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**HEALTH
SCIENCES**

SOHAIB AHMED KHAN

***Poliomyelitis
in Socio-Cultural Context***

Study from Province Punjab, Pakistan

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EASTERN FINLAND

SOHAIB AHMED KHAN

*Poliomyelitis in socio-cultural
context – Study from province
Punjab, Pakistan*

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Editors:

Professor Veli-Matti Kosma, M.D., Ph.D.

Department of Pathology, Institute of Clinical Medicine

School of Medicine, Faculty of Health Sciences

Professor Hannele Turunen, Ph.D.

Department of Nursing Science

Faculty of Health Sciences

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Author's address: Institute of Public Health and Clinical Nutrition
University of Eastern Finland
P.O.Box 1627
FI-70211 Kuopio, Finland

Supervisors: Professor Jussi Kauhanen, M.D., Ph.D.
Institute of Public Health and Clinical Nutrition
University of Eastern Finland
Kuopio, Finland

Professor Tuula Vaskilampi, Ph.D.
Institute of Public Health and Clinical Nutrition
University of Eastern Finland
Kuopio, Finland

Clinical Lecturer Marja Aira, Ph.D.
Institute of Public Health and Clinical Nutrition
University of Eastern Finland
Kuopio, Finland

Reviewers: Professor Anssi Auvinen, M.D., Ph.D.
Tampere School of Public Health
University of Tampere
Tampere, Finland

Professor Jorma Virtanen, Ph.D.
Department of Public Health
University of Helsinki
Helsinki, Finland

Opponent: Professor (emer.) Sirpa Janhonen, Ph.D.
Institute of Health Sciences
University of Oulu
Oulu, Finland

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ABSTRACT

Poliomyelitis is an infectious disease, which is still endemic in four countries in the world: Pakistan, India, Afghanistan and Nigeria. Eradication activities focus mainly on the mass immunization of children under 5 years age with OPV (Oral Polio Vaccine). The present study explored the disease in context of social conditions and cultural influences and behaviours in province Punjab, Pakistan. A questionnaire survey was conducted in case-control design to investigate the socioeconomic factors, with 51 cases and 400 controls from high-transmission-zone for polio virus in the province Punjab. Results of this questionnaire survey were further seen in the light of latest available census data of these high-transmission-zone areas and the overall province. In addition to this quantitative approach, in-depth interviews were taken from laypeople and official vaccinators in one part of high-transmission-zone area focusing on the perceptions and cultural aspects of the common attitudes and responses to immunization process and the disease. Significant association was found between family's economic conditions and the presence of disease, but when studied separately for fathers and mothers, it was significant only for father's income and employment status. Similarly only father's education status was found to be linked to the disease status and not the mother's. Health education level and the belief in vaccination were found to be low in case families. Cultural patterns were revealed influencing this phenomenon. Trends in the utilization of health-care services were traced, which showed a greater tendency of laypeople to prefer the folk sector of health care providers and quacks over the professional health care services. Gender barriers were observed in the society, which restrict an easy contact and communication between women and men for medical consultation and health education. Parents were found to have different attitude towards the education of boys and girls, where sons are seen as potential earners and the daughters are to learn the household skills. Suggestions based on these social and cultural phenomenons are given for the vaccination campaigns and overall eradication activities for poliomyelitis in these areas.

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Abbreviations

| | |
|---------|---|
| AFP | Acute Flaccid Paralysis |
| BHU | Basic Health Unit |
| DC | District Coordinator |
| DHQ | District Head Quarter |
| DSC | District Surveillance Coordinator |
| EMRO | Regional Office for Eastern Mediterranean |
| EDO(H) | Executive District Officer (Health) |
| EPI | Expanded Program of Immunization |
| IM | Intra Muscular |
| IPV | Inactivated Polio Vaccine |
| KIHD | Kuopio Ischemic Heart Disease risk factor study |
| LHW | Lady Health Worker |
| MMR | Measles Mumps Rubella vaccine |
| MO | Medical Officer |
| NIDs | National Immunization Days |
| NS cell | National Surveillance cell |
| NWFP | North West Frontier Province |
| OPV | Oral Polio Vaccine |
| PEI | Polio Eradication Initiative |
| RHC | Rural Health Centre |
| RNA | Ribonucleic Acid |
| SIA | Supplemental Immunization Activity |
| SNIDs | Sub National Immunization Days |
| SO | Surveillance Officer |
| TH | Teaching Hospital |

| | |
|--------|--|
| THQ | Tehsil Head Quarter |
| UNICEF | United Nations Children and Education Fund |
| VAPP | Vaccine Associated Polio Paralysis |
| WHO | World Health Organization |

1. Introduction

The interaction of the human pathogens and the human physiology results in an abnormal functioning of the human life - an infectious disease. Although, very many different diseases have been identified, infectious diseases are somewhat different from others in the sense that the pathogens that are responsible for these diseases are capable of rapidly passing themselves on from one victim to the other, by using a variety of routes that may include direct physical contact, droplet contact or faeco-oral route etcetera. In view of this fact that microbial pathogens that are responsible for infectious diseases are capable of rapid transmission, the management of infectious diseases is of considerable interest to humans, because if correct treatment and management procedures are not applied rapidly, very many people can fall ill and the damage in terms of fatalities and/or costs of treatments can be substantial. This factor of transmission brings in the role of yet another influence - the human civilization. Human civilization and the way it affects the environment has been identified as the third dimension to this process of infectious disease (Waldvogel, 2004).

The continuous evolution and enormous diversity of the microbial world, and the limitations in our diagnostic and therapeutic approaches, and living in an era in which it is possible for the environment in which a human person exists to also change rapidly, tells us that the challenges associated with combating infectious diseases require novel and creative solutions, and further highlights the significance to study and understand the impact our social life exerts on our health. And even though human ingenuity and capacity to carry out manipulations at cellular or molecular levels often does provide an edge in the ongoing war with the pathogens of the microbial world, and although a tendency does exist to somehow focus on the more technologically sophisticated aspects of the management of infectious diseases, it is still appropriate to examine the more basic considerations associated with prevention, hygiene and healthy living to prevent and contain any

outbreaks. Social processes not only determine the ability of individual, but also of the society to provide itself with requirements to maintain good health. And the identification of these social processes can give clue to the interventions that can improve the health of a whole population, without having to resort to the expensive emergency measures which are required if an epidemic occurs (Sarol 1995; Galea, 2007). But the horizon of these social processes is very wide, including the economic, educational and living conditions as well as the lifestyles and cultural factors, and these all act through multiple pathways and determine the health status of the individual and the society (Gupta and Kumar, 2007).

Poliomyelitis epidemics paralyzed thousands of children in the 19th and 20th centuries, which prompted scientists and researchers to investigate the basics of the disease, factors involved and the possible prevention and treatment strategies (Global Polio Eradication Initiative, 2007). Immunization campaigns have been the key effort but then among other factors, various social and cultural influences have been reported by studies in different parts of the world, preventing the communities and populations to get high vaccination coverage. Quite understandably these socio-cultural phenomenons are found to have different roles and strengths in different societies, but still more is needed to be learnt about the characteristics of the children, areas and health care providers (WHO's Commission on social determinants of health, 2007). Pakistan is one of the very last few endemic countries today but not many studies have investigated how the social and cultural lives of lay people influence and interact with the poliomyelitis and its immunization situation in the country.

2. General background

2.1. POLIOMYELITIS

Poliomyelitis is an infectious disease which is caused by a virus. It can affect the nervous system causing paralysis of body muscles like in limbs, and muscles of respiratory system and swallowing, so may be fatal. In over 50 % of the cases it victimises children below the age of 3 years, thus being known as Infantile Paralysis, so in general children under 5 years of age are considered to be at increased risk to get this infection.

Polio virus is a RNA virus which has 3 serotypes: type P1, P2, P3. Infection with any one of these three serotypes does not protect the person from future infection by other two serotypes. P1 infections are most common, while P2 serotype is considered to be eradicated from the world due to high immunogenicity of the vaccine against this serotype.

Polio virus transmits from person to person, with transmission usually through the faeco-oral route. Faeces of infected people contain the virus which can spread to other people in bad hygiene conditions through the contaminated food, water or utensils etcetera. Flies also play a role in transmission of virus from faeces to food or water.

There is no long term carrier state but the infected people shed virus in faeces for several weeks, thus putting all the people in contact on risk. There is no animal reservoir and the virus only infects humans. Virus cannot survive long in the environment outside the human body.

In the human body initially it infects the intestines and later may spread to affect the nervous system. This happens in less than 1 % of all infections that virus invades and destroys the motor neurons (cells which activate muscles). These neurons cannot be regenerated and it leads to the onset of typical irreversible paralysis. If it affects the anterior

horn cells in the spinal cord, it paralyses the muscles in limbs or trunk including the respiratory muscles, termed as Spinal Polio. Limbs become floppy and the condition is termed as Acute Flaccid Paralysis AFP. When the neurons in the brainstem area are involved it may lead to paralysis of swallowing muscles, muscles of eyeball movements- this is named as Bulbar Polio.

Most infected people (90-95%) remain asymptomatic, while in less than 10% there are minor short term symptoms like headache, fever, stiff neck and back, muscular pain, lethargy, sore throat, vomiting, malaise etcetera. The incubation period is about 7 to 14 days.

Certain risk factors are identified which may aid in leading to paralysis after infection with polio virus. These risk factors include immune deficiency, pregnancy, tonsillectomy, IM injections, and injury (Park, 2004).

Poliomyelitis is not curable but preventable. Natural infection or immunization using vaccine usually protects the children for almost lifetime. But there may be some failure cases. 2 types of polio vaccine are available: a live attenuated trivalent Oral Polio Vaccine (OPV) and an Inactivated Polio Vaccine (IPV). OPV was developed by Albert Sabin in 1961. IPV was developed by Jones Salk in 1955. OPV is the vaccine of choice to fight the disease due to the fact that in addition to producing antibodies in the blood (which protects the person from spread of polio virus to central nervous system); it also induces local intestinal immunity, thus interrupting the wild polio virus transmission. And also the OPV is cheaper and easier to administer as compared to the IPV. But OPV being a live attenuated vaccine can cause vaccine associated polio paralysis (VAPP) (1 in 3 million doses). WHO recommends that every child must get 4 doses of OPV before the age of one year, starting with a 'zero dose' at birth and each dose 3 to 4 weeks apart, and one dose comprises of 2 drops of oral vaccine. Children with immune deficiency conditions must not be given the OPV, instead IPV must be used.

Treatment of poliomyelitis is entirely symptomatic as there is still no cure of the disease. Anti-spasmodic drugs and physiotherapy are used to aid muscle relaxation. Crutches and

wheelchairs are needed by the patients. In past Iron Lungs (picture 1), which were metal cylinders, were used to regulate the breathing. Nowadays positive pressure ventilators are being used (Global Polio Eradication Initiative, 2007).



Picture 1: Iron Lung ward at Rancho Los Amigos Hospital (Wikimedia Commons, 2004).

2.2. POLIOMYELITIS ERADICATION ACTIVITIES

2.2.1. History



Picture 2: Representation of a polio victim, Egypt 18th Dynasty (1550-1292 BCE) (Wikimedia Commons, 2007).

Poliomyelitis is a prehistoric disease. Egyptian remains show pictures of people crippled and paralysed (picture 2). Its effects have also been witnessed in the Roman age. In the nineteenth century, the disease was studied by "Jacob von Heine" who put forward the idea that the disease may be contagious. In the late nineteenth century, the first significant outbreak of polio disease was reported. In early twentieth century, a virus was discovered to be its cause, and vaccine development became the prime focus.

Immunization with the OPV was launched as a large area campaigns in Eastern Europe and successful results of these campaigns paved the way to devise a global effort to eradicate the disease. Expanded Program on Immunization EPI was designed by World

Health Assembly in 1974 to provide the children with all the basic vaccines in one campaign, and OPV was included in it. Global polio eradication initiative has been the biggest public health campaign till this day, taking its start from the decision at World Health Assembly in the year 1988, in Geneva, when there were about 1000 children getting affected by the disease around the world in 125 endemic countries in one day. A process was formulated for the certification of polio eradication on the basis of experiences gained during the campaign against smallpox. The ultimate aim was to stop transmission of virus by the year 2000, containment of wild polio virus by the year 2002, to eradicate poliomyelitis by the year 2005, and to stop the immunization from 2005 to 2010. Although these targets could not be met and the disease is still here, but as a result of this campaign of massive magnitude, now only four countries are left where poliomyelitis is still endemic. These countries include Pakistan, India, Afghanistan and Nigeria. Thus Pakistan being in this last endemic group garners special attention. Together with Afghanistan, it constitutes a single major epidemiological block of polio virus transmission, based on epidemiological and genetic sequence data.

Areas with Indigenous Polio



* as of 8 July 2006

Figure 1: Areas with indigenous polio (UNICEF, 2007).

According to the updated global polio eradication initiative strategic plan 2004-2008, transmission of virus was to be stopped till 2004-2005, polio eradication certification by the year 2008, and to stop immunization activities by 2009 and beyond. But the problem still continues despite the passage of years since 1994 when the Region of the Americas AMR was the first WHO region to be declared free of wild polio transmission..

Besides World Health Organization, national governments and non-governmental organizations on international and national levels are joining hands to eradicate polio, and forming a global polio partnership (Global Polio Eradication Initiative, Strategic Plan, 2004-2008).

2.2.2. Strategies

WHO advocates the following strategies to meet the targets:

A. Immunization activities (routine and supplementary)

Routine immunization comprises of at least three doses of oral polio vaccine, 4 to 6 weeks apart, to all the children below 5 years of age. National immunization days are arranged, when trained vaccinators move from door to door to reach each and every child.

Supplementary immunization activities comprise of additional activities with the purpose to access all the children who could not be reached during routine immunization coverage.

B. Acute flaccid paralysis surveillance

AFP surveillance is the system to seek out information about the cases of rapid onset of floppy weakness (of any cause) in children. This chain of detecting, reporting, differential diagnosing, follow-up and monitoring activities constitute the core component of polio eradication activities. The process should ideally work smoothly and quickly from the lowermost health care setup at the community level to the district and provincial level and ultimately to the federal surveillance unit.

