the area of classification of illness by severity. Again in the Philippines, observation showed that only 23% of health workers properly classified the severity of the illness, and treatment was correct in only 31% of cases. In Indonesia, record review showed correct classification of illness in 65% of cases; treatment was correct in 30% of cases. Appropriateness of treatment administered by community-based workers in Indonesia was mixed: while 80% of workers refrained from giving antibiotics for mild cases of ARI, only 48% correctly administered antibiotics in the case of pneumonia. Based on interviews,

clinic-based workers in Colombia correctly classified ARI in 35% of cases and gave correct treatment in 74% of cases.

Weaknesses found in the counselling were reflected in mothers' lack of knowledge about when to seek care. In Indonesia, for example, mothers were asked to react to the statement "an infection in the lung/trouble breathing in a small child probably isn't very serious". Of mothers surveyed, 26% agreed with the statement., 35% disagreed and 39% did not know. In exit interviews in Pakistan, mothers were asked what danger signs would alert them to seek medical attention. Of 73 respondents, 60% were unable to name one danger sign.

The studies indicated highly prevalent serious programme deficiencies in areas including diagnosis, treatment, patient education and supervision.

11.0 STUDIES CONDUCTED IN SOUTH AFRICA ON ARI

A number of studies have been conducted in South Africa with regard to Acute Respiratory Infections. Studies specifically relating to the knowledge and practice of health service providers on the case management of ARI were not found in the literature search. A general and text word Medline search was conducted using the following combination of search terms; respiratory tract infection, acute disease, knowledge and practice, health workers (Doctors and Nurses) and South Africa. References from articles on ARI were followed up and enquiries were also made at the National ARI guidelines unit at the Child Health Unit – University of Cape Town. However, studies that have been conducted in South Africa on ARI include the following:

11.1 Sixty-two children were prospectively followed up for 1 – 7 years after pneumonia contracted at a median age of 17 months. In 55% of cases the pneumonia was measles-associated and 27% had serological evidence of infection with other respiratory viruses. Recurrence of cough or wheeze for more than 6 months occurred in 85% with just over 50% having recovered during the follow-up period.[29]

While the highest incidence of persistent symptoms occurred in children after measles superinfected with another virus, this was not significant. Abnormal radiographic features persisted in 53% of children and consisted of peribronchial and/or parenchymal lesions. Abnormal large and small airway calibre and/or bronchial hyper-reactivity were found in one-third of children, and were

significantly more common in those children whose main symptom was recurrent wheezing.

Clinical and lung function abnormalities were demonstrated years after lower respiratory tract infection. Recognition that long-term sequalae occur may prevent inappropriate management of symptomatic children.

12.0 THE AIM OF THE STUDY

To assess the knowledge of Doctors and Clinical Nurse Practitioners (CNPs) with regard to the case management of ARI in children under the age of 5 years in the Khayelitsha District of Western Cape Province.

13.0 THE SPECIFIC OBJECTIVES OF THE STUDY

The specific objectives of the study were:

(i) To assess the knowledge of Doctors and Clincial Nurse Practitioners (CNPs) with regard to diagnosis and specific management of ARI in children under the age of 5 years in the Khayelitsha district of Western Cape Province.

(ii) To compare the knowledge of doctors and CNPs.

(iii) To assess the association of duration of clinical experience with knowledge.

(iv) To make recommendations regarding the diagnosis and management of ARI in children.

14.0 THE KEY STAKEHOLDERS

A. Services

The managements of :

- The community Health Services Organisation (CHSO).
- The Cape Metropolitan Council (CMC) clinics - Site B and Site C.
- The School Health Service.

B. Private General Practitioners (GPs) in the Khayelitsha District

C. **Trainers locally and nationwide** – particularly the National Guidelines Unit at the Child Health unit, and the Provincial Administration of Western Cape (PAWC) Paediatric guidelines initiative.

D. **Policy makers** – particularly the Policy Unit at Child Health unit, University of Cape Town.

15.0 METHODS

The study was descriptive and included all doctors and CNPs involved in treating sick children with ARI in Khayelitsha District.

The sampling method used was a survey of doctors and CNPs based in 3 community health centres (CHCs) Cape Metropolitan Council clinics (Site B and Site C), all private General Practitioners (GPs) and the School Health Service in Khayelitsha District. In the identification of these health workers, enquiries were made from residents and local GPs and the respective managements of the Community Health Centres in Khayelitsha. The key stakeholders who impacted on the project were consulted.

The approximate number of patients/school children seen monthly at each of the above health institutions and the School Health Service is presented in the table below:

Health Facility	Children under 5 years of age	Adults & Children above 5 years of age
Khayelitsha CHC	2 200 per month	12 000 per month
Michael Maphongwana	1 300 per month	8 500 per month
Nolungile CHC	-	7 900 per month
Cape Metropolitan Council (CMC) Clinic – Site B	2 300 per month	-
Cape Metropolitan Council (CMC) Clinic – Site C	3 500 per month	-
Private General Practitioners (GPs)	15-30% of all consultations are children under 5 years of age	-
The School Health Service	1 500 School Children per month per team	

Some schools have creches that admit children under the age of 5 years linked to them. The Doctors and Clinical Nurse Practitioners of the school health services are therefore obliged to offer curative services to these children.

A questionnaire (with open and closed-ended questions) based on the WHO ARI management guidelines was self-administered in person (Appendix 3). The content of the questionnaire was 20 questions with practical emphasis on diagnosis and case management of ARI and 2 questions as to whether the participants had seen and made use of the WHO ARI case management manual (WHO/ARI/190.5) and the University of Cape Town Paediatric Handbooks. The completed questionnaires were collected in person but the participants were not required to write their names on the questionnaires.

The questions were related to the diagnosis and case management of pneumonia, otitis media and streptococcal pharyngitis/tonsillitis which are responsible for a high mortality rate, hearing disability and acute rheumatic fever/rheumatic heart disease respectively. Important differential diagnosis namely tuberculosis, asthma, bronchiolitis and croup were addressed. The Paediatric Handbook was used as the reference standard with respect to the questions on tuberculosis, bronchiolitis and croup.

A pilot survey involving 4 doctors and 4 clinical nurse practitioners was carried out at Michael Maphongwana Community Health Centre prior to the full scale survey. The purpose of the pilot survey was to identify problems and to make the necessary amendments in the final questionnaire. The participants in the pilot survey were included in the main study because the questionnaire underwent substantial modification with removal of some questions and addition of others. The answers to the pilot questionnaire were not made available to the participants.

Due to the turnover of staff, one extra doctor had been recruited to fill up a vacant post and one CNP had resigned in order to take up another appointment. The number of doctors and CNPs who participated in the final survey had therefore changed to 5 and 3 respectively compared to 4 of each category who were present during the pilot survey.

The study was ethically justifiable as there was no possibility of inflicting harm in the process of carrying out the research and by instructing participants not to indicate their names on the questionnaires, the confidentiality was ensured.

16.0 DATA ANALYSIS

A scoring system was used, whereby each of the 20 questions was asigned a full mark. A question with 4 subsections had ¼ of the mark asigned to each subsection. The score percent (%) was then calculated from the total score out of 20 marks. There was no negative marking for wrong answers and no penalties for questions not answered.

The data were entered and analysed using the Epi Info 6 programme. Median scores were compared using the Kruskal Wallis test. Association between scores and years of experience was assessed with Spearman rank correlation coefficient. A significance level of 0.05 was used.

17.0 RESULTS

Questionnaires were to be delivered to 36 Doctors and 36 Clinical Nurse Practitioners. The following was the distribution of the 34 Doctors and 34 Clinical Nurse Practitioners who responded:

Health Facility	Doctors	Clinical Nurse Practitioner
Khayelitsha CHC	10	9
Michael Maphongwana CHC	5	3
Nolungile CHC	3	1
Cape Metropolitan Council (CMC) Clinic – Site B	-	8
Cape Metropolitan Council (CMC) Clinic – Site C	1	8
Private General Practitioners (GPs)	14	-
The School Health Service	1	5
Total	**34**	**34**

The population served according to the available December 1995 population figures for Khayelitsha district is approximately 325,600 people. Twenty percent are under 6 years of age according to a study conducted by Philani Nutrition Project in 1994. A map of the area with the location of the health workers is shown in Appendix 2.

