

CHAPTER II

Female Community Health Volunteer Training: A Strategy to improve the Case Management of Acute Respiratory Infection in under 5 children in Nepal

2.1 INTRODUCTION:

High rate of morbidity and mortality among children aged under five years is reported mainly due to Acute Respiratory infections (ARI) as some 40 thousand out of a total 100, 000 deaths in this age group in Nepal are estimated to be ARI alone (MOH, 1994). To reduce the high morbidity and mortality, community-based intervention is extremely important, given the difficult terrain, inaccessible villages and poor health infrastructure in Nepal. Female Community Health Volunteers come from the community where they live and they are readily available in the community whenever community people needed them. Studies have shown that the FCHV can manage ARI effectively as per WHO case management guidelines (Dawsan et al., 1996). Therefore, they can help in reducing the morbidity and mortality of children at the doorstep if proper training on ARI case management with appropriate support with drugs and follow-up are carried out.

The FCHV are the community based, grass root level health workers, the concept of which was developed in 1986/87 to support in family planning and maternal child health as trained health workers as there was practically no availability of basic facilities for health services at the community. This is further complicated by poor development of health infrastructure, low health seeking behavior in ARI and difficult terrain of the country. The experience of FCHV in family planning and maternal child health over one decade has shown encouraging results for community based health activities which is readily available at the doorstep. This chapter envisages that proper training of the FCHV and adequate support with essential drugs for case management will help in reducing the high morbidity and mortality due to ARI.

Acute respiratory infection, prevail a significant problem in Nepal. It is estimated that among the 100,000 death in children of under 5 years from all causes, ARI alone accounts about 40,000 of death (MOH, 1994). The seriousness of ARI problem is prompt in the hill and mountain region of Nepal (Pandey et al., 1988). Hill and mountain represents 83 % of the total land of Nepal. In the year 1994/95, among all the reported cases of ARI, 60 % were pneumonia and severe pneumonia which needed a proper case management (DHS, 1995). According to the recent findings prevalence of ARI, nationally was 30% and it was about the same in both urban and rural areas. FCHV interviewed at 134 sites indicated that 46% of the child death were due to ARI (NPC/HMG, 1996).

It has been clearly established that the main causes of death in young children in developing countries is Bacterial pneumonia whether primary or secondary to viral infections, that the predominant organism responsible are streptococcus

pneumonia, and haemophilus influenza among untreated children (Pandey et al., 1991). Acute episodes of lower respiratory illness occurs ten to fifty times more frequently in developing countries where the assumption is that susceptible individual become super infected by bacteria (Pio et al., 1984).

The factors causing and promoting ARI are: predisposing factors; low-birth weight, low nutritional status, low immunization coverage, parental smoking, indoor air pollution by cooking fire and poor housing. In enabling factors; availability, affordability and accessibility are important and in reinforcing factors family / peers and media play a vital role which contributes to increase the incidence of ARI in under 5 children in Nepal. This will be further described in the PRECEDE-PROCEED model given in the causal relationship of factors affect ARI

To reduce the incidence and severity of ARI, World Health Organization has established three major strategies in 1982; which are: (I) improving immunization coverage against diphtheria, pertusis, measles and tuberculosis, (ii) Standard case management and (iii) Health education. Reduction of risk factors for ARI is also a long-term strategy initiated by WHO, at the same time. At present, ARI case management combined with health education is the most important strategy for the control of ARI.

Health education to the community as well as family will be another strategy for the reduction of morbidity as well as mortality due to ARI in under 5 children. Effective treatment is depending on mothers and other caretakers recognizing the critical sign of pneumonia and acting immediately to seek help. An appropriate

package of Health Education should be conducted in the community but it cannot alone reduce morbidity and mortality of children from ARI if there is no proper case management.

Standard case management (SCM) is a proven strategy outlined by WHO for reducing ARI morbidity as well as mortality among under 5 children of developing countries like Nepal. Acute respiratory infection consists of group diseases including pneumonia or severe pneumonia who requires antibiotics and immediate referral for patient care; those who have pneumonia need antibiotic treatment at home or health institution and those who do not have pneumonia only appropriate home care management. Classification and treatment of ARI according to SCM is given in appendix 6 and 7.

Table 2.1 Prevalence and treatment of Acute respiratory infection in Nepal

| Child age | Percentage of child with cough accompanied by fast breathing | Among children with ARI, percentage of children taken to health facility | Percentage of children ill with fever |
|-------------|--|--|---------------------------------------|
| < 6 month | 37 | 12.1 | 30.3 |
| 6-11 month | 38.1 | 19 | 45.8 |
| 12-23 month | 38 | 21.1 | 44.3 |
| 24-35 month | 26.4 | 17.8 | 35.7 |

Source: Pradhan et al., (1996). Nepal Family Health Survey.

It is found that use of Health facility for the treatment of ARI is low in Nepal. Less than 1 among 5 children with ARI were taken to the health facility. The table 1.1 shows that it is lowest among children under 6 months of age and highest for children 12-23 month old. The table 1.1 shows that use of health facility is very low. Children of more educated mothers are more likely to receive treatment in a facility rather than the children of little educated women.

The Ministry of Health of Nepal has a strategy to extend case management on ARI to community health workers (FCHV and VHW). Lack of training to Village Health Worker / Community health worker in delivering necessary services for prevent diseases might be one constraint to provide service at the door step where mothers may not be able to leave their house in the rural or remote areas. This is further complicated by non-availability of trained health workers. The health workers should also be trained in improving communication with mothers in terms of explaining the consequences of disease and follow-up treatment. Mothers need to be taught to recognize sign of severity and when to seek health care. Therefore, community health worker must be trained to deal with this major public health problem. FCHV is the community health workers that closer with the community members and living closer with the families with sick children and available at any time. Being a member of the community, they also are familiar to use those words to understand ARI at the community.

Due to the quick progressive nature of ARI and the present inability of the existing health infrastructure to meet the needs of rural communities, many pneumonia cases do not get proper and timely treatment. In the given intervention, FCHV will be

supplied with primary antibacterial to treat pneumonia for one year. FCHV will provide a regular ARI prevention education message in their regular mothers group meeting. In this regard National Health Education, Information and Communication Center (NHEICC) will be requested to supply the IEC materials to the FCHV through SHPs. Village Health Worker of that village will help her to carry out these activities. The FCHV will also keep all the records of ARI morbidity and mortality among children under five with the help of VHW and appropriate forms will be given to them.