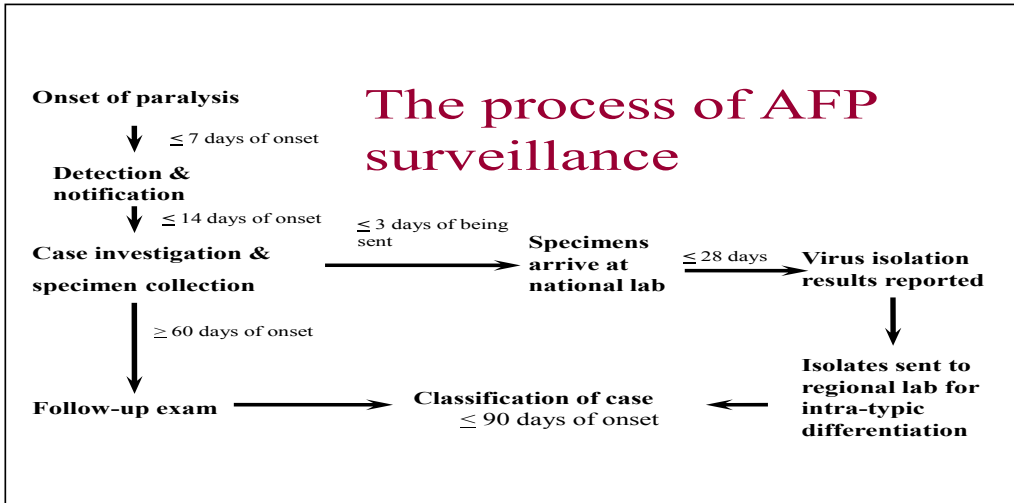


Figure 2: The process of AFP surveillance (WHO National Surveillance Cell, Pakistan, 2004).

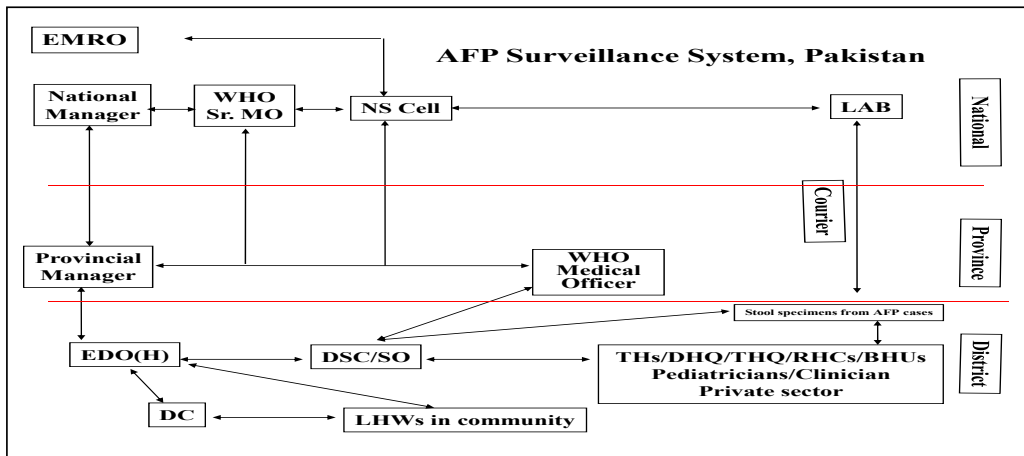


Figure 3: AFP surveillance system in Pakistan (WHO National Surveillance Cell, Pakistan, 2004).

C. Mopping up immunization

It refers to the immunization activities specifically focused on the areas of continued wild virus transmission. Mopping up immunization is the endgame strategy when the virus is restricted to a limited area.

Above mentioned strategies resulted in the disease eradication from three WHO regions (the Region of the Americas, Western Pacific Region, and European Region) and as described above now only 4 countries are endemic with poliomyelitis, with total number of polio cases reported in 2008 to be 1655 around the world (Global Polio Eradication Initiative, Strategic Plan, 2004-2008).

Polio eradication activities began in Pakistan in the year 1994. Over the past few years, progress has been made in implementing polio eradication strategies and reducing the transmission of polio virus in Pakistan, resulting in less number of cases being reported than the previous decades. The government of Pakistan has invested substantial human and financial resources to meet the global eradication goal. In addition, a large proportion of total budget as well as advanced technical and logistics support has been provided by the international partner agencies. But still high-transmission-zones exist in all the four provinces; Southern-Punjab area has been identified as the only high transmission zone in Punjab. At these near-end stages of national and global poliomyelitis eradication efforts it is of crucial importance to study and understand how the socio-cultural processes in these areas of Pakistan may or may not be a concern for the health authorities.

2.3. PAKISTAN

“Islamic Republic of Pakistan” is a South Asian country, having borders with the Arabian Sea in south, India on the east, Iran and Afghanistan on the west, and China in the north.



Figure 4: Pakistan.

Historically the roots have been traced back to the Indus valley civilization, and the area has seen invaders and migrants from Arab, Persian, Afghan and British empires among others over a period of centuries. A very diverse land ranging from glaciers and mountain ranges to plain strata and even deserts, divided into 4 provinces; Punjab, Sindh, North-West-Frontier-Province (NWFP) and Balochistan. Though Islam is the religion of vast majority of population in all the country but then the provinces show very different cultures and life styles from each other, with different ethnic groups, and often the similarities are more pronounced across the country-borders than the provincial-borders; for example NWFP province which shares the border with Afghanistan, and many same tribes and branches are located on both sides of border and thus are similar in many ways in their lifestyles, but very different than the people in Punjab province. Overall in the

country, the people are very close to their cultural and religious values. Country bears a population ranking at 6th in the world, and 2nd among the Islamic countries, and growing at a high rate. A predominantly rural population, which lives on an agriculture based economy, though the services sector is also on the rise.

Since its independence from the British India in 1947, Pakistan has faced countless challenges in the form of political instability, wars and conflicts with the neighboring countries, natural disasters, rise of the social and religious extremism, widespread corruption and inefficient governmental functioning system, illiteracy, weak economy, etcetera. Figure 5 enlists various social, demographic and health indicators of Pakistan.

| | | |
|--|--|--------|
| Area | 796,096 sq km | (2007) |
| Population in thousands | 156,000 | (2007) |
| Population growth rate | 1.8 % | (2007) |
| Birth rate per 1000 population | 26.1 | (2007) |
| Death rate per 1000 population | 7.1 | (2007) |
| Urban population | 35% of total population | (2007) |
| Religions | Muslim 95% (Sunni 75%, Shia 20%), other (includes Christian and Hindu) 5% | |
| Ethnic groups | Punjabi 44.68%, Pashtun 15.42%, Sindhi 14.1%, Sariaki 8.38%, Muhagirs 7.57%, Balochi 3.57%, other 6.28% | |
| Languages | Punjabi 48%, Sindhi 12%, Siraiiki 10%, Pashtu 8%, Urdu (official) 8%, Balochi 3%, Hindko 2%, Brahui 1%, English, Burushaski and other 8% | |
| Refugees and internally displaced persons | refugees (country of origin): 1,043,984 (Afghanistan) IDPs: undetermined (government strikes in Waziristan); 34,000 (October 2005 earthquake) (2007) | |
| Literacy | definition: age 15 and over can read and write. Total population:54%, male:65%, female:42% (2006) | |
| School life expectancy (primary to tertiary education) | total:7 years, male:7 years, female:6 years (2006) | |
| Gross primary school enrolment ratio - total (%) | 87 | |
| Education expenditures | 2.6% of GDP (2006) | |
| Unemployment rate | 7.4% plus substantial underemployment (2008) | |
| GDP per capita | 700 | |
| Total expenditure on health (per capita) | 15 | |
| Total expenditure on health of % of GDP | 2.1 | |
| Physicians per 10000 population | 12.0 | (2007) |
| Hospital beds per 10000 population | 10.0 | (2007) |
| Primary health care units and centres | 1.7 | (2007) |
| Population % with access to local health services, total | 96 | (2007) |
| Population % with access to local health services, urban | 100 | (2007) |
| Population % with access to local health services, rural | 92 | (2007) |
| One year-olds immunized in 2005 with OPV (%) | 83 | (2007) |
| Total life expectancy at birth (total years) | 65.0 | (2005) |
| Neonatal mortality rate | 54.0 | (2007) |
| Infant mortality rate (per 1000 live births) | 78.0 | (2007) |
| Under five mortality rate (per 1000 live births) | 94.0 | (2006) |
| Maternal mortality ratio (per 10000 live births) | 275 | (2007) |

Figure 5: Indicators of Pakistan (WHO, 2009; CIA, 2009).

3. Literature review

Over the years, various socio-cultural factors have been found to be associated with the immunization status of the children in different ways. But still more is needed to be learnt about how these different social conditions, cultural influences, and behavioral patterns translate into the health seeking trends and practices of the parents, and health status of the children (Geertsen, et al., 1975; Rosenthal, et al., 2004; WHO's Commission on social determinants of health, 2007).

3.1. SOCIAL CONDITIONS

3.1.1. Social class and socio-economic status

Social class and socioeconomic status is reported to be related significantly to the immunization coverage levels in the society (DeSpiegelaere, Dramaix and Hennart, 1996; Topuzoglu, et al., 2005; Theeten, et al., 2009). This has been further demonstrated by studies which have reported that people belonging to different social classes, have different attitudes towards practicing health behaviour which varies across different countries. Although, income, occupation and education are key correlates of social class, education seems to be the most important (Bhardwaj, Singh and Singh, 1991; Greenough, 1995; Pill, Peters and Robling, 1995). In addition, UNICEF has also reported that child health indicators are associated with the overall poverty situation in the region, (Pickett and Wilkinson, 2007), and it can be further aggravated by an element of race or ethnicity, and the parents belonging to minority groups in a community are often less attentive to their children's health and consult the health services less often than the other parts of the community (Bardenheier, et al., 2004; Barker, et al., 2006; Teerawichitchainan and Phillips, 2008).

In India where the society is based on cast systems, these social inequalities and differences between different social classes become more evident, the socially backward casts were found to be with least immunization coverage as compared to other, higher classes (Bonu, Rani and Baker, 2003). And minority group, religion or caste families and especially women are reported to be with comparatively poorer health practices than the other more dominant groups and religions in the community (Smith, Chu and Barker, 2004; Choi and Lee, 2006). Similar results were reported from a study in Pakistan where in rural areas, the cast and social status was among the main factors in determining the health status of children in families (Sathar, 1987). The trends in utilization of health care services is different for different ethnic and social groups, as a study in Britain reported that British, Pakistani, Indian, Africans in one area, showed different levels of immunization uptake provided by the national health services (Baker, Bandaranayake and Schweiger, 1984; Wood, et al., 1995).

Effects of socioeconomic status is reported differently for immunization coverage of children at different age groups (Williams, Milton, Farrell and Graham, 1995; Bardenheier, et al., 2004). One explanation of different vaccination coverage in children of different socioeconomic status is reported to be the different sources of vaccination; the higher socioeconomic status parents have been found able to approach and consult the **private sources**, while the lower status are limited to the public health sector only, which itself is limited in most problem areas (Topuzoglu, et al., 2005). Thus the NIDs (National Immunization Days) were needed. NIDs were developed based on an outreach approach to people, the door to door campaigns, to counteract these social inequalities of EPI (Expanded Program of Immunization) which it reduced to some extent but they do still persist (Bonu, Rani and Baker, 2004; Topuzoglu, et al., 2005). As seen in Sub-Saharan Africa, where macro-barriers of political and economic nature besides the health care systems prevented the NIDs from achieving its aimed success (Bonu, Rani and Baker, 2004).

Though in general, the low income groups of the community are with the higher burden of diseases and inadequate vaccination coverage (Perry, Weierbach, Hossain and Islam, 1998; Brenner, et al., 2001), but it does not always mean that the vaccination coverage problems are found only with the lower socioeconomic groups, but it is seen with higher groups as well in many areas of the world, thus calling for a broader approach of activities, and not always to run solely after the socially disadvantaged ones (Williams, Milton, Farrell and Graham, 1995).

However, it's been noted that not only does this low income, poverty and social class influence immunization coverage but also several other associated factors which include: parental perceptions and concerns about vaccination, logistical issues such as difficulties with transportation, scheduling appointments and missed work; and problems such as discrimination and bias (Barker, et al., 2006).

3.1.2. Literacy

Paternal education levels is found related to children's immunization status by many studies; children of college degree holder parents are reportedly more likely to get complete vaccination coverage than those of less educated or illiterate parents (Marks, et al., 1979; Mukhopadhyay, 1991).

When the Pulse Polio Immunization program in a rural Indian region was evaluated, it showed that those parents who were with better education levels were more aware of the immunization program details and schedules than their illiterate area fellows. It demonstrates the fact that the level of health-education has a link with the level of general education of the parents, and populations with better education trends are more likely to have better knowledge of the health care activities, and are with better odds to comply with the immunization services (Chincholikar and Prayag, 2000; Pandey, et al., 2002).

The role of **maternal education** is reported differently in different studies; often found to be of stronger effect than the paternal education (Nandan, et al., 1985; Sathar, 1987). While most linked higher maternal education with a higher vaccination coverage for their children owing to their better knowledge, firmer belief in the benefits and needs of the immunization, and good trust and rapport with their health care providers (Nandan, et al., 1985; Pillai and Conaway, 1992; Zeitlyn, et al., 1992; Farag, et al., 1995; Dhadwal, et al., 1997; Matthews and Diamond, 1997; Perry, Weierbach, Hossain and Islam, 1998; Stronegger, Freidl, Rasky and Berghold, 1998; Angelillo, et al., 1999; Singh and Yadav, 2001; Pandey, et al., 2002; Smith, Chu and Barker, 2004). But some studies gave totally contrasting results, stating that higher educated mothers were found to be more ignorant of the vaccination details and their children less covered by vaccination (Taylor, et al., 1997; Prislín, Dyer, Blakely and Johnson, 1998; Angelillo, et al., 1999; Luman, Mccauley, Shefer and Chu, 2003; Carrasco-Garrido, et al., 2006; Torun and Bakirci, 2006; Borrás, et al., 2009). The contrasting association can be due to different roles of genders in different societies (discussed in the “Cultural influences”).

A study in India revealed that in some rural areas even after multiple rounds of NIDs, majority of illiterate mothers were found ignorant of the specific details about different vaccines and schedules, or the availability point (Bonu, Rani and Baker, 2003). And this illiteracy as directly related to the under immunization of children (Dasilva, Gomes, Tonial and Dasilva 1999).

And then the rural-urban settings can further enhance or diminish the role of maternal education in child’s survival, as a study in Pakistan when examined the effect of maternal education separately in urban and rural area, reached the finding that only in urban areas is the effect visible and significant, while higher or lower education level of mothers in the rural areas does not seem to be a factor contributing to the child’s health (Mahmood and Kiani, 1994).

Streatfield, Singarimbun and Diamond (1990); Freeman, Thomason and Bukenya (1992) and Breiman, et al. (2004) attributed the beneficial effects of higher maternal education to the better child-caring knowledge, which includes not only the better understanding of the benefits of the immunization but also the knowledge about other aspects of child caring as well, though there are other factors as well in the picture, like economics, as higher maternal education is very often seen in economically well off families, and vice versa.