The infant and post neonatal mortality rates for the greater Cape Town obtained by pooling data from the annual reports of the Cape Town City Council (CCC) (1995/1996) and the Cape Metropolitan Council (CMC) (1996, not yet published) are as follows:

	CCC	**CMC**	**TOTAL**
Live births	20240	28923	49163
Infant deaths	302	631	933
Post neonatal deaths	145	378	523
Infant mortality rate	14.9	21.8	19.0
Neonatal mortality rate	7.2	13.1	10.6

The scores of individual doctors and CNPs are presented in Tables 1 and 2 respectively.

In Table 1 doctors with post-graduate Paediatric training are indicated by an asterisk. Post-graduate Paediatric training referred to those doctors who obtained a DCH (a Diploma in Child Health), MRCP (Membership of the Royal College of Peadiatricians of UK), DTCH (Diploma in Tropical Child Health) and Paediatric specialist training.

Table 1: Doctors' Scores (%)

Serial No	Experience (Years)	(%) Score
1	10	42.5
2	16	50.5
3	5	52.5
4	7	53.0
5	9	54.0
6	20	55.0
7	4	58.5
8	31	63.5
9	3	64.0
10	23	64.5
11	1	65.0
12	7 1/2	66.0
13	1	66.0
14	2	67.0
15	17	67.0
*16	33	67.0
17	8	68.0
* 18	5	69.0
19	9	69.5
20	12	70.5
21	6	71.0
22	7 1/2	72.0
23	15	74.0
24	12 1/2	74.5
25	8	75.0
26	5	77.0
*27	17	78.0
28	30	78.0
*29	15 1/2	78.5
30	30	79.5
31	14	80.0
*32	9 1/2	80.5
*33	25	82.5
*34	10 1/2	85.0

Table 2: Clinical Nurse Practitioners' scores (%)

Serial No:	Experience (years)	Score (1%)
1	14 1/2	38.5
2	27	39.0
3	3 1/2	44.5
4	4 1/2	45.0
5	8 1/2	46.5
6	1/2	47.0
7	5 1/2	48.0
8	3 1/2	48.5
9	14	51.0
10	16	54.0
11	1 1/2	55.0
12	1	56.0
13	3	59.0
14	11 1/2	60.5
15	1	60.5
16	4 1/2	61.0
17	14	62.0
18	16	64.0
19	2	64.0
20	27 1/2	65.0
21	15	67.0
22	10 1/2	68.0
23	4	68.0
24	10 1/2	69.0
25	16	69.0
26	21 1/2	70.0
27	6	70.5
28	2	70.5
29	1 1/2	70.5
30	10 1/2	72.0
31	8	73.0
32	4	73.0
33	2	74.0
34	5 1/2	75.0

Out of a total of 36 doctors and 36 CNPs practicing in Khayelitsha at the time, 34 Doctors and 34 CNPs (94%) participated in the study. Of the 2 doctors who did not participate, one had time constraints and the other could not be contacted despite several attempts. 2 CNPs were on annual leave at the time of questionnaire administration (December 1996 – January 1997).

All the questionnaires administered were returned, 100% response rate. The median scores of Doctors and Clinical Nurse Practitioners were 68.5% and 63.0% respectively, $p = 0.007$

The median scores of doctors with a post-graduate qualification in Paediatrics and of those without were 78.5% and 67.0% respectively, $p = 0.005$

The median scores of the private GPs and of doctors in the public sector were 65.0% and 71.0% respectively, $p = 0.03$

Out of the 68 participants, 12 (18%) had seen and made use of the WHO ARI manual.

The median scores of participants who had used the WHO ARI manual and of those who had not were 68.5% and 66.5% respectively, $p = 0.13$.

Out of the 68 participants, 63 had seen and made use of the University of Cape Town Paediatric handbooks and 5 had not.

The median scores of participants who had seen and made use of the Red books (University of Cape Town Paediatrics handbooks) and of those who had not were 67.0% and 64% respectively, $p = 0.37$.

The proportion of Doctors and Clinical Nurse Practitoners responding correctly to each Sub-section of the questions is shown in table 3.

The percentage of participants who incorrectly marked false subsections as true is indicated by an asterisk (*). A footnote appears at the end of the table.

Table 3: Percentages of answers to each subsection correctly identified as true or incorrectly marked as true (*).

Question	Doctors n=34	CNPs n=34
1. Diagnosis of pneumonia on the basis of clinical signs.		
a) correct answer – pneumonia	62.0%	62.0%
* b) Incorrect answer – bronchiolitis	47%	26.4%
* c) Incorrect answer – upper respiratory tract infection	2.9%	8.8%
* d) Incorrect answer – asthma	2.9%	11.7%
2. Criteria for admission of a child with pneumonia.		
a) correct answer – cyanosis	97.0%	85.0%
b) correct answer – chest indrawing	53.0%	59.0%
* c) incorrect answer – Tachypnea	44.1%	67.6%
* d) incorrect answer – fever	8.8%	41.1%
e) correct answer – difficulty in drinking or feeding	76.5%	56.0%
3. Choice of antibiotics for treating pneumonia at home. One correct answer		
*a) incorrect answer – Pen VK	5.8%	11.7%
*b) incorrect answer – Benzathine Penillin stat dose	5.8%	2.9%
*c) incorrect answer – Procaine penicillin for 5 days	2.9%	0%
d) correct answer – Amoxycillin	88.0%	82.0%
*e) incorrect answer – Erythromycin	14.7	2.9%

Question	Doctors n=34	CNPs =34
4. Indications of antibiotic therapy with regard to clinical features & age group. Three correct answers a, b & d		
a) correct answer – a 6 week old with respiratory rate 52, chest indrawing and wheezing	44.0%	23.5%
b) correct answer – a 6 month old with respiratory rate 50, wheezing and mild chest indrawing.	20.5%	14.5%
*c) incorrect answer – an 11 month old with temperture 39°C, respiratory rate 48, no chest indrawing.	58.3%	61.7%
d) correct answer – a 3 year old with respiratory rate 44, no chest indrawing and Temperature 39°C	53.0%	67.5%
5. Home care advice to give to a mother with a child who is managed at home for pneumonia.		
*a) incorrect answer – decrease fluid intake	8.8%	0%
*b) incorrect answer – stop breastfeeding	5.8%	2.9%
c) correct answer – frequent small feeds	85.0%	82.5%
d) correct answer – Paracetamol for fever	97.0%	76.5%
6. When the mother should bring the child managed at home for pneumonia back for review.		
*a) incorrect answer – after the first course of antibiotics	29.4%	35.2%
b) correct answer – if there is a persistent fever	35.0%	56.0%
c) correct answer – if the child cannot eat or drink	97.0%	76.5%
d) correct answer – breathing becomes fast	85.0 %	64.5%
e) correct answer – in 2 days time	50.0%	17.5%