Therefore training to FCHV in the case management of ARI as well as support them with regular supply with essential antibacterial will be the best strategy to reduce morbidity as well as mortality due to ARI among under 5 children.

2.2 SIGNIFICANCE OF THE PROBLEM

Acute respiratory infections are the leading killer of children under 5 years of age in the world and most of these deaths occur in the developing countries. Some 15 million children under 5 years old die each year, among them 96% are from third world and about 1/3 of these die from pneumonia (Lancet, 1985).

In most developing countries, ARI is associated with a high fatality rate and are responsible for up to one third of all death in children under the age of 5. Changes in ARI mortality could have a considerable impact upon mortality from all causes in this age group (WHO, 1982).

ARI are common cause of attendance in the health service center by the infants and children of the developing countries. The burden of ARI is not only in loss of lives but also are the leading cause of disability, including deafness as a complication of otitis media. ARI are an expensive drain on merge health resources accounting for 30 to 50% of visit by children to health facilities everywhere. They are the condition for which antibiotics are most often prescribed and misused worldwide (WHO, 1995).

In south East Asia region, it is estimated that ARI take a total of about 1.4 million death in children under 5 years of age annually (WHO, 1996).

Table 2.2 Estimates of Acute respiratory infection and Diarrhea associates 1995

| Country | Total under 5 population (000) | Under 5 Mortality /1000 live birth | Total under 5 death | ARI associated Death | Diarrhea associated Death |
|--------------|--------------------------------|------------------------------------|---------------------|----------------------|---------------------------|
| Bangladesh | 17.46 | 117 | 500,218 | 168,574 | 123,554 |
| Bhutan | 0.26 | 96.9 | 6,730 | 2,268 | 1,662 |
| <i>Nepal</i> | <i>3.55</i> | <i>118</i> | <i>101,384</i> | <i>34,166</i> | <i>25,042</i> |
| India | 116.97 | 109 | 2,968,086 | 1,000,245 | 733,117 |
| Indonesia | 21.93 | 84 | 4,099,56 | 138,155 | 40,711 |

Source: World Health Organization (1996). The World Health Report

Table 2.1 shows the under 5-child mortality rate among SEAR countries. It is clearly stated that ARI is the first leading killer disease among under 5 children in Nepal. ARI and Diarrhea accounts more than 75 % of all child death from all causes. ARI account 30 to 35% of death among children. Infant and Child mortality is one of the major social health indicators of a country, as it represents sum of coverage of immunization, poor nutrition, inside house pollution, health services and health seeking behavior. It shows the total health status of the society as well as the country. If a society has a good health system then the mortality from various disease in child as well as in infants will be less. Infant and child mortality has significant influence on the demographic aspects like fertility performance of women in the society. Mothers in the developing world have no confidence in the survival of their children. Therefore they are unlikely to be attracted to the control of their fertility (Douglas, 1991). The rate of morbidity and mortality of ARI is also associated with standard housing, basic public health, medical services and adequate nutrition.

The infections are a leading cause of medical consultation and hospital admission in childhood and are the reason for prescribing drugs. In an average, a child in his/her first year of life experiences 5 to 8 episodes of ARI per year and at least 3 million children die annually in the developing world from the serious consequences of the infection (Pio Leowski et al., 1984). Another study confirms that there are five to eight episodes of ARI annually (Douglas, 1991), with an average of six episodes of respiratory symptoms occur annually, and is the same both in developed and developing countries (Douglas et al., 1990). A new episodes of ARI is one occurring in an individual, who has been free of symptoms for at least 48 hours (Miller et al., 1985).

The magnitude of ARI morbidity and its impact on the health services can be measured by seeing the consultation of ARI case at the health facilities, which represents 30 to 60% of total visits and 20 to 40% of pediatric hospitalizations. By this the developing countries are committing a large proportion of their health care resources to ARI cases (Cardenas et al., 1992). To measure the seriousness of a Public Health problem, not only morbidity or mortality are considered as important factors but also the number of years of life that have been lost. ARI being more fatal in infant and children, there is a huge number of lives that have been lost (Sounding board, 1982).

There is a sharp contrast in mortality due to ARI in developed and developing countries. ARI cause less than 0.2% of death in developed countries, but 10 % in the developing countries (Christen et al., 1986). Mortality due to ARI in the developing countries is 30 to 70 times higher than that of the developed countries (Pandey et al., 1988). Though, there is a big differences in mortality rate between children in developed countries and in developing countries, the incidence rate of ARI has no difference. But, there is difference in the severity of illness and adequacy of treatment. The most attributing significant factor for different diseases in developing countries is the lack of health services at the community level. Due to the lack of health facility, people are unable to take treatment in time. Due to the lack of trained health workers and essential drugs, it is difficult to treat the patient in time immediately, which will be followed by serious consequences for health. People are unable to take treatment in time because there is insufficient supply of medicines to the Sub-Health Post or Health Posts (community level health facility). Therefore, the mortality rate goes high among vulnerable groups specifically in under 5 children.

2.3 COUNTRY SITUATION AND ACUTE RESPIRATORY

INFECTION

2.3.1 Nepal:

Nepal is a developing land locked country located in between two big countries of Asia: China and India. The estimated population of Nepal for the year 1995 is about 21,918,000. It has an area of 141,718 Sq. Km. Only 13.8% of the population live in urban areas. Life expectancy at birth for male is 54 years and 53.2 years for female. Literacy rate among male is 39% and among female is 25% (CBS, 1996). Refer map of Nepal in appendix I.

There are three distinct ecological region in Nepal: the mountains (above 12000 feet high), hills (3000 to 12000 feet high) and Low land, called Tarai (100 to 3000 feet). More than 83% of the geographical area is rugged terrain and mountains where more than 17 million people live. Majority of Nepalese people is dependent on subsistence agriculture (CBR, 1987 and 1993). About 15% of total population of the country is comprised of children under 5 years of age (DHS, 1995).

Percentage of under 5 children * total population

$$= 15/100 * 20,028,483$$

$$= 2,948.057$$

Therefore, the number of under 5 children comes close to 3 million in the country.