Higher education of mother is also found to be related to better child health through various other pathways; the number of children, as the better educated mothers are linked to lower number of children, and better nutrition to children, and better education opportunities for the children as well. Borooah (2004) classified the mothers to 3 groups on the basis of literacy; literate, proximate literate and illiterate, and the results proved that the children of literate mothers were in far better immunization status and were receiving better nutritious diet than the proximate or illiterate mothers, and the order decreases from literate to proximate to illiterate. This signals the impact of maternal literacy.

Also mothers with better access to information sources like media (TV, radio) are more likely to care for vaccination of children. So an informed and educated mother is better mother as far as vaccination goes (Choi and Lee, 2006).

In addition to the above described links and pathways, maternal literacy is also found to have an impact on how well she picks up and reports the illness of the child (Teerawichitchainan and Phillips, 2008).

Maternal literacy is linked to gender discrimination as well, as seen in families with an educated mother that girls were being treated fairly, while in families with uneducated both parents or with an uneducated mother the girls were more prone to face discrimination in overall life and also in health matters (Simmons and Bernstein, 1982).

3.1.3. Employment status

Though the **parental employment status** in general, and especially Father's employment status and occupation is reported to be significantly and directly associated to the children's immunization status (Nandan, et al., 1985; Waldhoer, et al., 1997; Strongegger, Freidl, Rasky and Berghold, 1998).

Mother's employment status is reported in different ways; in several studies to be insignificantly associated to immunization (Borras, et al., 2009), or in some studies unemployment of mothers and their role as mere traditional house wives is linked to the potential under immunization of the children (Nandan, et al., 1985; Pillai and Conaway, 1992; Brenner, et al., 2001).

Working women have better say in the decision making about health in the family (Mubarak, et al., 1990). And when women are with more control over the family and finances, it appears as positive influence to the children's health in the family. Families with a woman as head of family and when women are with more independence, better control of finances, report better health of children (Sathar, 1987; Pool, et al., 2006).

But then in other studies the regular employment of mother is seen to be having an inverse association to children's immunization care, and traditional house wives are linked to better immunized children, while the regular job mothers are shown to be having relatively less immunized children. The possible explanation given is of time availability that even though working mothers are adding to the financial resources of the family but they don't offer time to keep an eye on their children's vaccination status, while on the other hand the traditional house wives who stay in the house and big part of their duties and focus is on children, the health of children, so their children get better immunization attention. And factors like bigger size of family, which increases the burden on the financial resources of

the family and make the mothers opt the role of a working member of the family instead of a housewife, the health of children suffers (Anderson, Wood and Sherbourne, 1997).

3.1.4. Occupation

Father's occupation represents the income level and the social class in many societies, and influences the health opportunities for the children, as it is reported that much more children of low income occupations like laborers are under-immunized as compared to those of higher occupations (Nandan, et al., 1985).

3.1.5. Financial difficulties

Financial difficulties, costs involved and type of health insurance or lack of insurance, is reported as another of the most basic reasons for under immunization of kids in family (Mukhopadhyay, 1991; Zeitlyn, et al., 1992; Salsberry, Nickel and Mitch, 1994; Wood, et al., 1995; Taylor, et al., 2002; Sia, Kobiane, Sondo and Fournier, 2007), as it decides the everyday health behavior and the type of health care services in reach and access (Shaikh and Hatcher, 2004). It pushes the parents to certain type of health service providers, or even self-treatment instead of consulting the professional health care services (Teerawichitchainan and Phillips, 2008). Similarly, the low income people and families also face difficulties in reaching the health education sources, and even if they reach a source, they are often unable to understand the message due to their low literacy levels (Freeman, Thomason and Bukenya, 1992; Davis, et al., 1996).

3.1.6. Size of family

Size of family also bears a negative influence on the immunization status of the children, as seen in families with more number of children that even if the parents are aware of the concepts of immunization and the services are approachable for them, but still delays

occur, and children are not often up-to-date with the vaccination schedule. Explanation is the increased load and responsibilities on parents in so many different aspects that the immunization may get the blow, and the children per head gets less attention and less access to available family health resources, and the parents often fail to notice the illness in time and are not able to report it (Marks, et al., 1979; Brotons, Sanchez, Leal and Garcia, 1990; Mukhopadhyay, 1991; Wood, et al., 1995; Perry, Weierbach, Hossain and Islam, 1998; Stronegger, Freidl, Rasky and Berghold, 1998; Tiwari and Kulkarni, 1999; Brenner, et al., 2001; Bardenheier, et al., 2004; Teerawichitchainan and Phillips, 2008).

3.1.7. Living conditions

Another feature noticed consistently about the socially disadvantaged classes was their congested living conditions, which can potentially ease the spread of disease agents from person to person, and the highly dense areas are more at threat even after good vaccination coverage (Arita, Wickett and Fenner, 1986; Perry, Weierbach, Hossain and Islam, 1998; Bonu, Rani and Baker,, 2003; Shahrabani and Benzion, 2006). Even in socially well-off families when the living conditions are congested, with many children in the family and house, it affects the immunization coverage and incidence of diseases (Smith, Chu and Barker, 2004).

Various studies have attributed the immunization coverage gaps and nutritional disparities among children to the regional differences. Those belonging to the poorer regions, rural areas, slums, small villages, far flung difficult to reach tribal areas with poor living conditions are the ones with poorer states of immunization (Brotons, Sanchez, Leal and Garcia, 1990; Tandon and Gandhi, 1992; Matthews and Diamond, 1997; Perry, Weierbach, Hossain and Islam, 1998; Szilagyi, et al., 2002; Borooah, 2004; Tshikuka, Gueim and Diallo, 2007; Obregon, et al., 2009).

Better structure of the house can also be a factor, as a study in Amazon found that the children living in better houses with better construction material used were with better immunization status (De la Hoz, et al., 2005). One room houses with no separate kitchen

make the spread of infectious agents easy (D'Souza, 1997). Material possessions also indicate to the health practices, mothers in houses with better material possessions and conditions are more prone towards better immunization practices. (Choi and Lee, 2006) Residential status is yet another indicator of the socioeconomic situation; those living in public-housing are reported to be at higher risk of under immunization (Bardenheier, et al., 2004).

Access to better sanitary facilities is also a contributing factor to spread of poliomyelitis and other infectious diseases (D'Souza, 1997; Obregón, et al., 2009). It has been well established that in countries with good environmental sanitation, eradication of polio could be achieved with 2-3 doses of OPV, while those with poor sanitation have not been able to achieve success even when the mean doses have exceeded ten or even fifteen. Furthermore the amount of money spent on environmental sanitation will not only help in polio eradication but also in controlling so many other infectious diseases endemic in the country like enteric fever, hepatitis A, cholera, diarrhea, malaria (India Expert Advisory group for Polio Eradication, 2007). Thus to identify such pockets of need is a prerequisite for implementing any program designed to raise immunization coverage to assure that such disease resurgence does not occur (Bernstein and Taylor 1983; General Accounting Office, 1995).

3.1.8. Immigrants

Different studies and surveys found Immigrants with very low vaccination coverage as compared to the local native population of the area. Their moving and coming to new area makes them "missed" from the vaccination activities. Their records with the area administration are often not up-to-date, or it can be the other social and perception based limitations which undermine their access to vaccination. Also matters is the previous area which they left, if the immigrants are coming from a poor rural area without any significant vaccination activities going on, then they are more likely to avoid and stay uninterested in

such new activities at the new area (Topuzoglu, et al., 2005; Odusanya, Alufohai, Meurice and Ahonkhai, 2008).

3.1.9. Civil unrest, conflicts, war zones

Wars, conflicts and unrests are favorable conditions when diseases grow in incidence and prevalence, the health infrastructure gets damaged and routine health activities get interrupted, environmental health worsens, and the socioeconomic status and trends undergo crisis (Kuh, Wadsworth and Yusuf, 1994; Korzeniewski, 2005; Lowicki-Zucca, et al., 2008; Bompangue, et al., 2009; Vreeman, et al., 2009; Ponsar, et al., 2009; Ratnayake, Degomme and Guha-Sapir, 2009).

While most studies and reports overwhelmingly state the obvious hurdles faced in organizing and running effectively the immunization campaign activities, there are also examples of Somalia and Sudan where AFP (Acute Flaccid Paralysis) surveillance system and the OPV coverage has successfully increased over the years, proving that even in the most volatile environment public health workers have been able to do their jobs and reach their goals (Centers for Disease Control and Prevention, 1999).

3.2. CULTURAL INFLUENCES

Several studies have been reported over the years to investigate the different dimensions of general public's and parental knowledge, attitudes and practices (KAP) regarding children's immunization. The findings of these studies are to be considered in the light of the external factors like social settings, cultures, religions etcetera.

3.2.1. Behavioral and life-style factors

Some studies reported that individual and familial behavioral and cultural factors may dominate the financial reasons in health trends, and in some cultures where the family structures and ties are more supportive, the health of children gets the benefits, and scarce social and cultural support systems in the family and community may dent the trend to use health services effectively even with good financial resources available (Anderson, Wood and Sherbourne, 1997). Especially in those situations and areas where the health system is working efficiently, then the focus shifts to these behavioral and cultural factors affecting the results (Wood, et al., 1995).

Living as a joint family system with grandparents, uncles and aunts, all together sharing a house and responsibilities may have a positive effect on the health of children, as the child gets attention and care from many more in addition to just the parents. Presence of grand mother for example is found to be associated with better immunization of children in family, owing to the extra social, psychological and practical support (Brenner, et al., 2001; Pandey, et al., 2002).

Also important are the number of working age men in the family, owing possibly to the socioeconomic reasons (Gage, 1997).

Marital characteristics of parents are another related factor, as it has been observed that children of currently married mothers get better access to immunization and better

nutrition as compared to currently unmarried mothers, and polygamy of fathers makes them less likely to get complete immunization coverage (Gage, 1997).

Gray, Kesler and Moody (1966) described how parents take notice of what others are doing, others who they can relate to, and they try to follow the general trends and attitudes towards certain health practices. For example when parents in lower socioeconomic conditions see that the people they know, the people of their social circle and status are perhaps refraining from vaccination, they too then hesitate to get vaccination for their children, and feel a kind of guidance and solace in following the general patterns, and this shapes their individual behavior. This phenomenon is seen in people of all social classes, and explains the differences in health practices of different social class people.

Culture dictates the gender segregation in conservative societies, and the extent of distances and difficulties of communication and contact between men and women. A classic example is when female health workers were employed to reach to the women in Pakistani society, the immunization coverage increased in areas, attributing to the explanation that women are much more able to reach and convey the message and services to the women, as compared to men health workers trying to reach the women in society. And if the information reaches to women, it brings results as women are closer to the health of their children, even though men are the overall heads of the families and households (Obregon, et al., 2009).

In such cultures where women have limited independence and men are the key decision makers, then the involvement and reaching out to men in the society, to convince them, is of crucial importance, and can bring change and improved results (Pool, et al., 2006). Especially the rural woman suffers from these culturally imposed gender segregation customs, and it translates into her health seeking behaviours and patterns. The conservative values keep the women from visiting male health providers, and the inadequate availability of female health providers makes the situation worse for them (Shaikh and Hatcher, 2004). And as described above, culture can also govern the employment and movement of women

as well; as being seen in the rural Pakistan where people are not accepting women vaccinators moving from door to door during NIDs (Obregon, et al., 2009).

So the cultural influences are seen dictating the use of different health care services available and the everyday health decisions of individuals and families. Kleinman (1980) describes the health care system as a cultural system just like religion or language, and thus to understand health care system of a community and how its components act and interact, one needs to understand the culture of that particular community, and this explains the variations in health care systems from communities to communities and cultures to cultures. He describes the pluralistic health care system model based on communities, with the Popular sector, Folk sector, and the Professional sector, as core parts. These three sectors are in the same community and overlap and interact with each other depending upon the particular local settings (figure 6).

Popular sector forms the first step; the lay domain at individual, family, community level where the illness is defined, treatment options are decided including self-treatment, and then the phenomenon (may) enters to the Professional and/or Folk sector.

Professional sector consists of the modern medicine as well as the classical indigenous medical systems (for example traditional Chinese medicine) and is the most organized and legalized system with most power, and tries to label the illness as disease if it fits in the certain clinical science pattern or outline.

Folk sector is often more related to the popular sector and is comprised of the sacred and secular health care providers like faith healers (Moulvis and Peers in Pakistan) or herbalist (Hakeems in Pakistan). Despite having deep roots in developing societies it is usually ridiculed and ignored by the scientific community people.

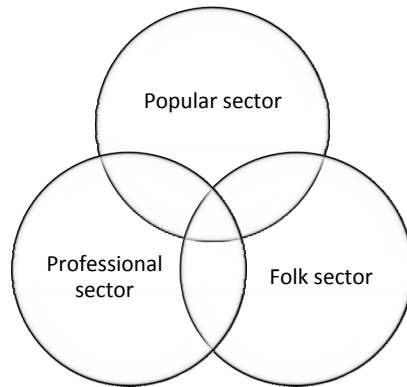


Figure 6: Pluralistic health system model (Kleinman, 1980).

The folk sector of private health providers is culturally closer to the rural people, and economically easier and physically accessible as well (Shaikh and Hatcher, 2004). In some cultures the important meaning of spirituality in health, and the role of spiritual healers as the primary and first health providers instead of the professional health services, calls for their inclusion and use in health education messages to the people (Qidwai and Tayyab, 2004).

Another scenario is of a tribal population, where the tribal structure of the community is a barrier in itself as it resists the foreign ideas and practices. The familiarity and tribal/community affiliation of vaccinators is source of better cooperation and trust, but an air of doubt and unfriendly reaction is given to a total outsider (Obregon, et al., 2009).

These culture related trends in health services utilization must be focused during the planning and policy makings about health services provision (Shaikh and Hatcher, 2004).

3.2.2. Religion

Religion plays a dominant role in governing the attitudes and opportunities of people and societies towards health, as a study in India demonstrated that the differences in the immunization coverage in the society had a link to religion, with Muslim communities far less immunized and far less likely to be immunized than the Hindus in the same regions. And though the polio eradication activities were with some success in countering the gender, social class and wealth based inequalities, still the religion based differences in the immunization coverage persisted (Bonu, Rani and Baker, 2003; Borooah, 2004; Obregon, et al., 2009).

In many western countries also the religion based differences in vaccination are seen, like in Netherlands where the overall coverage is as high as 97% but some religious minorities have considerably low figures. Some western states also accept the option of exemption from vaccination purely on religious grounds. But then these exemptions lead to the spread of the infectious diseases to other unvaccinated exempted children in the same area or unvaccinated children in other areas (Smith, Chu and Barker, 2004; Sturm, Mays and Zimet, 2005).