Question	Doctors n=34	CNPs n=34
7.Signs required for detecting cases of pnemonia in the young infant aged less than two months.		
*a) incorrect answer – respiratory rate ± 40 breaths per minute	23.5%	20.5%
b) correct answer – wheezing	14.5%	12.0%
c) correct answer – grunting	82.5%	79.0%
d) correct answer – apneic & cyanotic episodes	64.5%	76.0%
8. The significance of chest-indrawing in a 3 year old child presenting with a cough, respiratory rate 70 per minute and a fever of 38.5°C. One correct answer. A sign of respiratory distress and an underlying pneumonia requiring hospitalisation Any combination of answers which indicated a need for hospital referral was correct e.g. pneumonia, respiratory distress, and referral to hospital.	53.0%	53.0%
9. Agreement/disagreement with statements about Pneumonia.		
a) correct answer – empirical antibotic therapy for pneumonia is the commonly accepted practice world wide	82.5%	61.5%
b) correct answer – in developing countries, there is a higher probability of bacterial pneumonia than in developed countries.	91.0%	64.5%
c) correct answers – simplified guidelines and training in standard ARI case management requires use of "entry Criteria" for the detection of pneumonia.	53.0%	50.0%
10. The MOST SUITABLE treatment for a 2 year old child who presents with acute otitis media.		
*a) incorrect answer – Pen VK for 7 days	0%	11.7%
*b) incorrect answer – Amoxycillin for 5 days	32.3%	32.3%
c) correct answer – Amoxycillin for 10 days.	59%	50%
*d) incorrect answer – Co-trimoxazole for 7 days	14.7%	38.2%
*e) incorrect answer – Erythromycin for 7 days	8.8%	5.8%

Question	Doctors n=34	CNPs n=34
11. Agreement or disagreement with statements about chronic otitis media:		
a) correct answer – in many developing countries, children often present with a long history (more than 2 weeks) of chronic discharge from one or both ears.	100%	85.0%
b) correct answer – if the eardrum has been ruptured for more than two weeks, secondary infection with fungi, yeasts, psuedomononas, proteus or other gram negative enteric organisms usually occurs.	85.0%	62.0%
c) correct answer – the patient should have been referred for more expert care if there was no response after 10 days of initial antibiotic therapy.	67.5%	91.0%
*d) incorrect answer – a chronically discharging ear should be treated with intibiotics	44.1%	57%
e) correct answer – other specific therapy involves washing out the ear.	47.0%	50.0%
12. Treatment of choice in a 3 year old with enlarged red and painful tonsils.		
*a) incorrect answer – Bactrim for 7 days	2.9%	11.7%
*b) incorrect answer – Bactrim for 10 days	0%	2.9%
*c) incorrect answer – Erythromycin for 7 days	8.8%	14.7%
d) correct answer – Pen V K for 10 days	88.0%	82.5%
13. 2 Likely complications of streptococcal tonsillitis. 2 Correct answers		
(i) Acute post-streptococcal glomerulonephritis	84.5%	85.2%
(ii) Rheumatic fever/Rheumatic heart disease	76.0%	76.4%

Question	Doctors n=34	CNPs n=34
14. The management of a 16 month old presenting with grade 2 Croup inspiratory and expiratory stridor and/or prolonged expiration.		
a) correct answer – adrenaline by nebulizer	88.0%	73.5%
*b) incorrect answer – antibiotic therapy is always indicated	8.8%	32.3%
c) correct answer – close observation is always indicated	82.5%	64.5%
d) correct answer – referral if intubation/tracheostomy is not possible at your insitution.	76.5%	70.5%
15. The management of a child with bronchiolitis. Correct answers		
(i) Oxygen by nasal catheter	73.5%	82.3%
(ii) Nebulised bronchodilator if acutely distressed	85.2%	55.8%
(iii) Antipyretic/adequate fluid intake/3 hourly feeding	58.8%	55.6%
16. Statements that are applicable to the adminsitration of bronchodilators in a child presenting with cough, difficulty in breathing and wheezing.		
a) correct answer – a rapid acting bronchodilator such as salbutamol should be administered by nebulizer or metered dose inhaler with a spacer device.	91.0%	91.0%
b) correct answer – the child should be assessed 15 minutes after the administration of a rapid acting bronchodilator.	88.0%	64.5%
c) correct answer – children who remain in respiratory distress after 2 doses of a rapid acting bronchodilator should be admitted to hospital.	82.5%	82.5%
d) correct answer – asthma should be considered in recurrent attacks of wheezing responding to administered bronchodilator.	100%	88.0%

Question	Doctors n=34	CNPs n=34
17. Statements that are true with regard to asthma.		
a) correct answer – it is an uncommon cause of death	14.5%	23.5%
b) correct answer – steroids can be used if it is severe or prolonged	88.0%	88.0%
*c) incorrect answer – steroids are contraindicated if the patient has TB and is on treatment	38.2%	61.7%
d) correct answer – correction of fluid is important	82.0%	56.0%
e) correct answer – in a child aged less than 6 months, the diagnosis is most likely bronchiolitis	94.0%	76.5%
f) correct answer – oxygen therapy is indicated in an acute attack	82.5%	85.0%
18. Indications for oxygen. Severe chest indrawing		
a) correct answer – restlessness	91.0%	88.0%
b) correct answer – cyanosis	73.5%	38.0%
c) correct answer – abnormally sleepy or difficult to wake	64.5%	56.0%
d) correct answer – abnormally sleepy or difficult to wake	56.0%	20.5%
*e) incorrect answer – breathing rate of 50/minute	47.0%	50.0%
19. The most likely diagnosis in a child presenting with a non-paroxymal cough for 30 days and weight loss. One correct answer, Tuberculosis	91.0%	88.0%
20. Two investigations needed to confirm the diagnosis. Correct answers		
i) Tine test/mantoux	87.6%	84.7%
ii) Chest X-ray	86.3%	85.2%

***Percentage of answers to sub-sections that were incorrectly marked as true**

The following questions were answered incorretly by more than 50% of both doctors and CNPs.

Question 4:

Indications of antibiotic therapy with regard to clinical features & age group.

a) A 6 week old with respiratory rate 52, chest indrawing and wheezing.

(44.0%) of doctors and (23.5%) of CNP's responded correctly.

b) A 6 month old with respiratory rate 50, wheezing and mild chest indrawing.

(20.5%) of doctors and(14.5%) of CNPs responded correctly.

Question 7:

Wheezing was recognised as a sign of pneumonia in the young infant aged less than 2 months by (14.5%) of doctors and by (12.0%) of CNPs.

Question 11:

(47.0%) of doctors agreed with the statement that washing out the ear is specific therapy in the management of chronic otitis media.

Question 17:

(14.5%) of doctors and (23.5%) of CNPs agreed with the statement that asthma is an uncommon cause of death.

Question 18:

Only (38.0%) of CNPs identified restlessness and (20.5%) of doctors identified abnormal sleepiness and difficulty in waking as indications for oxygen.

The percentage of participants who incorrectly marked false sub-sections as true was high for the following questions which highlight areas where emphasis needs to be placed during training:

Question 4:

Incorrect answer; subsection c. (58.3%) of the doctors and (61.7%) of CNPs.

Question 11:

Incorrect answer; subsection d. (44.1%) of the doctors and (67.6) of the CNPs.

Question 17:

Incorrect answer; subsection c. (38.2%) of the doctors and (61.7) of the CNPs

Question 18:

Incorrect answer; subsection e. (47.0%) of the doctors and (50.0%) of the CNPs.

The frequency distribution of doctors' and CNPs' scores are shown in figures 1 and 2.