2.3.2 Health Service Infrastructure

Health care in the past was provided by the traditional faith healers (called Dhamsi and Jhankri) and traditional birth attendants (TBA) at present, the health services are provided through a system of health network in the country. The basic level of the infrastructure is Sub-Health Post (SHP) and Health posts. Besides, Primary Health Care center and Districts Hospitals are the peripheral units providing curative, preventive and promotional services. Referral units like zonal hospitals, sub-regional and regional hospitals also provide some of the curative and preventive services. At the top are central level and national hospitals including medical colleges.

The Sub-Health Post is the grass root level Primary Health care provider institution in Nepal. In accordance with the National Health Policy of HMG, Nepal, 1991, a total number of 3199 Sub-Health Post has already been established. Sub-Health Posts (SHP) are located in each Village Development Committee (VDC), the most peripheral politico-administrative unit. These are the closest health institution for the community people which provide preventive, promotive as well as curative Health Services (PPMSD, 1991). Each SHP has three trained staff. One auxiliary health worker, one maternal child health worker and a village health worker. The village health worker and the MCH worker are the community members closer to the families with sick children and thus available at any time. They are trained to treat ARI case if they get sufficient antibiotic.

2.3.3 Drug Supply

Logistic Management Division (LMD) under the Ministry of Health, Department of Health Services is responsible for the procurement, storage and distribution of essential drugs as well as other health related commodities to the Health institution of Nepal. In the procurement procedure, contract is done to the drug supplier or manufacturer to deliver the drugs to the regional medical store or transit medical store. Sometime it is delivered only to the central medical store of LMD. In this case LMD itself delivers the commodities to the Regional Medical Store (RMS) by its own resources. Further supplies to the District Health Office is carried out by its five RMS and one transit medical store. Then the District Health Office supplies the drugs to the Health Post and Sub-Health Post for the use of the clients. Therefore far only outpatient treated at HP/SHP are given drugs but people in the community do not receive any drug from out reach workers like VHW, MCHW, FCHV and TBA.

2.3.4 Extent of ARI in Nepal

Nepal, one of the least developed countries in the world, has un-acceptably high infant and childhood mortality. One of the major causes of these deaths is respiratory infection. In a study of determinants of morbidity and mortality of ARI by Tupasi (1988) mentioned that mal-nutrition, non compliance with childhood immunization, crowding in sleeping quarters and low maternal education are closely associated with low socio-economic status. The study also shows that risk of acquiring ARI as compared with children from the upper socio-economic level was almost 5 times higher among children from the lower level. These factors are taken as predisposing factors

for acute respiratory infection.

In Nepal, 40,000 children under 5 years old die every year due to acute respiratory infections, which covers more than 1/3 of total child death in the country. More than 80 % of the death are due to pneumonia. The problem is particularly important in the Nepalese context because of the climate, terrain, and living condition of the people (MOH, 1992). The total percentages of different stages of ARI recorded in 1994/95 are given below. Most of the reported cases were pneumonia and severe pneumonia that need antibiotic treatment.

Table 2.3 Identified ARI case by stage in July 1994 to June 1995:

| Stage of ARI | % |
|-----------------------|-------|
| % of No Pneumonia | 40% |
| % of Pneumonia | 46.9% |
| % of Severe pneumonia | 13.1% |

Source: Department of Health Services, Nepal (1995). Annual Report.

The seriousness of ARI problem is prominent in the hill and mountain region of Nepal (Pandey et al., 1988). Hill and mountain represents 83 % of the total land of Nepal. In most of the part local food production is inadequate. Therefore, there are a lot of mal-nourished children who are the most important group affected by ARI and lead to high ARI mortality. 28 % of admissions in the children ward of a hospitals of Nepal were due to ARI and in a children hospitals of Nepal 37.8% of the admissions

were due to ARI during April 1982 to March 1983. At that time case fatality rate was 9.6% (Pandey et al., 1984). The mortality due to ARI during January, 1983 to December 1983 collected retrospectively was found to be 42.8/1000 in children under five years. This study was conducted in a mountainous village near the capital city of Nepal (Pandey et al., 1988).

Various studies indicate that on an average, 4 to 6 episodes of acute respiratory infections occur among the children under 5 years of age in Nepal (Dawson et al., 1996). On an average, a child experiences about 5 episodes of ARI each year (DHS, 1995). And most of the reported death occurs in rural areas.

2.3.5 Recommended Treatment for ARI in Nepal

The technical guidelines on the control of ARI, Ministry of Health recommends that oral co-trimoxazole should be given to pneumonia. The dose in children is one tablet (containing Trimethoprim 40 mg and Sulphamethoxazole 200 mg) two times a day for five days (For detailed refer to appendix IV). Logistic Management Division under Ministry of Health, Departments of Health Services supplies Co-trimoxazole (Trimethoprim 80-mg + Sulphamethoxazole 400 mg) as essential drugs to the health post and Sub-Health Post of Nepal. From the Sub-Health post, the drug is distributed to the patients for free of charge. This drug is cost effective compare to other primary ARI anti-biotic and anti-bacterial (refer appendix V for detail)

2.3.6 Government's Effort on ARI

1. The Ministry of Health, Nepal recognizes ARI as a major public health problem among under 5 children.
2. To treat the complicated ARI, Co-trimoxazole should be available at the health facilities in sufficient quantities.
3. Front line health workers should be in post and promote preventive measures as well as provide required treatment
4. The ARI program to focus on children under 5 years of age, because the majority of death in this age group are ARI related.
5. The Ministry of Health recognizes the need to follow the WHO guideline for the classification of ARI cases, which are
 - a) No pneumonia
 - b) Pneumonia
 - c) Severe pneumonia
 - d) Very severe disease

The government has the objective to reduce under 5 ARI related morbidity and mortality and to improve the situation of child health in Nepal by the year 2002. For this the government has two targets:

- a) Reduction of pneumonia mortality among the children of under 5 years age through proper diagnosis and management of cases.
- b) Reduction of ARI morbidity among the children of under 5 years age.