Religion is also seen to be linked to origin of rumours and opposition, like in Muslim communities in India, it was noticed that people started believing that the poliomyelitis vaccine contain some infertility drug to harm their children, an evil conspiracy against Muslims specifically by west which is producing and sending the vaccine (Ansari, Khan and Khan, 2007).

Similar to culture, religion can also affect the easy accessibility of health care services, as seen in some religion dominated societies, like those of Sikhs and Muslims for example, where for a woman a simple process of visiting a doctor can become an expensive and serious issue as she has to be accompanied by her male family member or members (Booth and Verma, 1992).

3.2.3. Gender differences and inequalities

Gender bias has been reported in some studies in India which discovered that girls are less likely to get immunized as compared to the boys within the same communities, and the differences in the vaccination statuses of girls and boys are very visible (Mukhopadhyay, 1991; Perry, Weierbach, Hossain and Islam, 1998; Bonu, Rani and Baker, 2003). Similarly in a study in Africa when analyzed the differences in immunization status of boys and girls, it was reported that boys on the whole were more immunized than the girls in the same households and same community, and even when girls were immunized, their vaccination did not go to all the doses, and girls were given only the initial doses and then often ignored, whereas the boys had been getting all the doses and were completing the entire vaccination schedule (Pillai and Conaway, 1992).

Gender discrimination may be starting as early as at natal stages when parents wish and favor to have a son instead of daughter, this natal inequality shows a discrimination trend which continues to affect different aspects of girls lives later also, while those parents who were able to but did not practice natal inequality are more justifiably good and caring to their daughters, similar to sons in the family (Borooah, 2004).

Mother's education status is more in line with the gender discrimination for the kids than the father's; girls of illiterate mothers have been found to be discriminated against the sons more often as compared to girls of literate mothers (Borooah, 2004).

Rural – Urban settings are also associated to the gender inequalities, discrimination against daughters is seen to be more pronounced in the rural areas (Choi and Lee, 2006).

Gender discrimination may also affect the spread of health education into the society, for example hindering or decreasing the impact and transfer of knowledge given to mothers during maternity visits (Choi and Lee, 2006). Mothers are often seen providing health care and immunization to their daughters when it is easy to do so, but in case of sons they can ignore the distances and the broken roads to reach the vaccination services (Choi and Lee,

2006). Anthropologists have found the socioeconomic logics behind the phenomenon, where girls are considered to be of less social and economic worth as compared to boys, and these socioeconomic roots can be solved by socioeconomic development of the society, by an increase in literacy, by better economic conditions, at least to some extent if not completely (Bhan, et al., 2005).

Yet another angle to the practice is that presence of the same sex older siblings contributes to the discrimination especially for girls, and the discrimination increases with an increase in the number of same sex older siblings. Thus having many daughters in the family is associated to more odds of girls being undervalued, a phenomenon with possible origins in the desire by parents of a certain mixed gender composition and structure of their family. Though the phenomenon is much more pronounced and common for girls, but is seen with boys as well; an observation is from those families with many boys and only one daughter, there in these cases girl may be even given preference over sons (Pandey, et al., 2002).

In conservative societies it has been reported that use of available health services is different for men and women, where girls and women are not allowed to travel alone or visit health care services alone, so then especially if the health services are located at farther distances from home then the problem gets worse for women, while the men in the society approach the available health services much more easily (Booth and Verma, 1992; Perry, Weierbach, Hossain and Islam, 1998). Though most studies focus on differences in health seeking trends for boys and girls or men and women for minor illnesses, need is to examine the gender differences in cases of serious illnesses requiring hospitalization (Bhan, et al., 2005).

The severity of these gender discrimination practices varies from area to area and community to community. There are regional differences within the same countries, as for example the Northern India is found to be with more discrimination against the girls than the South (Pandey, et al., 2002).

Discrimination goes beyond gender to the **order of birth** as well, where the first born gets better health care and other resources as compared to the later borns, more immunization drop outs are seen with the later order of birth, and the first-time mothers are more caring of the immunization services (Nandan, et al., 1985; Farag, et al., 1995; Perry, Weierbach, Hossain and Islam, 1998; Angelillo, et al., 1999; Chen and Liu, 2005; Choi and Lee, 2006).

3.2.4. Attitudes and perceptions

3.2.4.1. Parental compliance and delays

Following the schedule of vaccination is described to be very significant as some studies found the vaccines to be most efficient when given at a given age and according to recommended schedule (Shann, 2000; Ota, Vekemans and Schlegel-Hunter, 2002; Breiman, et al., 2004). If immunization is missed at the scheduled age then it is more likely that the child will miss the later vaccinations as well (Williams, Milton, Ferrel and Graham, 1995; Pandey, et al., 2002; Bardenheier, et al., 2004). And the delay in receiving vaccinations has been found to have connections to the receipt of other preventive health care measures as well (Bolton, et al., 1998).

Several factors contribute to these delays in vaccination for example the social and health system related factors, but then the parental attitudes and how they perceive the need can be another governing factor. Delays occur as a result of parental failure to comply to the immunization schedule, often due to ignorance of the exact schedule and of their child's exact immunization status, or due to illness of the child leading to parental or provider refusal to vaccinate, or sometimes even sheer negligence (Lopreiato and Ottolini, 1996; Ughade, Zodpey, Deshpande and Jain, 2000).

Presence of **vaccination-card** is an indicator of the parental attitude as well, as majority of those who get and keep their children's vaccination-cards, their children are more up-to-

date with vaccination status, and it prevents the delays (Matthews and Diamond, 1997; Perry, Weierbach, Hossain and Islam, 1998). This missing-card phenomenon is very often reported in lower socioeconomic status parents (Topuzoglu, et al., 2005; Odusanya, Alufohai, Meurice and Ahonkhai, 2008). In the absence of immunization cards, the maternal recall is to be relied upon, but it has been reported very often as being not very accurate, an observation that varies from populations to populations, as in India the recall information was found to be inadequate and inaccurate, but with more reliable sensitivity and accuracy in a survey study conducted in Africa (Ramakrishnan, Rao, Sundaramoorthy and Joshua, 1999; Odusanya, Alufohai, Meurice and Ahonkhai, 2008).

3.2.4.2. Lay perceptions

Parental attitudes can possibly be a big hurdle to deal with (Oluasanya, 2004). Though many researchers have attributed the vaccination status to the social and economic situations, but then parental attitudes and perceptions have also been singled out as of having tremendous influence in vaccination trends of the people (Pless and Hibbs, 2002; Taylor, et al., 2002; Sturm, Mays and Zimet, 2005). These inherent attitudes whether positive or negative sometimes are the reason for making people follow certain health practices, and sometimes it's the exposure to certain health practices which influence the attitudes, a phenomenon which is difficult to exactly quantify (Choi and Lee, 2006).

Parental understanding of the benefits of the vaccination is a governing and motivating factor (Tshikuka, Gueim and Diallo, 2007). The need to immunize can be influenced by the rumours and news which determines the attitude and perception towards vaccination (Borras, et al., 2009), and often lead to negative beliefs thus hindering acceptance of vaccination (Smith, Chu and Barker, 2004; Heining, 2006).

For example the issue of vaccine safety, which is a major concern for many parents and it contributes to decreasing immunization coverage in some countries (Meszaros, et al., 1996; Alfredsson, Svensson, Trollfors and Borres, 2004; Bardenheier, et al., 2004; Gust, et al., 2004;

Allred, et al., 2005; Flanagan-Klygis, Sharp and Fader, 2005). Research has demonstrated that after adjusting for demographics, parental safety belief is significantly associated with the child's vaccination status (Allred, et al., 2005). Rejection of vaccination originates from mistrust in the information or the provider and failure to understand the need for the vaccine or the risks associated with it, and fear that the vaccine itself will harm the child, and especially multiple repeated doses of vaccines, as observed in some studies in Britain, Australia and New-Zealand where parents raised concerns especially about the multiple-antigen vaccines like MMR vaccine causing autism (Szilagyi, et al., 1996; Taylor, et al., 2002; Salmon, et al., 2004; Sturm, Mays and Zimet, 2005; Heininger, 2006; Benin, et al., 2006; Tickner, Leman and Woodcock, 2006; Borrás, et al., 2009). Despite the fact that the vaccine related effects are mostly of very low severity and duration, like pain of injection, or swelling and redness, but get aggravated attention (Andre, 2003).

Another reason for not having a child vaccinated was the belief that children receive too many vaccinations. Currently, children receive approximately 20 vaccinations within the first 2 years of life, an increase of 25% from 5 years ago. As more vaccines are developed and recommended for routine childhood vaccination, this issue may become even more important for health care professionals to convey to their patients. (Gellin, Maybach and Marcuse, 2000).

In addition to the fear of vaccine associated harmful effects, another worry was of contraindications, with people delayed in getting vaccination for their children considering many times and situations as contraindicated (Morgan, et al., 1987; Angelillo, et al., 1999).

Parents' concerns about vaccine safety occur within the context of the communities in which their children live and may be shared by other parents in those communities (May and Silverman, 2003). Unaddressed or ignored safety concerns may result in a community that has greater numbers of children who have received no vaccine doses (Smith, Chu and Barker 2004). Such children represent a pool of susceptible subjects who are at increased

risk of acquiring a vaccine-preventable disease and then transmitting it to other children in the community (Feikin, Lezotte and Hamman, 2000).

A number of reasons may exist for continued acceptance of vaccination despite possible safety concerns, these include the parents' beliefs regarding the benefits of vaccination outweighing the concerns, (Gellin, Maybach and Marcuse, 2000) compliance with social norms, (Ajzen, 1988) and the impact of school entry laws (Orenstein and Hinman, 1990). Widespread concerns about vaccine safety, however, can pose a risk to maintaining high coverage, especially as the incidence of vaccine-preventable diseases decrease (Gellin, Maybach and Marcuse, 2000).

These fears and misperceptions are found also in families with better social status and better economic conditions, and affect their children's vaccination status (Smith, Chu and Barker, 2004). Though often different perceptions are seen in people from different socioeconomic classes (Prislin, Dyer, Blakely and Johnson, 1998). A study in America reported that the parents who were consulting the private health setups or higher public setups, their views about vaccines were not significantly affecting the immunization status of their kids (Taylor, et al., 2002).

Bernal, Niguez and Navarro (2001) found that even though there were many who were aware of the effects of the vaccine- preventable diseases, a big proportion of people still felt that vaccination should be a matter of choice and not absolutely compulsory, figures varied in different Spanish studies.

These rumours and perceptions are not just seen in people and populations, but also in the very health workers who are working to provide immunization to others. Fear of infertility, side effects and doubts about the need and efficacy of the vaccine are found sometimes in the workers themselves, and this has to decrease their efficiency and commitment to their work, and how they spread the message of immunization to others (Arulogun and Obute, 2007). The interest of health workers often becomes the source of these negative perceptions

towards immunization, as often if the doctors or nurses are not enthusiastic about providing vaccination then the people notice this behaviour and deduce the perception that it may be something not very necessary after all, and something not high on priority, that's why "they" are not focusing on it themselves. And if news of many cases of vaccine side effects are being shown by media then that instills the fear element not only in parents about also in health workers as they fear for being blamed for the bad effects of the vaccines later wards. So if the incidence of disease in a community is low then all these combined scenarios affect the enthusiasm and vigilance on the part of both parents and health workers, labeling the immunization as something of secondary importance (Nicoll, Elliman and Begg, 1989; Noula, et al., 2008). Sources of rumours and misperception may also include the undertrained or under informed workers themselves, children and parents may be getting the wrong information from the school immunization service workers who though believe in the immunization and its needs and benefits but are not well trained enough themselves to answer and satisfy the questions and queries of parents. Thus reversing the positive role of the activity, and generating further misconcepts in parents (Salmon, et al., 2004). This calls for the improved training and education of the health workers so they can have all the answers and information to satisfy themselves and their clients (Nicoll, Elliman and Begg 1989; Noula, et al., 2008).

A study in Africa (Nuwaha, Mulindwa, Kabwongyera and Barenzi, 2000) arranged focus group discussions to know the perceptions of people towards NIDs, and people who attended those meetings were often of the view that the previous NIDs caused malaria, and the people and the local leaders of the community believed in that perception, as much as that those local influential leaders tried to stop others from participating in NIDs and the perception got roots quickly. The urgent need was felt by the researchers to educate and inform especially these influential people, and convince them that the NIDs are safe, so the message can reach through them to the general public and calm down the misperceptions affecting the results of NIDs.

Religion and politics related misperceptions also exist (Smith, Chu and Barker, 2004). Rumours erupted in 90's in the Muslim communities of some polio endemic countries about the polio vaccine that it may contain infertility medicine, may be contaminated with viruses or ingredients causing HIV or cancers, as a western or Christian conspiracy, or may be of lesser quality than what western people use themselves. These rumours became so strong that people started refusing giving vaccine to their children, and it generated a very hostile environment in those Muslim communities towards polio workers. When the local religious leaders were approached, they asked the authorities to check the vaccine for these risks. So widespread were these rumor related hostile responses that health authorities had to retest the vaccines to prove that the quality of vaccines was good and it was not harmful in any way for kids, this helped in convincing back many people but doubts still persisted, and the entire scenario hurted the immunization activities a lot (Chen, 2004; Obregon, et al., 2009).

Similarly in Nigeria, when the religious elements in the northern areas started and supported the disbelief campaign in the OPV, based on the same rumours about the safety concerns and western conspiracy theories, it severely affected the immunization uptake by their followers, and the coverage figures dropped alarmingly in those areas. Also another dimension of this threat was the export of this polio virus from these boycotting communities to the other regions and populations, new cases of poliomyelitis started appearing in countries previously free of polio, all linked to Nigeria and its coverage problems, thus the global polio eradication initiative got a big set-back (Kapp, 2003; Clements, Greenouch and Shull, 2006). Similar situation affected the polio immunization services in Pakistan when the local religious scholars labeled the immunization as unislamic (Ahmad, 2007). Thus the religious leaders can have the influence in making health perceptions of people, and their traditional opposition to modern advancements in health care and themes affect the overall community. (Ali and Ushijima, 2005).

Similar to religion, culture related perceptions also get momentum, as often seen in tribal communities where certain cultural beliefs and practices take the lead and resistance emerges to introduction of any new foreign practice (Tandon and Gandhi, 1992).