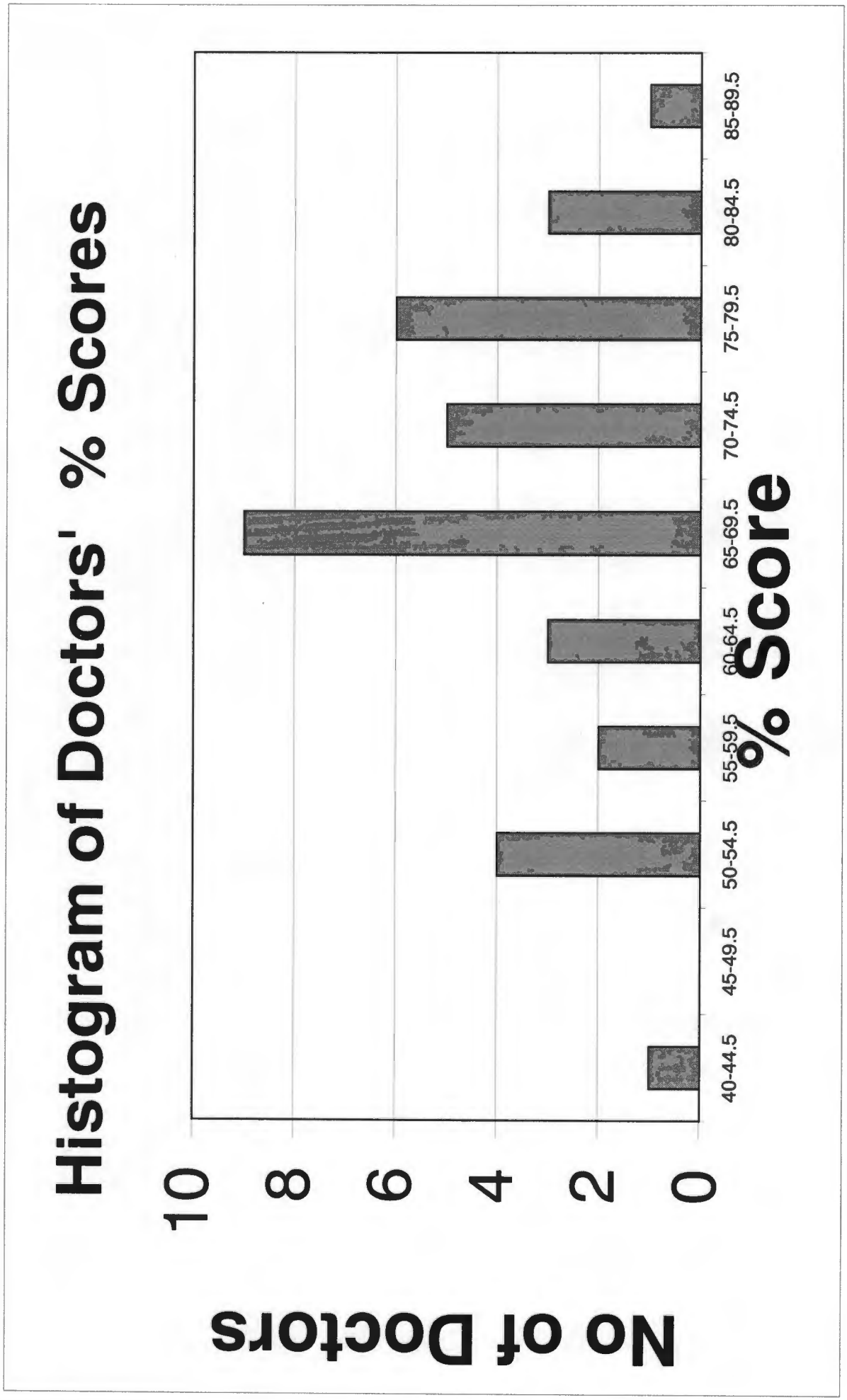
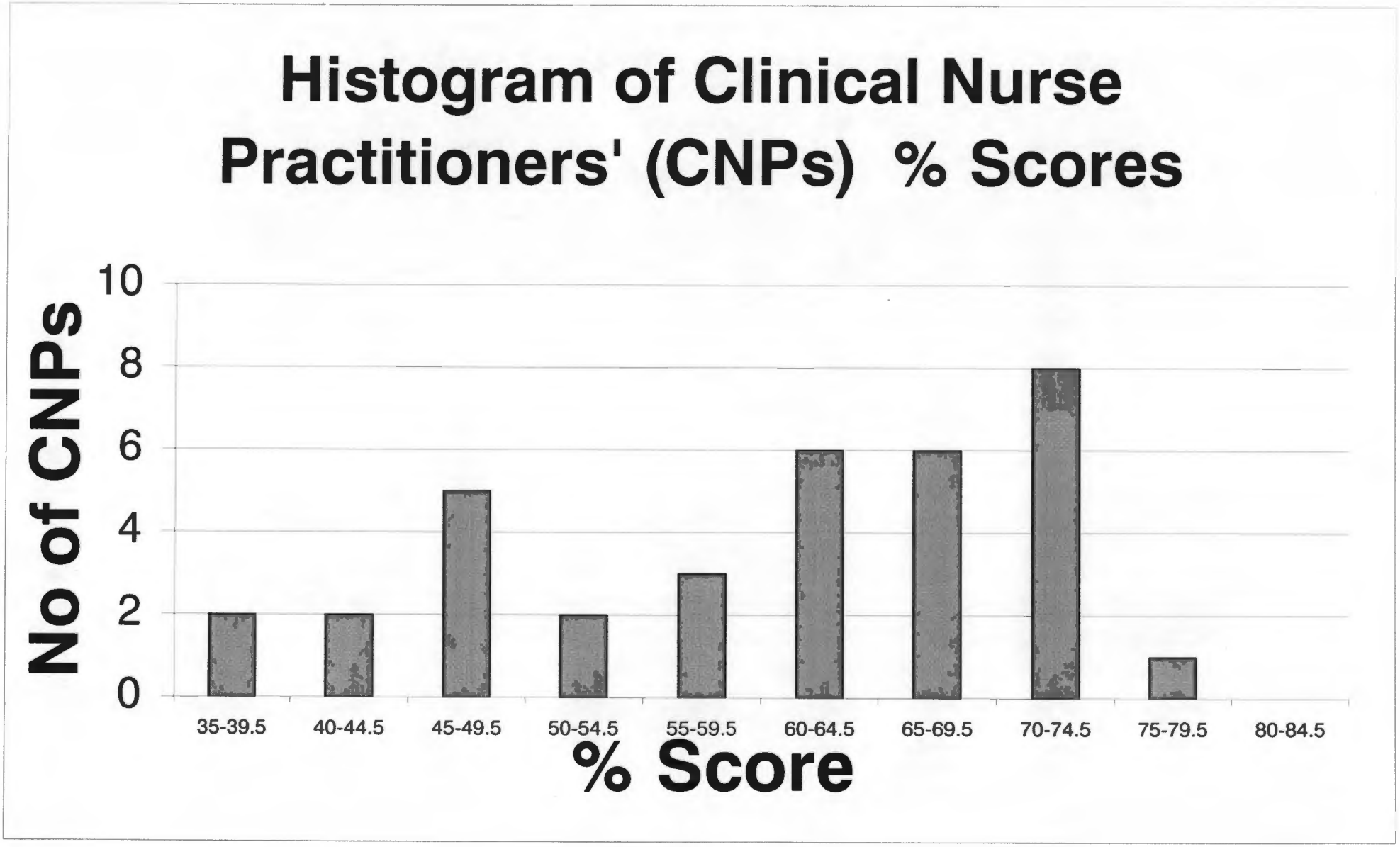

Histogram of Doctors' % Scores
No of Doctors
10
8
6
4
2
0
40-44.5
45-49.5
50-54.5
55-59.5
60-64.5
65-69.5
70-74.5
75-79.5
80-84.5
85-89.5
% Score

Figure 1.

Figure 2.