The annual reports of DHS, Nepal for the fiscal year 1994/95 mentions following strategies to achieve the targets:

a) Educate the mothers and child care takers in supportive care of the child and recognizes the sign and symptoms of ARI and pneumonia.

b) Develop a health education program aimed at the community in general and families in particular with the purpose of community awareness of ARI as a public health problem and encouraging active community participation in coping with the problem.

c) Train health workers and volunteers according to WHO guidelines on standard case management of ARI.

d) Support related activities to encourage breast-feeding, provide nutrition education, increase EPI coverage and promote maternal child health care and family planning services.

f) Deliver the program through the primary health care approach.

g) Utilize operational studies to define local ARI problems and measure the effect of the introducing new ARI approaches.

h) Continued monitoring of the ARI control program.

i) Strengthen the ability of District Health Office to supervise the program according to WHO guideline.

2.3.7 Female Community Health Volunteer (FCHV) Program:

The Female Community Health Volunteer Program (FCHV/P) was initiated during 1986/87 with the objectives of increasing involvement of rural women in promoting Primary Health Care services focusing on FP/MCH. Under this program, mothers group is formed in every ward by village health worker in collaboration with community leaders. More than one mother group may be formed depending on the

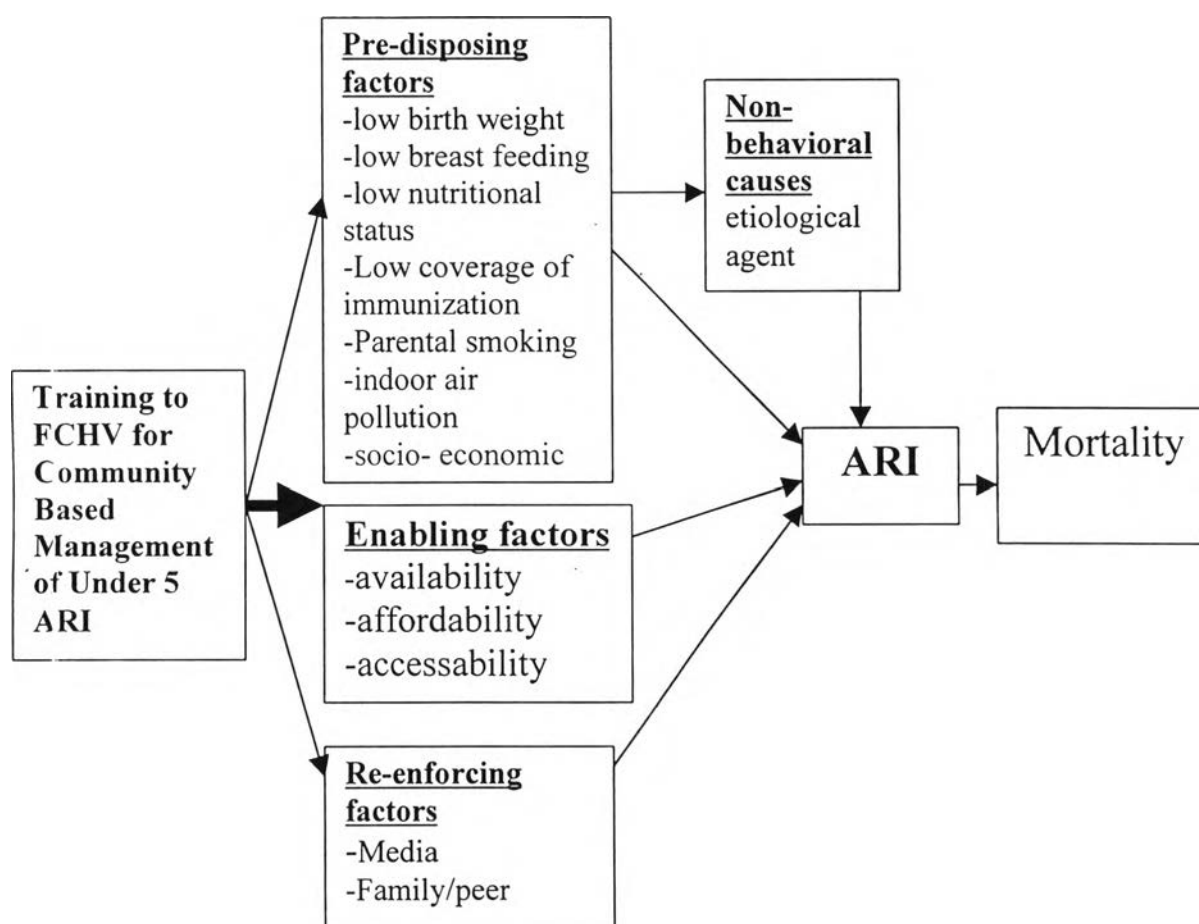
population. In a village, among the members of mothers group, one FCHV is selected with the help of village Health Worker. There are at least 9 FCHV (depending on population). This number may be more if the population of the ward is more than 250. The role of FCHV includes IFS, support to PHC out reach, EPI clinic, FP camps, distribution of ORS packet, contraceptives, minor treatment and referral services to health care facilities. The FCHV meets every six-month for two days at the SHP/HP/PHC centers to review their plan and progress, prepare plan for next six month and for collecting supplies such as drugs and devices. This occasion is also used for refresher and additional training. The FCHV selected by the mothers group is trained on PHC components and works as a volunteer for the health program at the ward level.

2.4 CAUSAL RELATIONSHIP OF FACTORS AFFECTING UNDER 5 ARI

The selected model was developed by Lawrence to assist health educators through evaluation of factors involved in planning community wide program. The original Proceed model (Green, Kreuter, Deeds and Patridge) was recently expanded and named the PRECEDE -PROCEED model (Green and Kreuter, 1990). I have slightly modified this mode. I have included only PRECEED part of the model. It explains the various factors that influenced the community based case management of ARI. In this modified model, these factors are described. All these factors are more or less responsible for ARI to the under 5 child.

The process to provide ARI case management services may be affected by different factors. Therefore, community based case management of under 5 ARI must be ready to deal and in the position to solve those factors which could have adverse impact on the process of intervention program and its achievements. The analysis factors affecting ARI are important in the planning of community based management of under 5 ARI.