Technological advances introduced to the immunization activities though theoretically should bring the coverage and results to better levels, but then again the community acceptance may be a totally different thing, for example concerns have been noticed about the Injectable polio vaccines, even though the use of injections is common in many populations as one of the routine ways to administer medicine, but its use for a vaccine is still not being accepted by people, and the need is not being understood (Dasgupta, et al., 2008), and then the introduction of new vaccines, or vaccines with multiple antigens is seen to raise parental concerns about the safety and quality, though multiple antigen vaccines should be able to lessen the parental difficulties by reducing the number of visitations and the repeated injections (Tickner, Leman and Woodcock, 2006). Incorporating the new vaccines into an already accepted EPI can give better results, as people will not have to adjust and understand the need to comply to a totally new activity (Pool, et al., 2006). In many countries and regions with better vaccination coverage and disease control, the focus of health officials is now diverting towards the harmful effects of vaccine itself (Ward, 2000; Chen, et al., 2001; Breiman, et al., 2004).

In general if the people see the overall health system in bad state, but the government is increasingly focused on only one specific activity like polio vaccination, this raises doubts and questions, that why not on the overall health and why all the energies and focus is on one activity, is there any hidden agenda there of the government, or is government being influenced by others? (Dasgupta, et al., 2008). Need is to consider all the individual, social, policy and management factors instead of just focusing on any one and ignoring the others, and to consider the acceptability or non acceptability response beforehand during the planning stages of a totally new activity, like by trial activity, so then the actual campaign can be modified or supported to garner better response and participation by people (Sturm, Mays and Zimet, 2005; Pool, et al., 2006).

3.3. AWARENESS STRATEGIES

3.3.1. Health Education

Health education and an open easy communication are regarded as key strategies in strengthening the health activities and gaining good feedback from the community (DaSilva, Gomez, Tonial and Dasilva, 1999; Pool, et al., 2006). Health education is advised to be aimed at empowering individuals and communities with positive attitudes on their health and cues to action on their environment (Pill, Peters and Robling, 1995; Tiwari and Kulkarni, 1999). A low-cost method but it has the power to change behaviours, behaviours that can dictate life style changes needed to restrict the diseases and promote health (Maskey, 2008).

Health knowledge level of mothers is shown to have direct association with their children's immunization status. Those who know more about the details of the disease, like the symptoms, are more interested and more attentive to an up-to-date immunization uptake for their children. And this health knowledge level has roots in the general education level of these mothers, better educated are the ones with more knowledge and thence better immunization practices (Oduanya, Alufohai, Meurice and Ahonkhai, 2008).

An inadequate health education is a result of poor emphasis by the health professionals in educating the public on immunization issues, and a reason given by many parents of their not knowing and not following the immunization practices is simply that they didn't know and they were never told (Morgan, et al., 1987; Bhasin, Agarwal and Kanan, 1997; Angelillo, et al., 1999). As it has been demonstrated that even though parents seek information about vaccinations from many sources, they most commonly seek that information from a physician (Gust, et al., 2004; Gellin, Maibach and Markuse, 2000). The obvious solution is to encourage the health providers to discuss issues on vaccination with their clients, in addition to providing pamphlets and other educating materials, because many studies show that clients often follow the advice given by their health provider especially the

doctor/ pediatrician (Tozzi, 1994; Borrás, et al., 2009). The mothers can be made aware during their antenatal and postnatal visits, as the use of maternity services has been found to be of positive influence on immunization status of children (Goodwin, 1990; Freeman, Thomason and Bukenya, 1992; Wood, et al., 1995; Perry, Weierbach, Hossain and Islam, 1998).

Health worker's role must be to make things simple and understandable for people (Borrás, et al., 2009). Every hospital stay or contact with any health services for any reason should be an opportunity for health workers to provide health education, and not just the specifically arranged gatherings and activities (Zeitlyn, et al., 1992). For example the information given to mothers during their maternity visits is of crucial significance in spreading it further to the society, especially in the rural areas, where other sources like media are unavailable, and mothers who get such health education information and guidance at this early stages are more likely to comply, follow-up and return to these services in future for the better health of their newborns, including immunization (Choi and Lee, 2006). These prenatal contacts with the professional health care services expose and introduce the mothers to modern medicine and information, and their absence translates into inadequate follow-up of immunization and other services for the child (Anderson, Wood and Sherbourne, 1997).

There is need for continued education of the health professionals as well, through latest scientific advances regarding vaccination by arranging regular health gatherings and circulating latest literature, (Goodwin, 1990), and correcting the beliefs and concepts of the health workers themselves first (Arulogun and Obute, 2007) as the knowledge level and the belief strengths of these health workers is contributor to the immunization success (Salmon, et al., 2004; DelaHoz, et al., 2005). If the health workers are with inadequate knowledge and are not up-to-date with the latest developments then they cannot discuss with parents and clients more effectively, and cannot provide them with satisfactory answers and explanations. As it was reported by a study in Newzealand district for example that 41% of

nurses and 21% of doctors were confused about the Autism and MMR vaccine linkage by society (Tickner, Leman and Woodcock, 2006). A study in India reported the verbal flow of information from different types of health workers to people as the biggest route of awareness, much more than media or other public health education activities (Balraj and John, 1986).

Image of the health services does affect the trust and belief by people in the message given. When a community was approached by hospital workers of the area to convince them of the positive importance of poliomyelitis vaccination, people did not take due interest in their message, but when social workers and interns who were not hospital workers, were sent, people responded better and it brought a good change in their attitudes towards poliomyelitis immunization (Chen, 2004; Ansari, Khan and Khan, 2007; Odusanya, Alufohai, Meurice and Ahonkhai, 2008). An attitude which highlights the importance of involving and incorporating other sectors in immunization activities as well (Sing, Mathew and Bhalerao, 1986).

In addition to this one-to-one information flow from health provider to parents, arranging health education gatherings can be another mean to raise the general health education level of the public. A study in Africa (Mulumba, Daoud and Kabang, 2007) arranged health-education gatherings before NIDs where vaccinators and social workers used visual materials to educate the people about the benefits of immunization, and the results later detected an increase in vaccination coverage in those areas during the NIDs. The better NID results immediately after these awareness efforts showed how much of an impact such activities can have in bringing people closer to adopting and trusting immunization activities.

Also the additional out-reach activities like visiting people at their homes, during NIDs, result in improving the knowledge level of people and families, much more than arranging fixed vaccination spots (Sing, Mathew and Bhalerao, 1986).

Information provided must be in simple language or way, and with simple graphics about the instructions, which is easily understandable to people and which should take less time, as studies found that even educated parents from higher socioeconomic status were found complaining that even if they get the information but they are unable to completely understand it, owing to the heavy language, or the long time it took to read all the details. So if this informative material is further supported by verbal explanations by the health workers that will lead to better comprehension by people of all income and education levels, especially important for poor illiterate people who don't have access to other information sources like TV or radio (Zeitlyn, et al., 1992; Davis, et al., 1996). Videos containing the health education messages are observed to be even further successful in reaching to people (Dunn, Shenouda, Martin and Schultz, 1998; Epee-Bounya, Gitterman and Moon, 2001).

Awareness of the immunization programme activities including information about doses, age, schedule, side effects of the vaccines, has been reported as being low in many studies and a cause for missed opportunities, and often it's not the parental perceptions or concerns about the vaccine which leads to under vaccination but studies in US and Australia demonstrated that parents simply are less aware of the details of the lengthy immunization schedules, especially true for parents of older children (Bhasin, Agarwal and Kanan, 1997; Tickner, Leman and Woodcock, 2006). (Few studies included in the literature review were conducted in settings different than the rural under-developed settings of this study. Applicability of the results is not to be put blindly as a general rule but rather be context-specific and after taking into consideration the differences in conditions and thus possibly the phenomenons).

This phenomenon is often seen with diseases of low incidence like poliomyelitis, and parents are found to be thinking that why not the vaccines should be against more dangerous, more visible diseases and when there are more rampant social problems exist in the society then the focus and importance towards vaccination may suffer (Chen and

Hibbs, 1998; Salmon, et al., 2004; Sturm, Mays and Zimet, 2005). And also as the better coverage leads to lower incidence of diseases, which in turn may make the disease bit irrelevant in the eyes of general public. The lower number of cases of vaccine preventable diseases lately in the Europe especially has been affecting the awareness of people and society about these diseases, and when people don't see the disease, they don't understand the urge and need to vaccinate against it. And for these low incidence diseases any side effect to a vaccine is seen to be much more attention grabbing news (Andre, 2003; Borrás, et al., 2009). In developing countries where the causes of child mortality are various and diverse, it may get harder to grab the attention to the immunization services (Henderson, 1990; Melgaard, 2001; Breiman, et al., 2004). Need is to make the people consider these immunization services as their own need, and not just as something that only government has to do (Dasgupta, et al., 2008).

Some studies recommend that the use of the onus of having the child vaccinated does not lie exclusively on the parents, especially if they are illiterate and uninformed. In the rural areas, the recently empowered village 'panchayats' must shoulder shared responsibilities regarding vaccination. The village panchayat personnel may be made accountable for ensuring that every child in the village is adequately vaccinated. They need to be informed about the benefits of vaccination and, they can, along with the health officials, correct misinformation and other local problems. It's further suggested that villages in which every child is fully immunized could be offered incentives. In the urban areas, especially in the slums and in children of migrant families, the responsibility should be assigned to local government personnel, elected representatives and community leaders (Srivastava, 2007).

Also in some situations, involvement of religious leaders, and focus on easy mass level communication strategies can quite the rumors, like in Muslim communities who consider polio vaccination as unislamic, can be approached successfully by getting the support of local religious elements of the society, instead of going directly to the people. Message spreads better, convincingly and to a broader audience. Those local workers and society

leaders involved in these health education activities who have a good reputation, and who are aware of and attentive to other common problems of the area, they are listened to more attentively by more people (Chaudhuri, 1990; Perry, Weierbach, Hossain and Islam, 1998; Ansari, Khan and Khan, 2007; Centers for Disease Control and Prevention, 2008; Obregon, et al, 2009).

It is definitely not easy to get through all these social, cultural, religious and other barriers and convince people of something totally new, and make them completely change their beliefs, but still an organized effort and activity can make them to at least be less refusing. As a survey in Maharashtra region of India revealed that despite a very high vaccination coverage, the knowledge level of people about the routine immunization program details and about the poliomyelitis disease itself remained very low, and though the excellent organizational efforts were able to raise the coverage figures for children in the area but they were not able to raise the health education levels of the masses (Chincholikar and Prayag, 2000).

3.3.2. Media

Media has strong role in shaping up the parental opinions and perceptions about the vaccination, and especially when a new vaccine is introduced. The spontaneous increase in general public awareness fluctuates with the changing levels of media coverage, and can be observed in the parental trends towards vaccination. An example of the effects are the situations in two polio endemic countries Pakistan and India where media and other ways of social mobilization has been adapted to reach the difficult to reach population groups, and the OPV coverage has risen substantially and the incidence of polio cases has lessen significantly ever since, over the years (Chaudhuri, 1990; Wood, et al., 1995; Sturm, Mays and Zimet, 2005; Tickner, Leman and Woodcock, 2006; Obregon, et al., 2009).

3.3.3. Decision Making and trust

Many studies have shown that many patient/clients rely on doctors recommendations solely and thus hesitate to take initiative on their own, believing that doctors and health workers should be the ones to suggest the better option for them (Tozzi, 1994; Thoms, et al., 1997; Epee-Bounya, Gitterman and Moon, 2001). Furthermore, it has been reported that health workers have the ability to convince even those parents who deem vaccination as unsafe. But this convincing power gets diminished if there are trust issues between the health care provider and their clients, and people may turn to other non-medical people in the society to get medical advice, solely based on better trust level in them in general. This is where the local community leaders and religious leaders often gain an edge over the health professionals of the area, and influence the common people in their decision making related to health without often even understanding the matter themselves (Chen, 2004). The ability to garner parents trust has been cited as the key to influencing their decision to vaccinate their children (Davis, et al., 2001; Gust, et al., 2005; Benin, et al., 2006). Trust in a health care provider is associated with use (O'Malley, Sheppard, Schwartz and Mandelblatt, 2004), and delivery of preventive services (Parchman and Burge, 2004). Distrust in a health care provider is associated with perceived barriers to immunization (Prislin, Dyer, Blakely and Johnson, 1998). Moreover, trust in the advice of a child's health care provider and feeling that it is easy to communicate with that provider have been found to be key factors associated with the parental belief that they have access to enough information to make a good decision about immunizing their child (Goold and Klipp, 2002; Gust, et al., 2005; Benin, et al., 2006; Smith, Chu and Barker, 2006).

This issue of rapport and trust was also raised by Kowli, Kumar, Trivedi and Bhalerao (1984), a study in India, which discussed the differences in the efficacy of a health-centre based model versus the sub-centre and community based model, noticing the observation that parents, especially from lower socioeconomic class, were responding better to the sub-centre and community based model than the centre based, owing to the rapport and access

problems with the centre model; a finding with influences in shaping later public health activities in the area.

So the parental decision making about immunization is based on the beliefs and perceptions, which shape up from their experiences of interaction with health care providers as well as by getting influenced by the sources of rumours or health education like media or other people in their community (as described earlier)(figure 7).

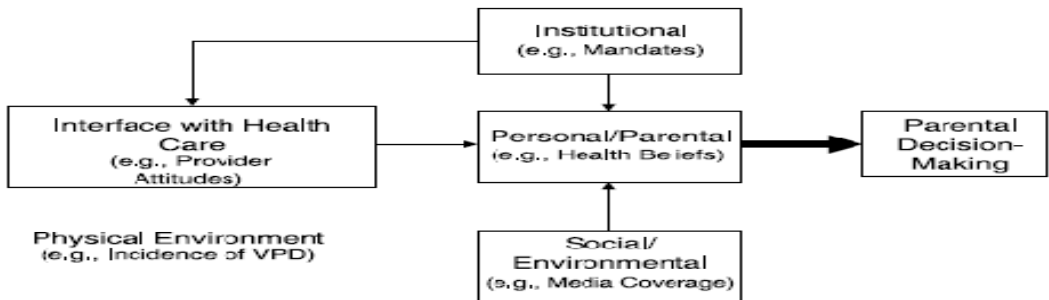


Figure 7: Parental decision making (Sturm, Mays and Zimet, 2005).

3.4. HEALTH CARE SYSTEM FACTORS

3.4.1. Efficacy of Health Care system

Under-immunization in a community or area is a function of many interrelated factors, and solution to one or two factors cannot solve the entire problem, and need is indeed to identify the factors, barriers and disparities and to utilize a multi-factorial approach, including improvements and adaptations in the health care systems especially at practise level, in both public and private sector (Paskert, 1983; Wood, et al., 1995; Szilagyi, et al., 2002).

Higher immunization coverage of a population calls for an efficient and effective health care delivery system with minimum disruption in vaccine supply and other logistics, and better coordination between all the stakeholders. Different interest groups starting from government and international agencies to the local level sectors and individuals should be coordinated in all the activities. And in addition to other stakeholders, collaboration with schools can bring results, which can help in detecting the unimmunized children and keeping the children all up-to-date with their vaccination schedule, regardless of their social class (Nicoll, Elliman and Begg, 1989; DeSpiegelaere, Dramaix and Hennart, 1996).