Histogram of Clinical Nurse Practitioners' (CNPs) % Scores
No of CNPs
10
8
6
4
2
0
35-39.5
40-44.5
45-49.5
50-54.5
55-59.5
60-64.5
65-69.5
70-74.5
75-79.5
80-84.5
% Score

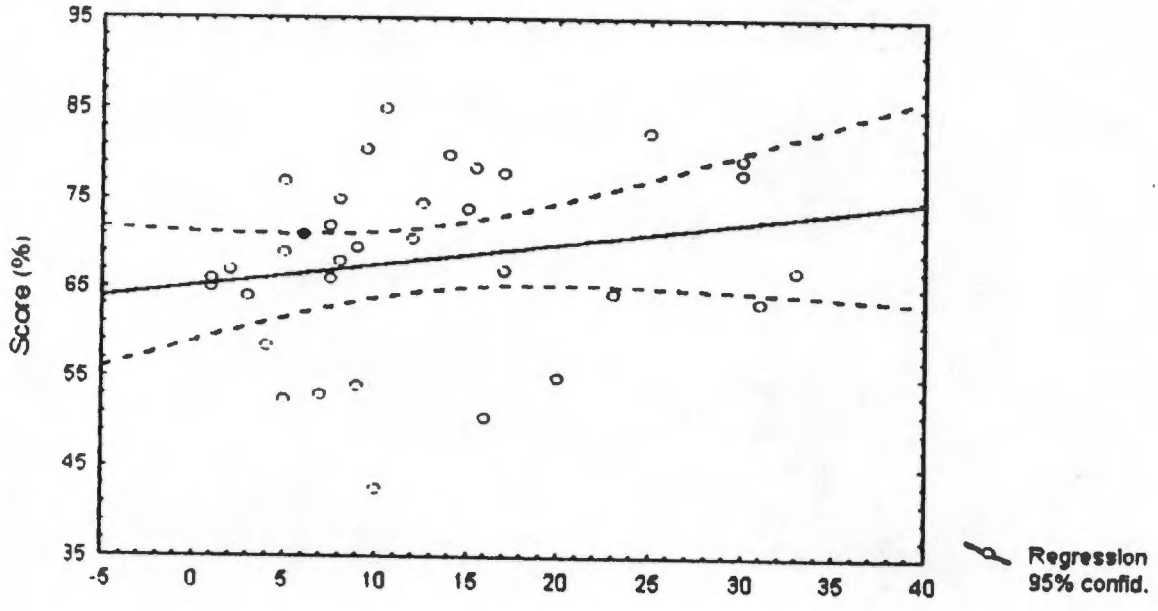
Out of 34 doctors, 1 (2.9%) scored below 50% and 19 (55.9%) scored less than 70%. Of the 34 CNPs, 9 (26.5%) scored below 50% and 25 (73.5%) scored less than 70%.

The above findings indicate a need for a service-oriented training programme to improve knowledge on ARI case management.

The correlation of doctors' and CNPs' scores with years of experience are shown in figures 3 and 4.

Figure 3

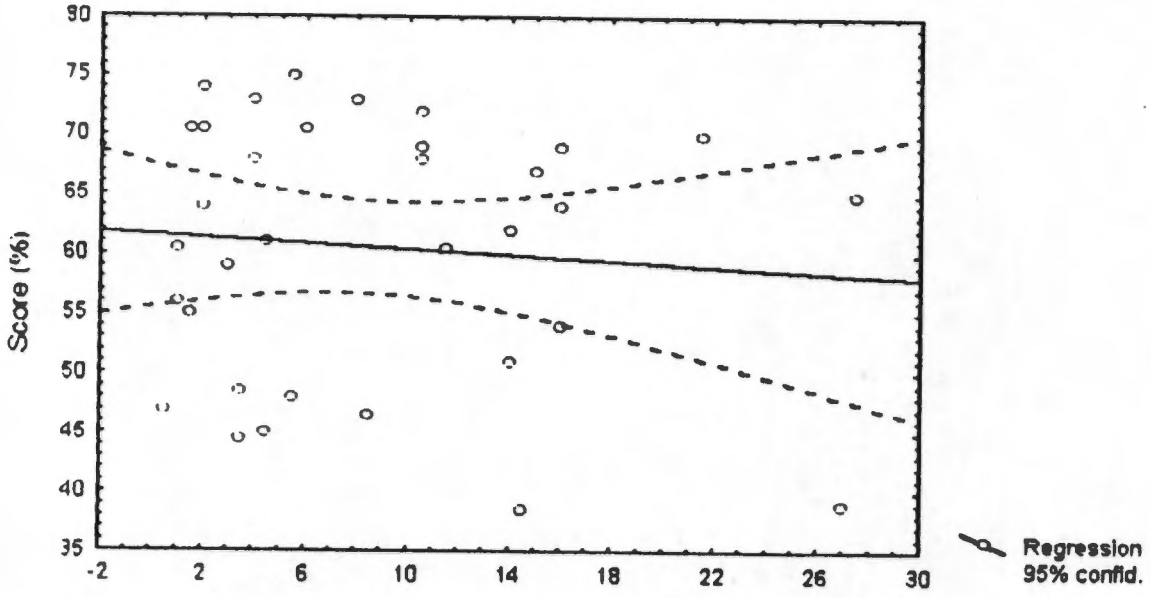
Correlation of Doctors' scores with years of experience.



Years of experience

Figure 4.

Correlation of CNPs' scores with years of experience



The correlation co-efficient of doctors' scores with years of experience was 0.26 ($p = 0.13$) (figure 3) and of CNPs scores with years of experience was –0.01 ($p = 0.94$) (figure 4).

18.0 DISCUSSION

Out of a total sample size of 36 doctors and 36 CNPs in Khayelitsha, 94% (34 of each category) participated in the study. This high response rate makes significant sampling bias unlikely. As all practitioners in Khayelitsha were included in the study, the findings are thus representative of Doctors and Clinical Nurse Practitioners (CNPs) in the district.

The median score of the doctors was significantly higher than that of the CNPs (68.5% and 63.0% respectively). This higher score of the doctors is expected given their training.

Doctors with a post-graduate qualification in Paediatrics scored higher than those without (78.5% and 67.0% respectively). This is also expected given their further training.

63 out of 68 (95.5%) of the participants had seen and made use of the Red books (University of Cape Town Paediatric handbooks) but only 12 out of 68 (18%) had seen and made use of the WHO ARI manual. However, there was no association between scores and use of the University of Cape Town Paediatric Handbooks.

Familiarity with the WHO guidelines was also not associated with higher scores. This implies that implementation of the WHO guidelines will require active training rather than dissemination.

The median, score of the private GPs was significantly lower than that of the doctors in the public sector (65.0% and 71.0% respectively). There are many possible explanations for this which cannot be addressed by this study. One such explanation is that the public sector doctors have had greater exposure to the WHO ARI guidelines, while the GPs could mainly be relying on other sources of information such as literature from drug company representatives. The implications for training of this is that ways need to be devised of reaching the private GPs. Possibilities include feedback of the results of this study, inviting them to Continuing Medical Education (CME) meetings and sending to them extra information by post. However, WHO guidelines will require active training rather than more dissemination.

Academic detailing i.e. the non-commercial equivalents of drug company representatives have been shown to be effective and could be considered for inclusion in an implementation programme.[30]

There were low scores in a number of questions suggesting inadequate knowledge and questionable practice in some specific areas as follows:

Question 4:

Indications for antibiotic therapy on the basis of tachypnea and chest indrawing.

Question 7:

Signs of pneumonia in the young infant aged less than 2 months.

Question 11:

Specific therapy in the management of chronic otitis media.

Question 18:

Identification of abnormal sleepiness and waking as indications for oxygen was required. This is an important area for attention because of the life-saving implications of appropriate oxygen therapy.

The percentage of participants who incorrectly marked the false subsections as true was high for questions 4,11,17 and 18.

The finding of poor correlation between the scores and years of experience means that a longer working experience is not by itself associated with significant improvement in knowledge. This further supports the need for a service-oriented training programme on ARI management.

The comparison between this study and others studies conducted elsewhere on knowledge of health workers is difficult as the indicators of knowledge used were different.

This study assessed knowledge by means of a self-administered questionnaire.

The PRICOR systems analysis of health worker performance was focused on identification of presumptive pneumonia through observation of health worker performance. [28]

The study conducted in Simbu, Papua New Guinea, observed the diagnosis and treatment of pneumonia among health workers and compared this with assessments made by independent ARI surveyors.[23]

The limitation of the study is that the WHO guidelines were used as the gold standard. These are not necessarily the only valid method of managing respiratory infections.

Given the low exposure to these guidelines, participants could have been using other appropriate practices in some areas of management (e.g. diagnosing pneumonia by criteria other than tachypnoea).