Figure 2.1 A conceptual frame work showing the causal relationship of factors affecting Under 5 ARI



Source: The PRECEDE-PROCEED model for health promotion planning and

evaluation By Kaplan, Sallis and Patterson. Text book of HEALTH AND

HUMAN BEHAVIOR

2.4.1 Predisposing Factors of ARI:

ARI associated mortality in developed countries has declined dramatically during the past few decades because of widespread use of anti-microbial therapy. Immunization with DPT, measles and influenza vaccines improved health care management and adequate nutrition for infant and children. But in other hand developing countries has no such change made because of the standard of living continues to be associated with increase the risk of severe respiratory infections in children (Narain, 1987).

2.4.1.1 Low Birth Weight:

In Nepal, more than 30% of children's weight is below 2500 Gm. at the time of birth (MOH, 1994). The most important factors that predispose a child to severe ARI are low birth weight. Infants with weight below 2500 GM during birth have high chance of ARI during first year of life. In a study in England, Mortality per 1000 live birth during infancy was 26.4 among low birth weight children compared to 6.8 for children of birth weight of over 2500 gm (Narain, 1987).

2.4.1.2 Low Breast-Feeding:

Due to the illiteracy and poor socio-economic condition, women of developing countries do not know the importance of breast-feeding. Therefore unknowingly they do not continue breast-feeding for a required period. Proper breast-feeding reduces the risk of ARI morbidity and mortality. Although, there is little or no association between

breast feeding and the overall prevalence of ARI but a prospective study from India has shown an increased risk of ARI in bottle fed infants especially after four month of age. The protection offer by breast-feeding against moderate to severe ARI is more definite. The median relative risk of moderate to severe ARI is about 2-5 times higher in bottled fed infants as compared to breast fed (Singhi et al., 1987).

2.4.1.3 Malnutrition or Low Nutritional Status:

Mal-nutrition is found to be an important risk factor for ARI. About 49% of children of under 3 years of age are mal-nourished in Nepal. The overall ARI episodes were higher in mal nourished children as compared to the well nourished. The malnourished children were much likely to develop life threatening moderate and severe ARI. It was not only positively co-related with ARI but the risk was found to increase with the severity of the mal-nutrition (Pandey, 1987).

2.4.1.4 Immunization:

The immunization coverage is not satisfactory therefore far in Nepal. A successful immunization program covering at least 80% of all child under 5 years of age is likely to reduce the total ARI morbidity by 1.5-4 % and moderate to severe ARI by 2.5- 30% and ARI mortality by 5-20% (Singhi et al., 1987).

2.4.1.5 Parental Smoking:

70 % of mothers in the hill region of Nepal have smoking habit (MOH, 1994). Therefore, their children are more in danger from acute respiratory infection. Cigarette

or any other tobacco smoking contains many harmful chemicals such as carbon-monoxide, nicotine etc. There is 1.5- 2 times increased risk of moderate and severe ARI in children whose parents are smoker. The risk is greater when both parents smoke. Tobacco smoking by parents cause not only high morbidity and mortality in children due to ARI but in long term, there is possibility of chronic lung disease during their adult life (Pandey et al., 1987).

2.4.1.6 Indoor Air Pollution by Cooking Fire:

A study carried out in a hill district of Nepal, showed that children under one year of age, who spent longer hours at the fire place each day, were more likely to experience potentially life threatening ARI (Pandey, 1987). In developing countries, 30% of urban and more than 95 % of rural house hold use wood, cattle dung or crop residues for cooking and heating fire. The burning of fuel produces considerable amount of smoke, which contains carbon monoxide, oxide of sulphur and nitrogen. These are the causes of considerable domestic air pollution. Inhalation of these pollutants impair pulmonary defense mechanism and damage tracheo-bronchial mucosa which are likely to increase the susceptibility to respiratory infection (Singhi, et al., 1987).

2.4.1.7 Socio-Economic Factors:

Socio-economic factors such as income parental educational level, family size and housing may affect morbidity and mortality associated with ARI. Nepal is the least developed country and the per capita income is very low. Therefore, the population is

poor. People in hill and mountain have a poor housing. There is insufficient space and ventilation in the room. People think that more windows account more cold. Therefore the people do not construct ventilated room (thinking cold will cause ARI). This may be due to the ignorance and low literacy. Over crowding in the houses (Five members in one or two small rooms) were found to be the one, which was intimately related to the high incidence of respiratory illness. There is greater likelihood of ARI in large families than those with fewer family members. Seeking help from health facility is also too low.

The above factors cannot be solved within a short period of time. They take a longer time. In the intervention given by me, regular prevention message about the above factors will be given to mothers.

2.4.2 Enabling Factors

2.4.2.1 Availability

Availability of services is an important factor which influences the success of any intervention. Mothers of under 5 child with ARI need convenient availability of case management services. At present the, government has expanded the number of service delivery outlet and services are provided through hospitals, Primary Health Care Center, Health Post, Sub-Health Post, PHC out reach clinics etc. But the health facilities have a low supply of ARI anti-bacterial which is necessary for ARI case management. The Co-trimoxazole supply to Sub-Health Post in 1995 was 7.5 million tablets. For the treatment of one episode of pneumonia, 10 tablets of Co-trimoxazole

are needed and the total requirement reaches more than 40 million (refer to appendix X, XI, XII, and XII). Therefore, the above supplied quantity is not adequate even for one episodes of pneumonia, of which 60% are severe ARI. Therefore the current supply of drugs shows that there is a gross deficit of co-trimoxazole to treat pneumonia (LMD, 1995). In such case, there is a great chance of not getting proper treatment at the earliest. A better case management is possible only if there is adequate primary drug supply. Therefore trained in case management of ARI manpower can solve this problem by providing adequate treatment at the earliest and acceptable counseling at the doorstep with locally available resources. The children mortality was found higher in a village of Pyuthan district because of inadequate drugs and other technical facilities for the treatment of children (Puri, 1996). If there is adequate drug and other technical facilities in the closest health institution, more cases can be contacted for treatment and management will be better.

2.4.2.2 Accessibility

In Nepal, about 53% of the total population live in the hills and mountains. Because of the harsh terrain, transportation and communication facilities in this region, it is difficult to reach the health institution in time. In some places people have to walk 3-4 hours to reach the health facilities which is very costly to their family because they have to earn the money in the same days for food. In the hills and mountains, distances are measured by the number of days it takes to reach them. It often takes as many as five days to visit all the communities of one Village Development Committee (VDC). A study shows that long distance was the main reasons for not coming the health care services (Niraula, 1996).