Experiences with measles campaign helped in identifying the common causes for **missed opportunities**, and provided guidelines to make use of any and every contact of child with health care services a chance to get updated with vaccination status and to convey the health education information to parents, thus providing them an easy adjustable timetable for vaccination instead of a rigid schedule, in order to overcome the problems of access, cost, time, confusions about the vaccine schedule, doubts about side effects, or other troubles and barriers faced by parents (Taylor, et al., 2002; Tickner, Leman and Woodcock, 2006).

Methods involved in provision of services can make the people interested or uninterested in these services, and thus affect the future reponses of the parents (Salsberry, Nickel and

Mitch, 1994; Wood, et al., 1995). Moreover, like for health education, the individual health workers can play a crucial role in avoiding the missed opportunities for immunization through better training and supervision (Perry, Weierbach, Hossain and Islam, 1998; Bardenheier, et al., 2007). This is because the provider attitude can encourage or discourage the parents in their perception of the whole process of immunization (Williams, Milton, Farrell and Graham, 1995). And the immunization provision training and activities should not be limited to one type of health workers or health centers but all workers should have basic training so they are able to cover more population (Nicoll, Elliman and Begg, 1989; Odusanya, Alufohai, Meurice and Ahonkhai, 2008). In a study done in Nigeria, it was found that many health workers were not well trained enough to know the basics of the vaccine provision, for example the use of vaccine viol monitor etcetera (Arulogun and Obute, 2007).

Parental practices are associated with how they perceive the environment and support they get when they visit the healthcare centers, those mothers who feel that the health care workers and environment is very supportive to them, they are more likely to stay interested in complying with and completing the immunization services for their children (Bukonya and Freeman, 1991; Chen and Liu, 2005). Attitude of the health workers played a significant force in pushing or pulling the clients, and the missed opportunities were created at the health centers when the parents were told that the health worker specifically designated for providing immunization is absent, and parents were asked to try again, undermining the concept of the importance of immunization in parent's minds (Corrigall, Coetzee and Cameron, 2008).

Also if there was shortage of time at health centres, and parents could not talk in detail about their vaccination concerns then that might increase their hesitation further in approaching the immunization services in future (Tickner, Leman and Woodcock, 2006). Not having enough time has been cited by pediatricians as the greatest barrier to communicating with parents (Davis, Fredrickson and Arnold, 2001). Guidelines for

communicating with parents who refuse to vaccinate their children have been published (Diekema and Committee on Bioethic, 2005). These guidelines suggest that an ease of communication is the key, and health care providers should listen carefully and respectfully to parents' concerns, giving them adequate time and attention. By not spending time to adequately address parents' concerns or by extinguishing the trust of parents who express safety concerns by dismissing them, parents may divert their trust to homeopaths or practitioners of alternative medicine who may reinforce parents' misconceptions and fears and successfully discourage those parents from vaccinating their children (Salmon, et al., 2005; Benin, et al., 2006).

Density of health workers, especially nurses in an area is important for producing better immunization coverage. More land area to be covered by the health workers leads to coverage problems. Increased workload on an inadequate numbers of health workers logically affects their performance and motivation (Dasgupta, et al., 2008). This phenomenon is true for most countries, but then there are exceptions as well, for example countries like Nigeria which have good nurse density but not the corresponding results so this points to a greater need to understand the other factors involved as well (Anand and Barneghausen, 2007).

Presence of higher health services like a hospital or clinic in rural areas significantly increases the immunization coverage and other health indices for children, as compared to a single basic health unit (Pandey, et al., 2002). And the greater the distances in reaching these higher health centres, the greater will be the drop-outs and failures on part of parents to get their children immunized, and closer proximity leads to easy access and thus frequent contacts (Perry, Weierbach, Hossain and Islam, 1998; Tiwari and Kulkarni, 1999). But it has also been noticed that vaccination providing centres in urban densely populated areas can get overburdened and which can affect the quality of immunization services they provide (Topuzoglu, et al., 2005). Efforts are needed to improve methods to identify areas with low immunization coverage so that resources can be directed to places where

interventions are needed, and an area's need for childhood immunization interventions is not well predicted by a low number of providers per capita. Other criteria must be developed to predict areas or populations with low immunization coverage (Ouédraogo, et al., 2006).

An evaluation survey of people in the rural areas of Maharashtra revealed the success of the Pulse Polio Immunization campaign, primarily based on the efficient organization, and an easy access to the services.(Chincholikar and Prayag, 2000). Especially when the mobility of vaccinators is improved, and they are provided with better transport facilities and efficient cold chain equipment, it contributes to better coverage results, as seen in Somalia (Centers for Disease Control and Prevention, 1999).

In Taiwan, when the types and number of health care service centers and personals who could provide immunization were increased by policy changes, the effect was tremendous, and the immunization coverage percentages grew rapidly, as more and more children were being accessible this way, and also more and more parents were being approached and were conveyed the immunization information by many more sources than before (Chen and Liu, 2005). Other studies also reported that the contact and access to maternity services increased the likelihood of better immunization coverage (Sia, Kobiane, Sondo and Fournier, 2007).

Social mobilization, and reaching out to people who are away from the routine activities, has been proven to be the core but difficult process in most public health campaigns. A public health campaign based on an outreach approach to people produces better results than the fixed centre provision of services, and improves the perceptions of parents, even in those who were resistant earlier (Obregon, et al., 2009). As seen in the door to door campaign of NIDs for polio vaccination, which has better outcomes than if it would be given only at certain health centers (especially when the distances are long to reach these centers) (Perry, Weierbach, Hossain and Islam, 1998; Topuzoglu, et al., 2005). When the

parents were followed-up, and were given reminders by health workers by phone or personal visitation, it proved very boostful in the timely compliance of parents and in reducing the disparities of different kinds (Morgan, et al., 1987; Szilagyi, et al., 2002; Bardenheier, et al., 2004; Tickner, Leman and Woodcock, 2006).

An over burdened and fatigued health system can be the source of discouragement to the workers involved, and precipitates the doubts about the need and affectivity when the results do not get achieved quickly. Need is to take steps to re-motivate the care-givers in results-deprived areas and to boost their confidence in what they are supposed to do (Obregon, et al., 2009). Improving the conditions of health workers and vaccinators; giving them better work facilities like transport, and better incentives can be crucial to their output. (Mangrio, Alam and Shaikh, 2008).

3.4.2. Community involvement

Involvement of the community is essential for acceptance of the immunization program, and this interaction of the system and the people generates a culture of immunization, and the degree of interaction explains the differences in results between regions and populations (Basu, 1982; Sia, Kobiane, Sondo and Fournier, 2007; Dasgupta, et al., 2008). As seen in the immunization programs in Nigeria, Sudan and Somalia where when common people were approached and involved in the activities, the results improved (Centers for Disease Control and Prevention, 2008).

But this community involvement should be right from the start of the activities, even in the planning phases of such mass level campaigns, but often the campaign strategies are imported from abroad, and they miss out on getting the opinions and input of local community leaders and local organizations during the initial development stages of the program, which may help in tailor fitting the activities for that society specifically, so then these issues of negative responses suddenly arise in the public (Chen, 2004).

But then also if the activities are being repeated too much, it may lead to tiredness and exhaustion on the part of communities as well as the service providers, who do not see the clear results immediately attached to these repeated efforts, and may rethink their intensity of participation (Dasgupta, et al., 2008; Obregon, et al., 2009).

3.4.3. Sustainability of immunization coverage

In order to have results beyond mass oral polio vaccination, NIDs required a high level of political commitment; an efficient health system; large cadres of high caliber managers to organize logistics; sufficient grass root activism to mobilize people; and, most importantly, a willingness of the civil society to participate in the campaign (Haxton, 1984; Dietz and Cutts, 1997). Some countries with weak health systems or other barriers apparently have failed to capitalize on inputs from NIDs to improve their EPI. Global campaigns have been criticized as being too standardized, with limited leeway for national and local adaptation and interpretation (Melgaard, 1999). Hence, global campaigns may be made more effective by suitable local adaptation where organizational, operational, social and cultural aspects demand contextualization of program implementation (Adachi, 1999; Bonu, Rani and Baker, 2003).

While many studies insist that sustainability of immunization coverage can come ideally from mass level efforts aimed at a total change in culture towards health, promoting a culture of prevention by masses, but a task not easy to achieve, and there are others studies which are not very optimistic and confident of the role and impact of the mass campaign approach. An interesting obstacle may be the huge differences in prioritizing the issues, the federal level and the policy level priorities may be totally different from the problems and needs faced by the common people in masses. Small Pox eradication history proves that target can be achieved without the extreme mobilization of masses, but it then needs to have very efficient other components like technology, resources and planning (Dietz and Cutts, 1997; Bonu, Rani and Baker, 2003).

3.4. THEORETICAL FRAMEWORK OF THE STUDY

Numerous studies have reached the conclusion that socio-economic and cultural conditions to which a person, a family or a community is exposed to; exert key influences in dictating their access to health, shaping up their attitudes and beliefs, predicting their responses to health activities, structuring their life styles and determining the overall health distribution. A process of interlinked pathways with different dimensions and strengths in different populations and areas, thus producing different results for health activities and scenarios (WHO's commission on social determinants of health, 2007).

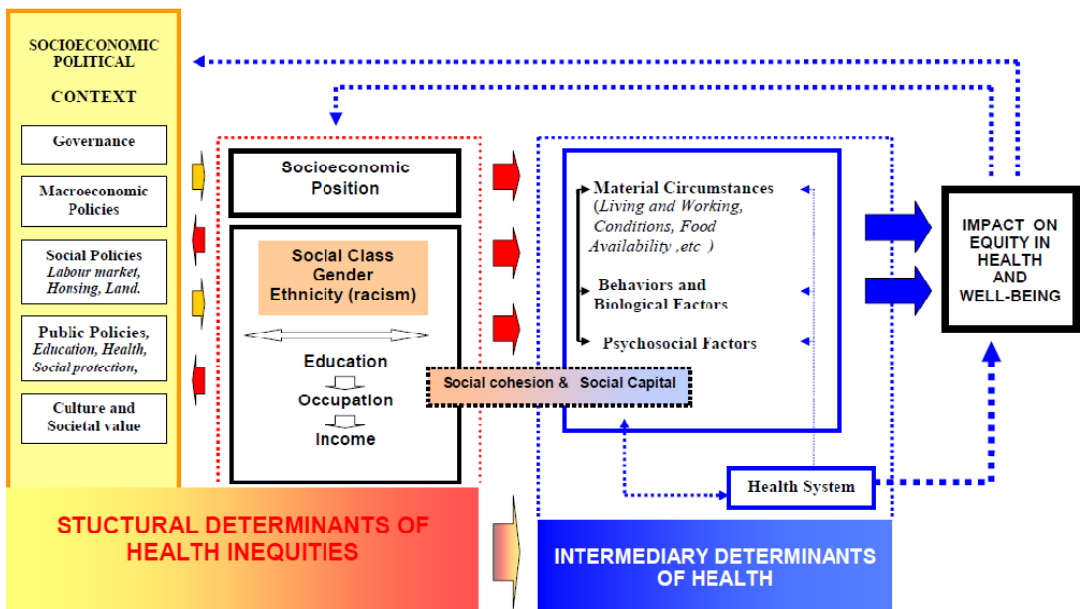


Figure 8: Socio-cultural determinants of health (WHO's commission on social determinants of health, 2007).

4. Aims of the study

To conclude from the literature review, the social conditions in which a family lives, and the culture which shapes up its life style, impacts the health of the family by influencing the health seeking attitudes, practices and health beliefs. Towards these near end stages of global poliomyelitis eradication it is of importance to study the phenomenon in different settings. The general aim of this study was to investigate poliomyelitis in socio-cultural context in province Punjab, Pakistan. The study explores various social conditions, cultural influences, health behaviours and perceptions of families in high-transmission-zone areas for poliomyelitis in the province Punjab, Pakistan.

The specific aims were:

1. to access the associations of socioeconomic factors to poliomyelitis in case control design.
2. to probe into lay perceptions towards poliomyelitis and its immunization.
3. to evaluate the role of genders in decision-making about health.
4. to investigate the general trends of health care services utilization.

5. Materials and methods

5.1. STUDY DESIGN

Study consisted of two main parts; a quantitative and a qualitative part.

In quantitative part a questionnaire survey was done in case-control design. Cases and controls were from the Southern-Punjab area which is the high-transmission-zone for polio virus in province Punjab. Cases were the confirmed diagnosed cases of poliomyelitis in the WHO records from the year 2000 to 2006. Controls were randomly selected from similar rural areas of the high-transmission-zone; similarly exposed and with similar transmission and immunity gap patterns. A total of 51 cases and 400 controls were included. Questionnaire was aimed at the families of these confirmed cases and also similarly for controls, with variables designed for the family, the father and the mother.

Findings of this case-control questionnaire survey were further supported with the census records of these areas and the overall province. Census publications were acquired from the Population Census Organization, Lahore office.

The qualitative part was comprised of in-depth interviews from families in an area of high-transmission-zone. Families included were randomly selected regardless of the disease status from the same area. In addition to these 19 in-depth interviews from lay people, 3 official vaccinators of the area were also interviewed in detail.

Digital photographs and news reports were used to support the other data forms.

5.2. STUDY AREAS

In the year 2007, National Surveillance Cell, Polio Eradication Initiative (WHO, Pakistan) considered southern Punjab as high-transmission-zone for polio in province Punjab (appendix), an area with boundaries to all the other 3 provinces; Sindh, Balochistan and NWFP (figure 11).

Predominantly rural in nature, these areas have plain, desert and mountainous terrain, and people with a simple, conservative life style. Most areas of these districts are highly undeveloped, with unplanned housing, spreading in an undocumented way. Streets are mostly unpaved with no up-to-date street maps or house addresses in government records. Even in WHO records of the confirmed poliomyelitis cases, the addresses are not complete or easy to locate practically in the field, and with some part of population living a nomadic life makes the population tracking even more difficult.