In some areas however this limitation does not apply. For example the non-use of oxygen in abnormally sleepy children with pneumonia can be regarded as inappropriate in any circumstances where oxygen is available.

The study assessed knowledge which could differ markedly from actual practice. Higher knowledge scores also do not necessarily mean better clinical practice.

The implications for training of this study are as follows:

(i) There is a need for an active training programme if the WHO case management guidelines are to be implemented in Khayelitsha district.

(ii) Areas needing particular attention are indications for antibiotic therapy and oxygen on the basis of clinical signs.

(iii) Attention needs to be given to devising means of reaching out to the private GPs.

(iv) Studies in other geographical areas are necessary to inform prioritisation of training.

(v) This study could serve as a base line for evaluating the impact of any such training programmes.

19.0 RECOMMENDATIONS AND CONCLUSIONS

19.1 There is a need for training in the case management of ARI in Khayelitsha particularly among CNPs. Aspects of management needing special attention are the diagnosis of pneumonia, and indications for antibiotic and oxygen therapy.

19.2 In the training programme, attention should be given to reaching the private GPs because of their contribution to providing health care to relatively larger numbers of children.

19.3 This study could serve as a base- line for evaluating the impact of training interventions.

19.4 There is a need for similar studies in other areas, to inform training programmes and to allow prioritisation of training.

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21.0 APPENDICES

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APPENDIX 1

DEFINITION OF TERMS AND ABBREVIATIONS

ARI Acute Respiratory Tract Infections. Refers to infection of the upper and lower respiratory tracts designated by the following clinical sydndromes:

i. Upper respiratory tract; the common cold, otitis media and pharyngitis.

ii. Lower respiratory tract; epiglottitis, laryngitis, laryngotracheitis, bronchitis, bronchiolitis and pneumonia.

CLINIC

Is a basic small health facility which is usually the first point of contact of the population with the formal health care system.

COHORT STUDY

A follow up study

COMMUNITY HEALTH CARE CENTRE

A centre that carries out promotive, protective, preventative, diagnostic, curative and reabilitative activities for ambulant people, but does not have beds other than those for emergencies and maternity care.

CROUP

A condition of infants and children due to obstruction of the larynx by allergy, foreign body, infection, or a new growth, marked by a resonant barking cough, hoarseness, and persistent stridor.

FAST BREATHING

50 Breaths per minute or more in a child aged 2 months up to 12 months.

40 breaths per minute or more in a child aged 12 months up to 5 years.

60 breaths per minute or more in the young infant aged less than 2 months.

INFANT

Baby younger than 12 months of age.

KAPPA, k.

Is a measure of agreement which corrects for chance agreement. It has a maximum value of 1.0 when agreement is perfect and zero when there is no agreement. Negative values show worse than chance agreement.

LRI

Lower Respiratory Tract Infection.

MEDIAN

A value that comes half-way when the data are ranked in order.

PNEUMONIA

Inflamation of the lungs with exudation and consolidation.

PRIMARY HEALTH CARE

Is essential health care based on practical, scientifically sound and socially acceptable methods and technology, made universally accesible to individuals and families in the community through their full participation and at a cost that the community and country can afford to maintain at every stage fo their development in the spirit of self reliance and self determination.

PRIMARY LEVEL CARE

Promotive, preventative, curative and rehabilitative ambulatory care which is available in a clinic or general practioner's office or through an outpatient's department in a hospital.

p– VALUE

A probability calculated from a test statistic; it is the probability of obtaining a statistical test result as extreme or more extreme as that calculated from the observed data. The test statistic is calculated from the observed data usually under the assumption of a null hypothesis in conjunction with a statistical model.

STRIDOR

A harsh, high pitched respiratory sound that is due to laryngeal obstruction.

TB

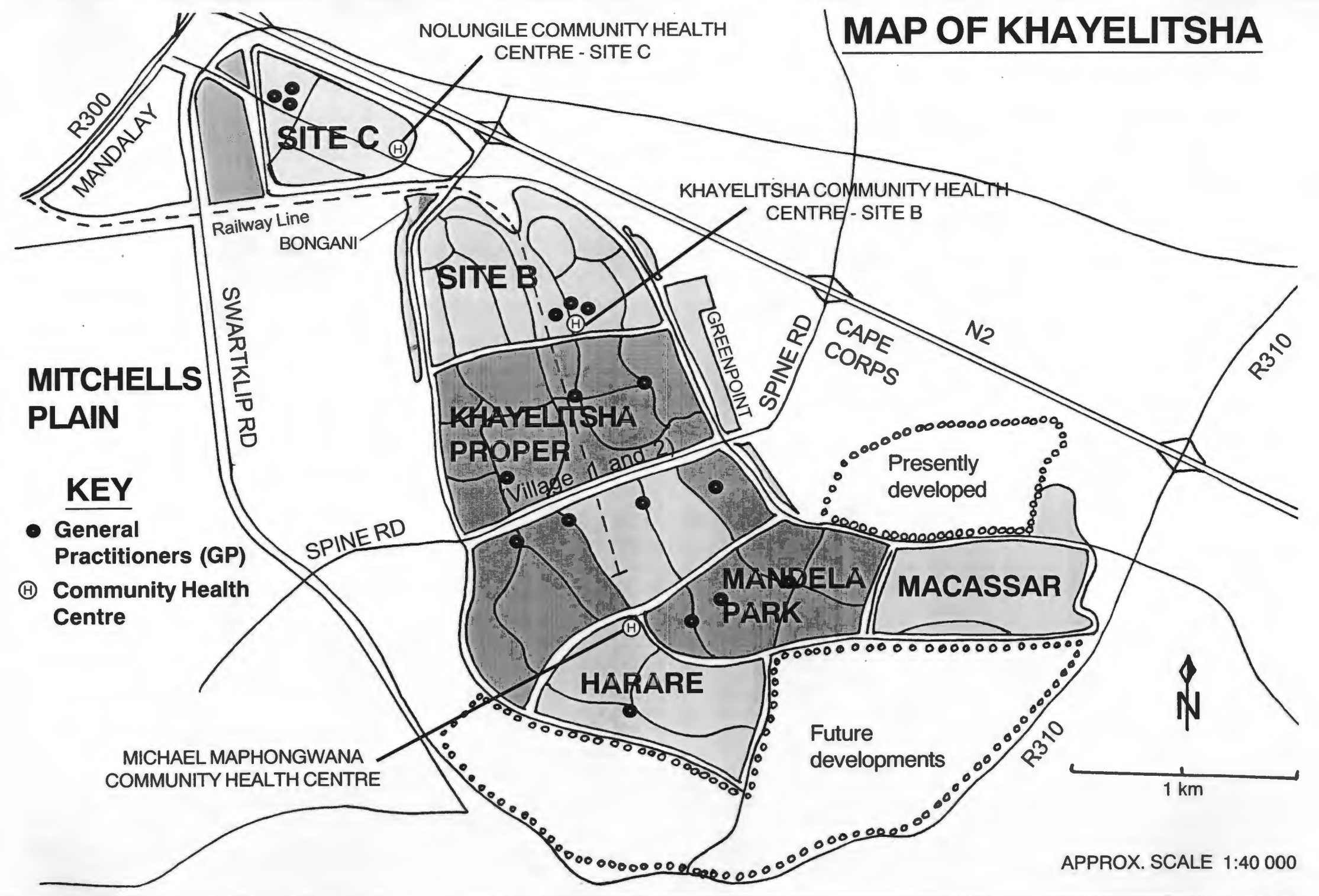
Tuberculosis.