The high maternal and infant mortality rates of Nepal are a product of low availability and utilization of health services. Difficult access to health services especially in the hill and mountain areas and women low confidence in health services due to lack of female health workers (NPC/HMG, 1996)

2.4.2.3 Affordability

In Nepal, majority of the rural population are estimated to be living below the poverty line. According to the world bank, "*by any reasonable international standard every one in Nepal is poor, except for a few professionals and business man and perhaps some large farmers*" (NPC/HMG, 1996). These are the level of poverty (about 40 % of house hold), a high dependency ratio (1500/10000), low per capita income (US \$ 170.00), a high population growth rate (2.1), external dependence for food, lack of safe water and sanitation and a general inadequacy of social support service infrastructure (Pandey, 1987). Above information shows that the socio-economic status is poor for Nepalese.

A typical poor family can produce food only three to six months of the year. Due to the poor access of food, 36% of the population in Nepal consumes less than minimum calorie requirement. This percentage is high in hill and mountain region of Nepal (NPC/HMG, 1996).

Knowledge about ARI among mothers play a vital role in the community-Based Management of ARI in under 5 children. The fatalities due to ARI are due to the fact that some children are brought to the contact of the Health workers too late or they are

brought at a stage when they are already too sick to respond to the treatment. The reason for this is lack of knowledge on the side of parents. Therefore, there should be great need of education about the key symptoms of ARI (WHO, 1981). In the given intervention, FCHV will give a regular education message about ARI to the mothers in their regular mothers group meeting. Therefore, access to knowledge will be easier to mothers (of under 5 ARI child) by the availability of trained FCHV within their community.

2.4.3 Re-Enforcing Factors

2.4.3.1 Mass Media

In Nepal, due to the poverty and illiteracy, there is low use of mass media by mothers. Only 17% of women are literate. Therefore, it should be kept in mind that during intervention, information education and communication activities should be together with other intervention activities. A study was conducted in Nepal recently which shows that only 5% of women read a newspaper once a week, 12% watch television once a week and 36% listen to the radio daily. Only 3% of women are exposed to all three media (Pradhan et al., 1996). There is a close relationship between the level of education and exposure to various mass media. Women with no education have almost no exposure to all three media.

The community should be informed about and involved in all stages of development of the program which will be important in generating demand, the use of case management services and collection of essential statistics (Tang et al., 1990)

2.4.3.2 Family /Peer

In Nepal, women share in decision making with their husbands about children need and relation to the outside world such as being sent to school or taken to health facility. The friends and neighbors can influence to take services from the health worker. They talk to their friends about the advantages, dis-advantages, dealing of the service point taken by them from the health worker or health facility. A study done by Pradhan et al., 1996, shows that using of health facility by women is 34% by the advised of their husband, 20% of women were advised by their friends and neighbors, 18% by health personal and 7% by other relatives. Approximately 60% of the women are taking their child to the health facility with the advice of husband, friends and relatives (Pradhan et al., 1996). Twenty percent of women are affected by their peers.

2.4.4 Non-Behavioural Cause: Etiological Agent

Acute respiratory infections result from collusion of three factors which are, infectious agent-Bacteria and virus; Child genetic make-up and immune system and Environment (Pandey, 1987). A large number of infecting agents are involved in ARI. These include viruses, bacteria, and a range of parasitic agents (Douglas et al., 1996). It has been clearly established that the main causes of death in young children in developing countries are bacterial pneumonia whether primary or secondary to viral infections. The predominant organism responsible for severe ARI is streptococcus pneumonia, and haemophilus influenza among untreated children (Pandey et al., 1991). Transmission of majority of respiratory pathogens occurs more on a person to person basis through respiratory and naso-pharyngeal secretions. In ARI of bacterial

etiology, a person responsible for transmitting infection is likely to have had an antecedent upper respiratory illness probably of viral etiology more than any other time.

2.4.5 Acute Respiratory Infection

The Acute respiratory infections have been classified in three groups. Upper respiratory infection, which include pharyngitis, tonsillitis, sinusitis and otitis media. Mid respiratory tract infection includes laryngo-tracheal bronchitis and epiglottitis. Acute lower respiratory tract infections (ALRI) include bronchiolitis and pneumonia (Khan et al., 1996). There are three serious types of ARI, one is Pneumonia; which is marked by inflammation of the lungs with fluids filling air spaces in the lung. Next is Bronchiolitis; Inflammation of the small air passages and the third one is Laryngitis or inflammation of the upper part of the wind- pipe (Pandey et al., 1987). Acute infection of the lower respiratory tract, specifically pneumonia. Children are a major public health impact because among all ARI death, 90 % of the death are due to pneumonia (WHO. 1996).

It is well accepted that traditional. etiological or anatomical classification is not necessary for management oriented decisions. The ARI can be categorized into mild, moderate and severe forms on the basis of three simple clinical manifestations, i.e. rapid respiratory rate, presence of breathing difficulty and inability to drink. If any of the above symptoms are present, it indicates moderate or severe forms, which need to be treated with antibiotics.

2.4.6 Prioritization of Causal Selection of Factors

The PRECEED-PROCEED model that I used has three broad categories of factors which affect the ARI problem as: predisposing, enabling and re-enforcing factors. I am selecting the category that are appropriate for intervention are on the basis of feasibility of action and the strength of their effect on the problem. I have designed my study to target the enabling factors because they can be acted accordingly.

The predisposing factors, described as low birth weight, low breast feeding, low nutrition, low coverage of immunization, parental smoking and poor housing; can not be solved within a short period. The predisposing factors described in the model are complexly interrelated with each other and depend upon human behavior, standards of living, illiteracy, poverty etc. These factors are widespread and difficult to change. According to World Bank *by any reasonable international standard every one in Nepal is poor, except for a few professionals and business man and perhaps some large farmers* (NPC/HMG, 1996). To solve these factors, some long-term strategies are needed which can not be implemented without the full support of government.

Reinforcing factors are usually social feedback that encourages or discourages behavior change (Kaplan et al., 1993). The media and family/peer support play major roles in achieving success in any program. Family norms, belief, culture and traditions however, also cannot be changed within a short time. Only media campaigns or family pressure alone can not affect the problem. Re-enforcing factors may generate greater demand for health services. However, if there are not good services available, there is

the possibility that the demand may be translated into frustration rather than leading to sustained behavior change.