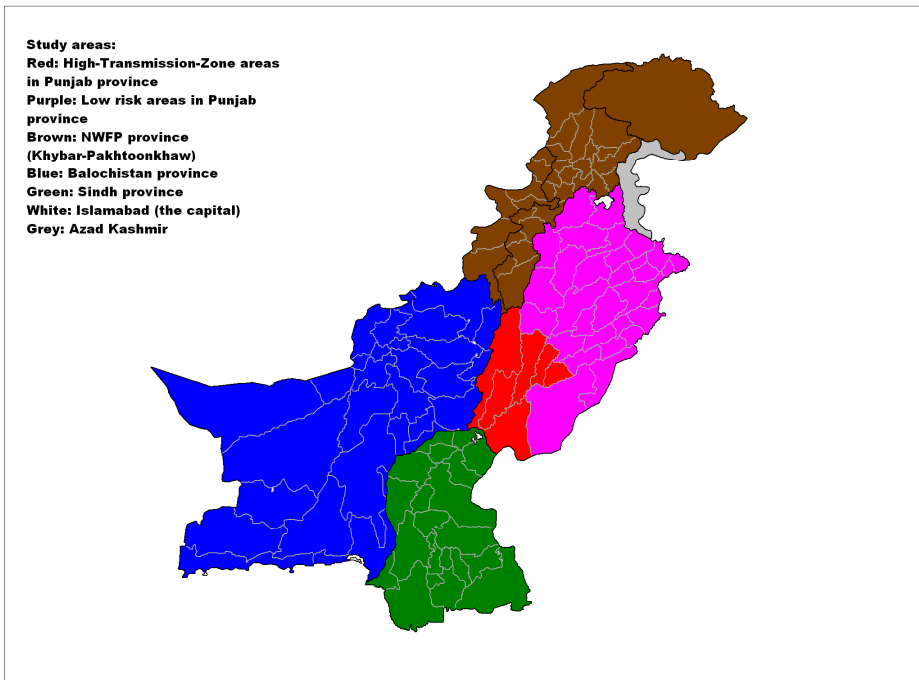


Figure 9: Pakistan, provinces, and study areas.

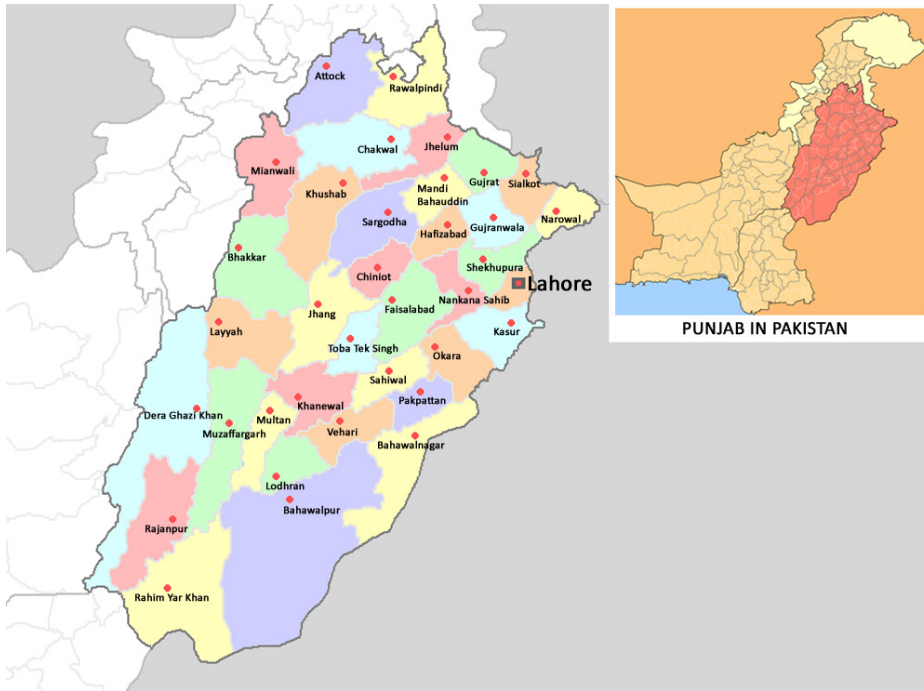


Figure 10: Districts in Punjab province (Wikipedia, 2009).

5.3. QUESTIONNAIRE SURVEY

5.3.1. Data collection process

Data collection process was started in February 2007. Initial most steps were to approach the WHO Islamabad office (National Surveillance Cell, Polio Eradication Initiative) to get house addresses of the confirmed poliomyelitis cases in the records (application as appendix).

A total of 66 **cases of poliomyelitis** from year 2000 to 2006 were targeted from these high-transmission-zone areas. Later, the local district level government or WHO's setup was approached for further guidance. In some places an official vaccinator's help was needed and requested to guide to the required houses. 11 families (16.7%) with confirmed poliomyelitis cases could not be traced, either due to incomplete and insufficient addresses

in the records or the families moved to some new address but with no updates in the health department's records. Totally 55 of the 66 confirmed poliomyelitis cases were reached successfully, but 4 families (6.1%) refused any cooperation to the researcher giving different reasons (explained below). So in total 51 cases (77.3%) could be included in the study. A preformed questionnaire was used to get data. Mostly the data collection was done in the afternoon or evening timings when the men are usually back to home from their work, or in some cases an appointment was made for some specific day time when both the father and mother were to be available at home.

Control group included 400 families with child/children below the age of 10 years.

To avoid selection bias, matching was taken into consideration, thus the controls are also from the same high-transmission-zone of southern Punjab; from areas exposed similarly and with existence of similar transmission and immunity gaps; from rural areas with similar distances to the main cities; with the same religion; culture; language; race; governmental health setup; vaccination campaign policies, organization, schedule and activities; similar environmental conditions and sewerage/drainage situation; similar security and peace situation; and also the fact that the major media of the province is the same and circulated similarly in all these areas of southern Punjab. And furthermore randomization was applied to avoid the bias. Main mosque of a village was taken as the starting point, and then every tenth house was selected in the more populated direction from the mosque (11th or 12th house if the house was found to be locked or family members absent or if with no children below 10 years age).

A total of 39 refusals were faced during the process from families unwilling to cooperate. Reasons given of non-cooperation were various, but most often the absence of the father or any male member of family at that time in the house was the case. In such situations a second attempt was tried at later hours of the day, or then the researcher moved on to the next house in sequence if still unsuccessful. Families were presented with the same questionnaire used for the case group.

A total of 5 interviewers conducted the process (including the principal researcher). All 5 are male, with MBBS degree, with basic training of the interview process during the medical school courses, with experience of public health field-work, and with total understanding of the project details.

Proper prior verbal consent was taken from the head of the family, but without giving any hint of partiality about the matter.

Men were always spoken to directly face to face without allowing any presence or interference from anybody else, but women were talked to in different ways depending upon the permission given by the husband or male members of the family.

5.3.2. Questionnaire

The questionnaire used was based on “socio-economic part of the questionnaire used in KIHHD” (Kuopio Ischemic Heart Disease risk factor study)(University of Kuopio, 2010), with certain modifications and additions were done to tailor-fit it to the study and conditions of the particular area and society. This adjustment to the local circumstances was based on the pre-testing process. For instance, based on the common practice in Pakistani society, health care services were broadly divided into these categories; Professionals, Folk healers and Quacks. Professionals included properly trained and registered medical doctors, staff, and different levels of health centres (primary, secondary, tertiary) in the government (public) or private health sector. Quacks were the dispensers, nurses and homeopaths who had no proper medical education, training or license but still were working openly as physicians in the society. Folk sector healers included moulvis (religious leader) and hakeems (herbalist).

Most questions were closed format questions with multiple choices given as the answers. Questions and the multiple choices in answers were all pre-coded to record the data in an organized way without any ambiguity. Variables included were primarily about the social

conditions of the families as well as their general health attitudes and health education status (questionnaire is attached). General questions about the family and living conditions were asked from the head of the family, and then father and mother were individually asked separate questions directed particularly at them.

As often the written vaccination history (card) was not available from families, the information was collected based on personal recall of the interviewees.

Self-observation was used to record certain visible answers and conditions (like for example the material used to build the house).

Questionnaire was translated beforehand to the local dialect of the Siraiki language, the translation was double checked and revised so as to convey the exact same meanings, and the interviewers were fluent in that language and the exact dialect. Translation and double checking of the questionnaire was done by a university professor with post-graduate teaching experience in both languages.

Simple commonly used local dress was worn by interviewers to develop a sense of ease and rapport with the interviewees. The process was mostly done in the "baithak" of the house (room for guests who are not allowed to go into the general part of the house where women live), or sometimes by putting a chair in the street in front of the house door.

5.4. CENSUS DATA

Above described questionnaire survey was supported by collecting information about the poliomyelitis high-transmission-zone areas and the province Punjab as a whole, from the last census conducted by the government of Pakistan. Census provides information about a vast range of social and demographic indicators. Government conducts census after every 10 years but often due to political instability the process is much delayed. Latest detailed census available was the one conducted in 1998 (Population census organization, 2010). Provincial and district census reports were purchased for about 300 Pak rupees each from

the provincial office of Population Census Organization in Lahore. Relevant information and statistics were extracted in the form of tables.

5.5. IN-DEPTH INTERVIEWS

Families in one area of high-transmission-zone (Dera Ghazi Khan) were approached by the principal researcher, who took prior studying and training of the qualitative research methodology and especially the in-depth interview process at the school of public health, university of Kuopio, under the tutelage of the supervisors of the study. Grounded-theory approach was used in conducting detailed, in-depth semi-structured Interviews from father or mother, based on their views on their child's diseases and their health attitudes, health education status and their socio-cultural conditions in general. Probing was the tool of choice to extract and explore the views, ideas, knowledge and opinions (Straus and Corbin, 1998). The conversational style of these interviews took the shape of narratives; an approach which provides clearer and deeper understanding of the spoken and unspoken language, the interactions and the cultural phenomenon (Riessman, 1990).

These families were randomly selected from the same neighborhood, regardless of the disease status. Randomization was achieved by selecting every 10th house starting from the house of a polio case (in the most populated direction). A total of 19 in-depth interviews were taken, 15 from fathers, 4 from mothers (based on availability and willingly participation). The process was stopped when the answers and information started repeating itself – the saturation stage (Straus and Corbin, 1998; Dantas, 2009). Again like the questionnaire survey, these interviews were conducted usually in the “baithak” or in the street.

In addition to these families, 3 official vaccinators of that area (Dera Ghazi Khan) were also interviewed to get their individual take of the situation. These vaccinators asked and were assured the guarantee to be kept anonymous so that their views don't affect their

government job, and thus it helped in getting their freely expressed opinions. Interviews of vaccinators were conducted out of their work place, usually in some road-side simple tea spot, but in some quiet corner to avoid any interference. Vaccinators were never given any money or any other incentive to get cooperation (though still the cup of tea was paid for at the end of the interview because of the politeness of the customs).

No time limit was fixed before hand for the interviews but it was usually about a little more than an hour for each interview. Voice recording equipment was used to avoid the loss of any verbal response.

All the interviews were conducted in local language Siraiki, and later translated to English language by the researcher. Translation was reviewed and corrected by a professional with good command over both languages involved; Siraiki and English.

Verbal consent was taken from the families and also the vaccinators before the interview process. They were all assured of confidentiality, and were never given any hint of partiality about the discussed matters.

5.6. MULTI MEDIA

The data and findings were further clarified by using the real-life photographs taken by the researchers during the field work. All the photos were specifically for this project, and were not used in any other way or purpose. Multiple photographs were taken to represent the various aspects of social conditions, cultural trends and phenomenon in the study areas, and later those with more appropriate content and quality were selected to be used in the report. The potentially sensitive photographs like those of mosque, madrassa, school, house, woman, children were taken after getting verbal consent, and taking into consideration their privacy as well as accuracy of the message (Edgar, 2004). Each photo was labeled.

In addition to photographs, newspaper reports were also used to further highlight the issues and situations under study. News reports from online prints of a widely circulated and respected English language Pakistani newspaper "The News" and of British news agency "BBC" were incorporated at relevant places in the text, with proper referencing to the source.

This use of media served basically as a support and explanation to the study findings and descriptions, especially for the non-Pakistani readers to get a better understanding of the conditions and phenomenon under discussion.

5.7. DATA ANALYSIS

Data collected by the above described methods was analyzed statistically and philosophically to understand the effects of social conditions on the situation of Poliomyelitis in Pakistan.

As the questionnaire involved questions to both father and mother in every family, thus the data was stratified into father-mother groups in addition to the case-control groups. Frequencies and percentages were given for fathers and mothers separately in cases and controls to identify and explain the differences.

For the questionnaire survey data, SPSS (version 14.0) software was used and the statistics included calculating the p values to determine the significance of association of variables with the disease. p value was set to be 0.05. Pearson's chi-square test and Fischer's test were applied for the categorical variables. Mann-Whitney test was used for continuous variables. Logistic regression was applied to calculate the OR and 95% CI. Bivariate analysis was done, but because of small number of cases the adjustment for extraneous variables did not work.

Content of the in-depth interviews was analyzed and understood in detail by using the “constant comparative analysis” strategy; by breaking down the interviews into compilations of similar themes and patterns. (Straus and Corbin, 1998; Thorne, 2000; Dantas, 2009). Kleinman’s elaborating style (1988) was then followed to present these explanatory models, lay-perceptions and attitudes, to capture the maximum meanings, and also displaying the process of probing and the background informations. These narrative excerpts were further interpreted and explained in text and also supported by relevant incorporation of photographs and local news reports as well.

6. Census data of study areas and province Punjab

Last census was conducted in year 1998, and it reports a vast information on social and demographic indicators about the province Punjab as a whole and about all its administrative parts including the high-transmission-zone areas for poliomyelitis. The differences and similarities are to be noted in the following.

For instance it compares the general patterns of economic activity in these areas and the province Punjab as a whole in following table 1; where it shows that though there are no significant differences between the areas but overall almost all economic activity lies with the male population of the areas, and 98% females are economically inactive.

Table 1: Percentage of population by economic categories and sex (Population Census Organization, 1998 Census report, 2000).

| admin. unit | economically active | | | not economically active | | | un-employment rate | | |
|-----------------------------------|---------------------|------|--------|-------------------------|------|--------|--------------------|------|--------|
| | both sexes | male | female | both sexes | male | female | both sexes | male | female |
| Punjab | 22.6 | 42.2 | 1.4 | 77.4 | 57.8 | 98.6 | 19.1 | 19.6 | 5.5 |
| Rahimyarkhan | 23.8 | 44.3 | 1.4 | 76.2 | 55.7 | 98.6 | 18.9 | 19.3 | 6.2 |
| Muzaffargarh | 24.1 | 44.7 | 1.8 | 75.9 | 55.3 | 98.2 | 20.9 | 21.6 | 1.9 |
| Rajan pur | 25.1 | 36.0 | 0.8 | 74.9 | 64.0 | 99.2 | 19.3 | 19.6 | 2.2 |
| D.G.Khan | 23.8 | 45.1 | 0.9 | 76.2 | 54.9 | 99.1 | 24.8 | 25.2 | 4.8 |
| Multan | 24.3 | 45.1 | 1.4 | 75.7 | 54.9 | 98.6 | 20.5 | 21.0 | 1.9 |
| Lodhran | 24.4 | 46.3 | 0.7 | 75.6 | 53.7 | 99.3 | 18.9 | 19.2 | 2.0 |
| Average of High-transmission-zone | 24.2 | 43.6 | 1.2 | 75.7 | 56.4 | 98.8 | 20.5 | 21.0 | 3.2 |

Populations in poliomyelitis high-transmission-zone have on average considerably lower literacy ratio as compared to the province Punjab as the whole. The differences are vast in both males and females, but with female populations much less literate than their male counterparts. (Table 2)

Table 2: Population (10 years and above) by literacy and sex, in percentages (Population Census Organization, 1998 Census report, 2000).

| | Punjab | Rahimyar khan | Muzaffargarh | Rajan pur | D.G.Khan | Multan | Lodhran | Average of High-transmission-zone |
|------------|--------|---------------|--------------|-----------|----------|--------|---------|-----------------------------------|
| Both sexes | 46.56 | 33.09 | 28.45 | 20.73 | 30.61 | 43.4 | 29.9 | 31.03 |
| Male | 57.20 | 43.40 | 40.87 | 29.01 | 42.09 | 53.3 | 42.7 | 41.89 |
| Female | 35.10 | 21.82 | 14.77 | 11.35 | 18.05 | 32.3 | 16.0 | 19.05 |

Census data also displays far less enrolment ratio in these high-transmission-zone areas than the provincial figures, and smaller size of student population as well. (Table 3, 4).