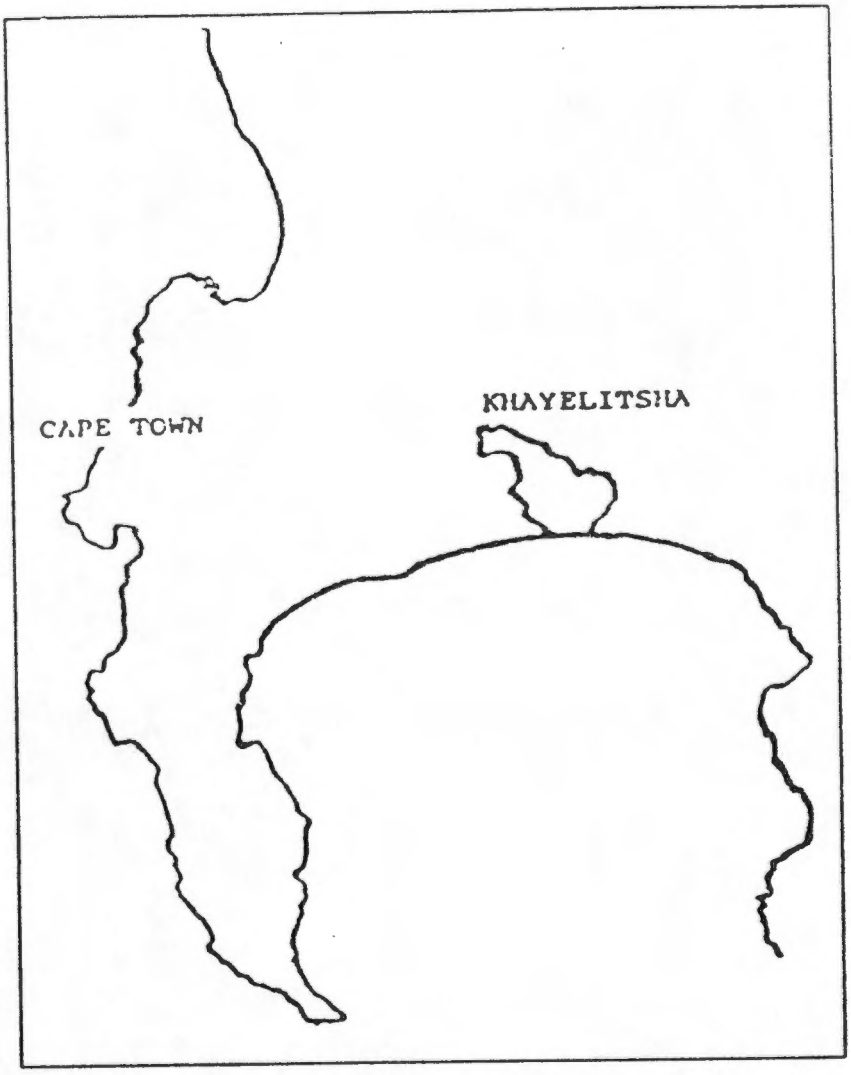
WHO

World Health Organisation.

APPENDIX 2:

MAP OF KHAELITSHA DISTRICT ILLUSTRATING THE DISTRIBUTION OF HEALTH FACILITIES


MAP OF KHAYELITSHA
NOLUNGILE COMMUNITY HEALTH CENTRE - SITE C
R300
MANDALAY
SITE C
Railway Line
BONGANI
KHAYELITSHA COMMUNITY HEALTH CENTRE - SITE B
SITE B
SWARTKLIP RD
GREENPOINT
SPINE RD
CAPE CORPS
N2
R310
MITCHELLS PLAIN
KHAYELITSHA PROPER
Village 1 and 2
Presently developed
SPINE RD
MANDELA PARK
MACASSAR
HARARE
KEY
General Practitioners (GP)
Community Health Centre
MICHAEL MAPHONGWANA COMMUNITY HEALTH CENTRE
Future developments
R310
N
1 km
APPROX. SCALE 1:40 000



Location of Khayelitsha in the Cape Peninsula.

APPENDIX 3

THE QUESTIONNAIRE USED IN THE STUDY.

A Questionnaire for

A Knowledge Survey on the case management of Acute Respiratory Infections (ARI) in children under the age of 5 years, amongst Doctors and Clinical Nurse practitioners (CNPs) in the Khayelitsha District of Western Cape Province

David Opedun

INSTRUCTIONS

Tick (✓) in the right box for correct responses and cross (X) for inappropriate answers.

Tick as many boxes as appropriate for questions with more than one correct answer.

Fill your response into the space provided for open-ended questions.

For each participant please indicate whether Doctor or Clinical Nurse Practitioner as applicable in the adjacent box by a tick. Do not write Your name.

Dr	
CNP	

Please indicate working experience from year of qualification to date:
Years_____ Months_____

For Doctors, please state any additional post graduate qualification in Paediatrics._____

Thank you for your participation.
Feedback will be communicated to you.

1. An 18 month old presents with cough and fever for 2 days. She has a temperature of 38.5° C, respiratory rate 60/min, lower chest wall indrawing and bilateral crepitations. The most likely diagnosis is : (Tick only one box)

a. Pneumonia ☐

b. Bronchiolitis ☐

c. Upper respiratory tract infection ☐

d. Asthma ☐

2. Which clinical features warrant admission of a child with a pneumonia ?

a. Cyanosis ☐

b. Chest indrawing ☐

c. Tachypnea ☐

d. Fever ☐

e. Difficulty in drinking or feeding ☐

3. In a 3 year old child with pneumonia, which is the most suitable for treatment at home ?

a. Pen VK ☐

b. Benzathine Penillin stat dose

c. Procaine penicillin for 5 days ☐

d. Amoxycillin ☐

e. Erythromycin ☐

4. Which of the following children need an antibiotic ?

a. A 6 week old with respiratory rate 52, chest indrawing and wheezing. ☐

b. A 6 month old with respiratory rate 50, wheezing and mild chest indrawing. ☐

c. An 11 month old with tempreture 39° C, respiratory rate 48, no chest indrawing. ☐

d. A 3 year old with respiratory rate 44, no chest indrawing and tempreture 39° C ☐

5. What home care advice will you give to a mother with a child who is managed at a home for pneumonia ?

a. Decrease fluid intake. ☐

b. Stop breast feeding. ☐

c. Frequent small feeds. ☐

d. Paracetamol for fever. ☐

6. For the child with pneumonia, the mother should bring the child back:

a. After the first course of antibiotics. ☐

b. If there is a persistent fever. ☐

c. If the child cannot eat or drink. ☐

d. Breathing becomes fast. ☐

e. In 2 days time. ☐

7. The following are signs that are required for detecting cases of pneumonia in the young infant aged less than two months:

a. Respiratory rate ± 40 breaths per minute. ☐

b. Wheezing. ☐

c. Grunting. ☐

d. Apneic and cyanotic episodes. ☐

8. What is the significance of chest indrawing in a 3 year old presenting with a cough, respiratory rate 70 per minute and a fever of 38.5°C ?