The lack of enabling factors are usually thought of as barriers to change which include limited facilities, lack of income, promotion of use, healthful behaviors, etc (Kaplan et al., 1993). Such conditions that are created by social systems are more easy to change compared to their norms and culture. Here we are focusing on the health system. The availability, affordability and accessibility of health services have direct and significant effects on health behavior. One of the significant attributing factors for many health problems in developing countries, is lack of health services at the community level. If quality health services are available and accessible to the people, it can generate its own demand. People are found to value more highly health services in the presence of symptomatic health problem. As the present problem; ARI, has notifiable symptoms, people are found to seek treatment. Hence, enabling factors were assigned higher priority for intervention related to treatment of a illness in this study.

2.5 POSSIBLE STRATEGY FOR THE REDUCTION OF ARI IN CHILDREN:

To reduce the high under 5 ARI mortality globally, different types of strategy are suggested. Some of the important are: health education to the community, adequate supply of ARI anti-bacterial, emphasize the appropriate training of health workers, maximizing the access, immediate referral to well equipped hospital, increase the immunization coverage, pneumo-coccal vaccine, integration of health services to the

other health programs, etc.

2.5.1 Health Education to the Community

The fatalities due to ALRI are due to the fact that some children are brought to the contact of the Health workers too late or they are brought at a stage when they are already too sick to respond to the treatment. The reason for this is lack of knowledge on the side of parents. Therefore, there should be great need of education about the key symptoms of ARI. This includes rapid breathing, indrawing of the chest and cyanosis. Not only the key symptoms but parents should also be educated about care of the sick child including the importance of providing the child with sufficient fluid and a moderate environmental temperature. In fact, appropriate supportive care may help to prevent a mild case from developing into a severe one. Health education increases the capabilities of families to recognize a child with pneumonia and decide when to seek help (WHO, 1984). Educating the community in simple supportive therapy of ARI as well as avoiding of using ineffective remedies, promoting timely immunization, promotion of breast feeding, reducing parental smoking are the most effective control measures in ARI. But health education not only a solution if the people can not afford the medicine. A child having ARI (pneumonia) can not be saved without a appropriate antibiotics.

2.5.2 Availability of Drugs

The availability and effectiveness of drug is a key factor in generating and maintaining public interest and participation in health related activities. Initially, the

credibility of health workers depends on their ability to save a dying child with a course of appropriate drugs. The underlying factors like malnutrition, poor sanitation, inadequate housing and poor economics, deprivation to health cannot be ignored but at the same time we can not ignore the importance of essential and potentially life saving medicines (MDS, 1982). Adequate and timely supply of drugs to the health facility is helpful to gain the acceptance of the public. It must be available at the health facility because leading causes of discomfort, disability and death in the developing countries are often preventable and treatable with medicines (WHO, 1997).

2.5.3 Availability of Trained Staff

The availability of trained staff and facilities, which are accessible to the population, are necessary component of Primary Health programs but they alone are not sufficient to provide effective health care (WHO, 1984). Studies shows that cotrimoxazole if given in an appropriate time can prevent death significantly from pneumonia. Studies has shown that a Community Health worker trained in case management of ARI as WHO case management strategy is effective for the reduction of ARI mortality to a significant level (Pandey et al., 1991).

2.5.4 Maximizing Access

In Nepal, Government has established a sub -health post for each 4000 thousands population in the country. But even now, contact to health facility is too low. Only 15-18% of mothers of under 5 child with ARI are contacting to health facility (Pradhan et al., 1996). Therefore, the training to the Female Community Health

Volunteer (FCHV) in case management of ARI will be most effective for the reduction of ARI morbidity as well as mortality of ARI in the country.

In Nepal, the primary drug supplier from the government sector is Logistic Management Division, under the Ministry of Health. It is also responsible for procuring, maintaining and transporting the drug supply to the grass root level of health institutions. This process involves all steps from getting drug from the supplier to distributing the drug up to the Sub-Health post. From there, the drugs goes ultimately to the individual patients.

2.5.5 Immediate Referral to Hospitals

Child having pneumonia or severe pneumonia could not be prevented without appropriate antibacterial. Along with this, it is needed to manage a child more carefully means needed oxygen and drip. A child can be saved by referring to a well equipped hospital. But due to the difficult topographical situation, it is not possible in Nepal. 83% of the land is covered by hill and mountain and the transportation facilities is also very poor (Pradhan et al., 1996). These types of facilities are only available in urban areas.

2.5.6 Immunization and Pneumo-Coccal Vaccine

Immunization is also helpful to reduce the under 5 mortality in some extent. Some factors limit the usefulness of the effective vaccines that are currently available. Live vaccines specially measles vaccines are heat liable and therefore, require

refrigerated distribution system. This requirement creates difficulties in summer season especially in summer areas (Berman and Kenneth, 1990). The exposure of infants during the first year of life is more prominent. Therefore, measles require an immunization at six month with a little booster rather than only one immunization.

Pneumo-coccal vaccines also documented a beneficial effect on over all respiratory morbidity and mortality in children but the vaccines can not be expected to effect significant effect in infants (Berman and Kenneth, 1990).

2.5.7 Integration of Health Services with other Program

Children living in areas with limited access to primary medical care are at high risk of dying pneumonia. Mortality is usually highest in rural areas where primary health care services are lacking. An integrated approach to ARI case management services can decrease the ARI mortality among under 5 children (Berman and Kenneth, 1990). The ARI clinic should be incorporated with other health programs as immunization, nutrition, formal and non-formal education etc.

2.6 Case management of under 5 ARI children at the community by

FCHV

To reduce the under 5 ARI related mortality, there should be an assessment of the structure and coverage of the existing primary health care system. There are four level of Primary Health Care; the family, the community, the first health care facility and the referral facility. Unfortunately areas with the highest ARI associated mortality

are the most difficult areas. The most effective ways to expand the services in these areas is through the work not of Physicians but of nurses or other primary health care providers who are trained to diagnose and manage respiratory infection (Berman and Kenneth, 1990).