_____

_____

_____

_____

9. The following are statements about pneumonia. In each box tick (✓) if you agree and cross (X) if you disagree.

a. Empirical antibiotic therapy for pneumonia is the commonly accepted practice world wide. ☐

b. In developing countries, there is a higher probability of bacterial pneumonia than in developed countries. ☐

c. Simplified guidelines and training in standard ARI case management requires use of "entry criteria" for the detection of pneumonia. ☐

10. In a 2 year old child who presents with acute otitis media, the MOST SUITABLE treatment is:

a. Pen VK for 7 days. ☐

b. Amoxycillin for 5 days. ☐

c. Amoxycillin for 10 days. ☐

d. Co-trimoxazole for 7 days. ☐

e. Erthromycin for 7 days. ☐

11. The following are statements about chronic otitis media. In each box tick (✓) if you agree and cross (X) if you disagree.

a. In many developing countries, children often present with a long history (more than two weeks) of chronic discharge from one or both ears. ☐

b. If the eardrum has been ruptured for more than two weeks, secondary infection with fungi, yeasts, pseudomonas, proteus or other gram negative enteric organisims usually occurs. ☐

c. The patient should have been referred for more expert care if there was no response after 10 days of initial antibiotic therapy. ☐

d. A chronically discharging ear should be treated with antibiotics. ☐

e. Other specific therapy involves washing out the ear. ☐

12. In a 3 year old with enlarged red and painful tonsils, the treatment of choice is: Tick only one box.

a. Bactrim for 7 days. ☐

b. Bactrim for 10 days. ☐

c. Erythromycin for 7 days. ☐

d. Pen VK for 10 days. ☐

13. Name 2 likely complications of streptococcal tonsillitis.

_____

_____

14. A 16 month old present with grade 2 croup i.e. inspiratory and expiratory stridor and/or prolonged expiration. The management would involve:

a. Adrenaline by nebulizer. ☐

b. Antibiotic therapy is always indicated. ☐

c. Close observation with ready availability of intubation/tracheostomy equipment. ☐

d. Referral if intubation/tracheostomy is not possible at your institution. ☐

15. How would you manage a child with bronchiolitis which is characterised by:

(age <2 years, rhinitis, mild cough, fever <38° C, tachypnea, prolonged expiration, soft wheezing, and crackles):

a. _____

b. _____

c. _____

16. The following statements are applicable to the administration of bronchodilators in a child presenting with cough, difficulty in breathing and wheezing ?

a. A rapid acting bronchodilator such as salbutamol should be administered by nebulizer or metered dose inhaler with a spacer device. ☐

b. The child should be assessed 15 minutes after the administration of a rapid acting bronchodilator. ☐

c. Children who remain in respiratory distress after 2 doses of a rapid acting bronchodilator should be admitted to hospital. ☐

d. Asthma should be considered in recurrent attacks of wheezing responding to administered bronchodilator. ☐

17. The following is true with regard to asthma:

a. It is a uncommon cause of death. ☐

b. Steroids can be used if it is severe or prolonged. ☐

c. Steroids are contraindicated if the patient has TB and is on treatment. ☐

d. Correction of fluid is important. ☐

e. In a child aged less than 6 months, the diagnosis is most likely bronchiolitis. ☐

f. Oxygen therapy is indicated. ☐

18. Oxygen should be given to a child with:

a. Severe chest indrawing. ☐

b. Restlessness. ☐

c. Cyanosis ☐

d. Abnormally sleepy or difficult to wake. ☐

e. Breathing rate of 50/minue. ☐

19. If a child presents with a non-paroxysmal cough for 30 days and weight loss, what is the most likely diagnosis ?

_____

_____

20. What 2 investigations are needed to confirm the diagnosis?

i. _____

ii. _____

21. Have you ever seen or made use of any of the following literature resource materials:

a. A manual for Doctors and other Senior Health Workers: Acute Respiratory Infections in Children: Case management in small hospitals in developing countries. WHO/ARI/90.5. Yes ☐
No ☐

b. The Red Books: (University of Cape Town Paediatric Handbooks)

Yes ☐
No ☐

APPENDIX 4

ANSWERS TO THE QUESTIONNAIRE

1. a
2. a,b &e
3. d
4. a,b &d
5. c & d
6. b,c,d & e
7. b,c &d
8. It is a sign of respiratory distress and an underlying pneumonia requiring hospitalisation.
9. a,b & c
10. c
11. a,b,c & e
12. d
13. a) Acute post-streptococcal glomerulonephritis
    b) Rhemumatic fever/Rheumatic heart disease.
14. a,c & d
15. a) Oxygen by nasal cannulla / face mask
    b) Nebulised bronchodilator if acutely distressed.
    c) Antipyretic/Adequate fluid intake/3 hourly feeding.
16. a,b,c & d
17. a,b,d,e & f
18. a,b,c & d
19. Tuberculosis
20. a) Chest X-Ray
    b) Mantoux/Tine test

APPENDIX 5

THE WORLD HEALTH ORGANISATION (WHO) ARI CASE MANAGEMENT GUIDELINES FOR CHILDREN UNDER THE AGE OF 5 YEARS.

AGE 2 MONTHS TO 4 YEARS

(i)	**Classification of illness.**	• Cough or cold; no pneumonia
	Signs	•No chest indrawing •No fast breathing (Respiratory rate (RR) less than 50 breaths per minute if child 2 months up to 12 months and less than 40 breaths per minute if child 12 months up to 5 years).
	Treatment	• If coughing for more than 30 days, refer for assessment. • Assess and treat ear problem or sore throat if present. • Assess and treat other problems. • Advise mother to give home care. • Treat fever if present. • Treat wheezing if present.
(ii)	**Classification of illness**	• Pneumonia
	Signs	• No chest indrawing • Fast breathing (RR 50 breaths per minute or more if child 2 months upto 12 months; 40 breaths per minute or more if child 12 months up to 5 years).
	Treatment	• Advise mother to give home care. • Give an antibiotic. • Treat fever if present. • Treat wheezing if present

• Advise mother to return with child in 2 days for re-assessment and if:

(i)The child is getting worse,

Signs • Not able to drink
• Has chest indrawing
• Has other danger signs.

Treatment • Refer urgently to the hospital

(ii) The same (no improvement)

Signs • No chest indrawing
• Fast breathing

Treatment • Change antibiotic or refer

(iii) Improving

Signs • Breathing slower
• Less fever

Treatment • Finish 5 days of antibiotic course

(iii) **Classification of illness** • Severe pneumonia

Signs • Chest indrawing

Treatment
• Refer urgently to hospital
• Give first dose of an antibotic
• Treat fever if present
• Treat wheezing if present (if referral is not feasible, treat with an antibiotic and follow closely).

(iv) **Classification of illness** • Very severe disease

Signs

- Not able to drink
- Convulsions
- Abnormally sleepy or difficult to wake
- Stridor in a calm child
- Severe malnutrition.

Treatment

- Refer urgently to hospital
- Give first dose of an antibiotic
- Treat fever if present
- Treat wheezing if present
- If cerebral malaria is possible, give an anti-malarial (applicable to areas where malaria is endemic).

AGE LESS THAN 2 MONTHS (ASSOCIATED WITH HIGH MORTALITY)

(i) **Classification of illness**

- Cough or cold, no pneumonia

Signs

- No severe chest indrawing
- No fast breathing (Respiratory rate less than 60 breaths per minute).

Treatment

Advise the mother to give the following home care;

- Keeps the young infant warm
- Breast feed frequently
- Clear the nose if it interferes with feeding.

Return quickly if;

- Breathing becomes difficult
- Breathing becomes fast
- Feeding becomes a problem

		• The young infant becomes more sick.
(ii)	**Classificaiton of illness**	• Severe pneumonia
	Signs	• Severe chest indrawing • Fast breathing (60 breaths per minute or more).
	Treatment	• Refer urgently to hospital • Keep the young infant warm • Give the first dose of an antibiotic (If referral is not feasible, treat with an antibiotic and follow closely).
(iii)	**Classification of illness**	• Very severe pneumonia
	Signs	• Stopped feeding well • Convulsions • Abnormally sleepy or difficult to wake • Stridor in a calm child • Wheezing • Fever or low body temperature.
	Treatment	• Refer urgently to hospital • Keep the young infant warm • Give the first dose of an antibiotic.[14]

APPENDIX 6

THE LETTER SENT TO EACH OF THE 68 PARTICIPANTS IN THE STUDY WITH FEEDBACK.

Dear.....

Thank you for your cooperation in completing and returning the questionaire for a study featuring the case management of Acute Respiratory Infections (ARI) in children under the age of 5 years in Khayelistsha district from December 1996 to January 1997.

This communication serves as feedback to you on the following:

1. Results of the study
   - Tables 1, 2 and 3
   - Figures 1, 2, 3 and 4
2. The questionaire used in the study with answers.
3. The World Health Organisation (WHO) ARI case management guidelines for children under the age of 5 years.

Yours Sincerely

Dr. D. Opedun