Early use of antibiotics is an effective strategy for preventing death due to pneumonia. The anti-bacterial intervention is recommended based on the following assumptions; large number of children who die of pneumonia caused by *S. Pneumonia* and *H. Influenza* if early therapy to these agents can prevent many of the deaths and the use of antibiotics by non-Physicians in this setting will not lead to adverse outcomes (Berman and Kenneth, 1990).

A study done in Tanzania, shows that the ARI mortality was dramatically reduced after the training of health workers in the case management of ARI according to the case management guidelines developed by WHO (Mtango and Neuvians, 1986).

In the efficient case management strategy as proposed by WHO to control ARI mortality; the use of Co-trimoxazole is warranted in developing countries for community level treatment of pneumonia in children. At the primary health care level, supplies of primary antibiotics should be in adequate quantity. Case management approaches, making antibiotic available on a rational basis world wide for ARI, are capable of saving lives.

2.7 ACTIONS NEEDED

The great majority of life threatening respiratory infections are bacterial in origin and respond readily to timely treatment with antibiotics. The most immediately available measure to avert most pneumonia death is treatment with an appropriate antibiotics (WHO, 1990). The availability of effective antibiotic drugs offers a bio-medical response to this problem and the health worker can prescribe antibiotics for those children most likely to be suffering from pneumonia (WHO, 1994).

Children with pneumonia and severe pneumonia are at high risk of death in developing countries, but access to clinical services is very limited. Previously access to clinical services was limited due to scattered health services facility and lack of trained health staff. Recent introduction of Acute respiratory infections case management approach by WHO, which advocates that pneumonia should be diagnosed early before it becomes life threatening requires availability of primary antibiotics available at the community. For this, emphasis on minimally trained health worker which can recognize signs of severe ARI and teach the mother about it are relevant to two management decisions, and provide essential antibacterial for a child with severe acute respiratory infection is important. They can help the child to be treated at home or refer to a hospital.

The finding of a case control study, conducted in a sub-urban area of Mexico city, the crude etiologic fraction of ARI fatalities among children that could have been avoided through antibiotic use was 54% (Cardenas et al., 1992). Child death from respiratory infections have greatly decreased in the industrialized countries over the

past century because of Socio-economic changes and the wide spread use of antibiotic therapy particularly for pneumonia (Pandey et al., 1987). These shows that an appropriate antibiotic child mortality will decrease.

A prospective pilot study on ARI carried out in a rural community in the hill region of Nepal, has established that it is technically feasible to reduce ARI mortality among children under 5 years of age by at least 50% through effective case management approach (using appropriate antibiotics, if and when necessary) within the primary health care concept. Case management of ARI including anti-microbial therapy should be based at Health post level (Pandey et al., 1988) due to Health post is the nearest Health institution for the villagers. However, non-availability of trained health workers, remoteness of villages, low health seeking behavior and ignorance about the seriousness of ARI demands that the service is available at the door step, which is possible only if we could train the FCHV and it seems feasible too in Nepalese context.

According to the WHO decision strategy, with a 5 days home treatment course of co-trimoxazole in a mountainous district of Nepal was carried out among 13404 children under 5 years age. This was relied exclusively on indigenous health workers to detect and treat pneumonia. No other health services were provided and referral of children to hospital was not possible due to distance and unavailability of services. This program laid to a 28% reduction in the risk of death from all causes by the third year of services. Low literate villagers without previous health knowledge can be trained to detect and treat childhood pneumonia effectively even without other health or referral services and this intervention alone can lead to a significant overall mortality

reduction. Indigenous community workers can effectively detect and treat pneumonia and reduce overall mortality, even without other primary care activities (Pandey et al., 1991).

Another community based intervention trial to reduce childhood mortality from pneumonia in Gadchiroli, India was conducted in 1990. The intervention included case management of pneumonia by paramedical, village health workers and traditional birth attendants who were trained to recognize childhood pneumonia and treat it with co-trimoxazole. By this intervention, parents sought treatment and the coverage was 76% without active case detection efforts. After a year of intervention pneumonia specific childhood mortality was significantly lower in the intervention areas as 8.1 Vs 17.5 death/1000 children under 5 years (Tang et al., 1990). A study conducted in rural Bangladesh to see the impact of a community based program to control acute lower respiratory infection's through community health workers showed that ARI mortality among under 5 children was lower 28% than in comparison area.

The above studies shows that a community health worker / indigenous health worker can effectively detect and treat pneumonia with simple case management training according to WHO case management guidelines. Therefore, training of FCHV on ARI case management and sufficient supply with primary antibacterial to treat severe ARI could be successfully carried out.

2.8 CONCLUSION:

FCHV are community members living close to village members with a sick children and thus are available whenever necessary. Being a member of the community, they know their community well and will use the same terminology as the mothers of a child and can explain the signs and symptoms in a local term that the mother of a child can understand better. By training to FCHV in the case management of ARI, this will also help the mothers to seek health care in early stage. This will help in getting necessary treatment or referral timely. Similarly, the mothers will acknowledge supply of primary antibacterial for the management of severe ARI at the doorstep and looking nationally, it will help to reduce the morbidity as well as mortality due to severe ARI.

The above description of several factors causing and promoting acute respiratory tract infection among under 5 children are more or less equally responsible. Among these, availability of an appropriate antibiotic is the most important one because if a child with pneumonia is not treated appropriately during the episodes of ARI, all the later measures might be considered useless. In the case management of children with acute respiratory infection recognition of different stages of ARI, treatment of simple pneumonia cases, appropriate home care by mother with the help of FCHV and referral of severe cases by female community health worker to health posts and PHC or Hospital are important. Different studies show that antibiotic with a simple case management training in ARI reduces the incidence of severe ARI and mortality due to ARI in a significant way (Pandey et al., 1991). With a short orientation on ARI signs

and symptoms to a grassroots level health worker like FCHV, the health worker can effectively detect and treat pneumonia and reduce over all mortality even without other primary care activities. If there is adequate supply of antibiotics with the FCHV to provide to the child with ARI and regular supply at the health institution (HP and PHC), certainly the mortality due to severe acute respiratory infection will decrease. Therefore training to FCHV with supportive activities on ARI case management could be one of the major intervention to reduce morbidity and mortality from ARI in Nepal.

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