Table 3: Enrolment ratio by sex (in percentages) (Population Census Organization, 1998 Census report, 2000).

| | Punjab | Rahimyar khan | Muzaffargarh | Rajan pur | D.G.Khan | Multan | Lodhran | Average of High-transmission-zone |
|------------|--------|---------------|--------------|-----------|----------|--------|---------|-----------------------------------|
| Both sexes | 39.4 | 27.0 | 23.9 | 21.6 | 23.0 | 34.9 | 26.1 | 26.1 |
| Male | 43.8 | 31.4 | 30.2 | 27.0 | 28.4 | 40.8 | 23.6 | 30.2 |
| Female | 34.6 | 22.2 | 17.4 | 15.3 | 17.1 | 28.6 | 39.9 | 23.4 |

Table 4: Student population (in percentages) (Population Census Organization, 1998 Census report, 2000).

| | Punjab | Rahimyar khan | Muzaffargarh | Rajan pur | D.G.Khan | Multan | Lodhran | Average of High-transmission-zone |
|------------|--------|---------------|--------------|-----------|----------|--------|---------|-----------------------------------|
| Both sexes | 7.9 | 6.2 | 5.4 | 4.2 | 5.1 | 7.4 | 5.6 | 5.6 |
| Male | 14.4 | 10.1 | 10.4 | 7.9 | 9.6 | 13.9 | 10.6 | 10.4 |
| Female | 0.8 | 1.8 | 0.2 | 0.1 | 0.2 | 0.3 | 0.1 | 0.4 |

Census findings also depict that the populations in these areas are growing annually at a higher rate, living in congested mud houses, with less number of rooms and inadequate or unavailable toilet facilities, while the province population has lesser growth rate, has better brick houses with more number of rooms per housing unit, less persons per room and per housing unit, and better sanitary conditions. (Tables 5, 6, 7).

Table 5: Material used in outer walls of houses (in percentages) (Population Census Organization, 1998 Census report, 2000).

| admin unit | brick (blocks, stones) | mud (earth bounded) | wood/bamboo | others |
|-----------------------------------|------------------------|---------------------|-------------|--------|
| Punjab | 68.0 | 30.4 | 0.7 | 0.9 |
| Rahimyar khan | 52.0 | 44.9 | 1.9 | 1.2 |
| Muzaffargarh | 34.8 | 62.2 | 1.0 | 2.0 |
| Rajan pur | 21.5 | 68.7 | 5.1 | 4.7 |
| D.G.Khan | 31.3 | 65.2 | 1.9 | 1.7 |
| Multan | 54.1 | 43.7 | 1.0 | 0.2 |
| Lodhran | 40.3 | 56.9 | 1.0 | 1.8 |
| Average of High-transmission-zone | 39.0 | 56.9 | 1.98 | 1.9 |

Table 6: Indices of congestion (Population Census Organization, 1998 Census report, 2000).

| admin unit | persons per housing unit | persons per room | rooms per housing unit | housing units with 1 room (percentage) | housing units with 2-4 rooms (percentage) | housing units with 5 or more rooms (percentage) | 1981-98 average annual growth rate (%) |
|----------------------------|--------------------------|------------------|------------------------|--|---|---|--|
| Punjab | 6.9 | 3.0 | 2.3 | 32.0 | 60.6 | 7.4 | 2.64 |
| Rahimyarkhan | 7.5 | 3.6 | 2.1 | 39.5 | 54.3 | 6.2 | 3.19 |
| Muzaffargarh | 7.3 | 3.8 | 1.9 | 46.2 | 50.0 | 3.8 | 3.38 |
| Rajan pur | 7.3 | 4.1 | 1.8 | 53.7 | 43.3 | 3.0 | 3.27 |
| D.G.Khan | 7.8 | 3.7 | 2.1 | 38.9 | 55.2 | 5.9 | 3.31 |
| Multan | 7.1 | 3.4 | 2.1 | 39.0 | 55.9 | 5.1 | 2.73 |
| Lodhran | 7.2 | 3.4 | 2.1 | 37.2 | 56.8 | 6.0 | 2.74 |
| Average of High-trans-zone | 7.4 | 3.7 | 2.0 | 42.4 | 52.6 | 5.0 | 3.1 |

Table 7: Housing units' percentage by kitchen, bathroom and latrine (Population Census Organization, 1998 Census report, 2000).

| admin unit | kitchen | | | bathroom | | | latrine | | |
|-----------------------------------|----------|--------|------|----------|--------|------|----------|--------|------|
| | separate | shared | none | separate | shared | none | separate | shared | none |
| Punjab | 31.5 | 11.1 | 57.4 | 32.1 | 17.8 | 50.1 | 26.5 | 15.8 | 57.7 |
| Rahimyarkhan | 16.4 | 6.2 | 77.4 | 23.6 | 12.5 | 63.9 | 20.9 | 11.3 | 67.8 |
| Muzaffargarh | 15.4 | 7.9 | 76.7 | 10.1 | 6.6 | 83.3 | 12.1 | 6.8 | 81.1 |
| Rajan pur | 9.2 | 9.6 | 81.2 | 9.5 | 10.0 | 80.5 | 11.1 | 9.8 | 79.1 |
| D.G.Khan | 12.0 | 10.3 | 77.6 | 12.4 | 10.5 | 77.1 | 14.4 | 10.6 | 75.0 |
| Multan | 22.3 | 10.7 | 67.0 | 26.9 | 17.2 | 55.8 | 31.5 | 18.4 | 50.0 |
| Lodhran | 22.4 | 7.4 | 70.2 | 19.4 | 9.0 | 71.6 | 15.7 | 7.5 | 76.8 |
| Average of High-transmission-zone | 16.3 | 8.7 | 75.0 | 17.0 | 11.0 | 72.0 | 17.6 | 10.7 | 71.6 |

Census data also records less percentage of under 10 years population immunized in these areas, with about 35 % either not vaccinated or not known at all (table 8), and the province consisting of mostly low-transmission-zone areas has higher immunization figures.

Table 8: Percentage of population (under 10 years) by immunization (Population Census Organization, 1998 Census report, 2000).

| | Punjab | Rahimyar khan | Muzaffargarh | Rajan pur | D.G.Khan | Multan | Lodhran | Average of High-transmission-zone |
|----------------|--------|---------------|--------------|-----------|----------|--------|---------|-----------------------------------|
| Vaccinated | 75.5 | 65.9 | 65.2 | 64.0 | 65.1 | 75.6 | 66.2 | 67.0 |
| Not vaccinated | 7.0 | 9.9 | 18.2 | 22.4 | 15.5 | 9.2 | 16.1 | 15.2 |
| Not known | 17.5 | 24.2 | 16.6 | 13.6 | 19.4 | 15.2 | 17.7 | 17.8 |

7. Results

7.1. RESULTS OF QUESTIONNAIRE SURVEY

7.1.1. Income and occupation

Families with higher average monthly income were more likely to be poliomyelitis free as compared to those with lower income (table 9), but then there were differences in the employment and income characteristics of father and mother in the same family. Father's current and past employment status and his income during the last year were significant, with considerable difference between the cases and controls, but mother's was not and figures were equally low in mothers of cases and controls (table 10, 12). Control group had far bigger percentage of full-time employed fathers, while in cases group most fathers were either unemployed or they were working part-time jobs. The "employment status during the last 5 years" also described the same pattern of father's employment or unemployment affecting the health situation of children but mother's was not (table 11).

Table 9: "Monthly income" among cases and controls with odds ratios, 95% CI and p-value.

| | | | | |
|----------------|----------|---------------------------------------|-----------------|---|
| Monthly income | Cases | Low Income (less than 5000 Rs) | 88.2 % n=45 | p < 0.001 OR High income = 1 Low income = 15.8 95%CI = 6.5 – 37.9 |
| | | High Income (more than 5000 Rs) | 11.8 % n=6 | |
| | Controls | Low Income (less than 5000 Rs) | 32.3 % n=129 | |
| | | High Income (more than 5000 Rs) | 67.8 % n=271 | |

Table 10: “Employment status” among cases and controls with odds ratios, 95% CI and p-value.

| | | | | | | |
|-------------------|--------|----------|-------------------------|-----------------|--|----------|
| Employment status | Father | Cases | Employed full time | 37.3 % n=19 | <p>p < 0.001</p> <p>OR</p> <p>Employed full time = 1</p> <p>Part time or unemployed = 7.2</p> <p>95 % CI = 3.9 – 13.4</p> | |
| | | | Part time or Unemployed | 62.7 % n=32 | | |
| | | Controls | Employed full time | 81.0 % n=324 | | |
| | | | Part time or Unemployed | 19.0 % n=76 | | |
| | Mother | Cases | Employed full time | 0 % n=0 | | p = 0.79 |
| | | | Part time or Unemployed | 100 % n=51 | | |
| | | Controls | Employed full time | 0.5 % n=2 | | |
| | | | Part time or Unemployed | 99.5 % n=398 | | |

Table 11: “Employment status in last 5 years” among cases and controls with odds ratios, 95% CI and p-value.

| | | | | | | |
|--------------------------------------|--------|----------|---------------------------------|-----------------|--|----------|
| Employment situation in last 5 years | Father | Cases | never unemployed | 15.7 % n=8 | <p>p < 0.001</p> <p>OR</p> <p>Never Unemployed = 1</p> <p>Been Unemployed = 7.2</p> <p>95 % CI = 3.3 – 15.7</p> | |
| | | | been unemployed | 84.3 % n=43 | | |
| | | Controls | never unemployed | 57.2 % n=229 | | |
| | | | been unemployed | 42.8 % n=171 | | |
| | Mother | Cases | never unemployed | 0 % n=0 | | p = 0.79 |
| | | | been unemployed (or house wife) | 100 % n=51 | | |
| | | Controls | never unemployed | 0.5 % n=2 | | |
| | | | been unemployed (or house wife) | 99.5 % n=398 | | |

Table 12: “Last year’s income” among cases and controls with odds ratios, 95% CI and p-value.

| | | | | | | |
|------------------|--------|----------|---------|-----------------|--|---|
| Income last year | Father | Cases | < 60000 | 90.2 % n=46 | p < 0.001 OR >60000 = 1 <60000 = 18.9 95 % CI = 7.3 – 48.7 | |
| | | | > 60000 | 9.8 % n=5 | | |
| | | Controls | < 60000 | 32.8 % n=131 | | |
| | | | > 60000 | 67.2 % n=269 | | |
| | Mother | Cases | < 60000 | 98.0 % n=50 | | p = 0.59 OR >60000 = 1 <60000 = 1.4 95 % CI = 0.18 – 11.2 |
| | | | > 60000 | 2.0 % n=1 | | |
| | | Controls | < 60000 | 97.2 % n=389 | | |
| | | | > 60000 | 2.8 % n=11 | | |

But when we studied the occupation types of fathers in cases and controls, no substantial difference was found (table 13). So it’s the employment status that was of value here regardless of what type of occupation it was.

Table 13: “Type of occupation” among cases and controls with odds ratios, 95% CI and p-value.

| | | | | | |
|-----------------|--------|----------|-----------|-----------------|---|
| Occupation type | Father | Cases | unskilled | 37.3 % n=19 | p = 0.43 OR Skilled = 1 Unskilled = 1.3 95 % CI = 0.7 – 2.3 |
| | | | skilled | 62.7 % n=32 | |
| | | Controls | unskilled | 31.8 % n=127 | |
| | | | skilled | 68.2 % n=273 | |

The number of working persons in the family was not associated to the disease status as shown in table 14.

Table 14: “Number of working persons in family” among cases and controls with odds ratios, 95% CI and p-value.

| | | | | |
|-------------------------------------|----------|---|------------------|---|
| Number of working persons in family | Cases | 1 | 98.04 % n=50 | p = 0.74 OR with 2 working persons = 1 with 1 working person = 1.4 95% CI = 0.18-11.2 |
| | | 2 | 1.96 % n=1 | |
| | Controls | 1 | 97.25 % n=389 | |
| | | 2 | 2.75 % n=11 | |

Another important observation to be noticed was satisfaction with the financial situation of the family; case families were found mostly very unhappy about their financial well being and considered themselves insecure, but the controls on the contrary were feeling bit more secure, and statistically the association was significant for both fathers and mothers (table 15).

Table 15: “Financial security” among cases and controls with odds ratios, 95% CI and p-value.

| | | | | | |
|--------------------|--------|----------|----------|-----------------|---|
| Financial security | Father | Cases | secure | 1.96 % n=1 | p < 0.001 OR Secure = 1 Insecure = 40.5 95 % CI = 5.5 – 296.0 |
| | | | insecure | 98.04 % n=50 | |
| | | Controls | secure | 44.8 % n=179 | |
| | | | insecure | 55.2 % n=221 | |
| | Mother | Cases | secure | 1.96 % n=1 | p < 0.001 OR Secure = 1 Insecure = 40.5 95 % CI = 5.5 – 296.0 |
| | | | insecure | 98.04 % n=50 | |
| | | Controls | secure | 44.8 % n=179 | |
| | | | insecure | 55.2 % n=221 | |

7.1.2. Education

Father's education status differed significantly between cases and controls ($p < 0.001$), but mother's did not ($p = 0.065$). Cases seemed to have a very small percentage of literate fathers compared to the control families, but mothers were mostly illiterate in both cases and controls (table 16).

Table 16: "Literacy" among cases and controls with odds ratios, 95% CI and p-value.

| | | | | | |
|----------|--------|----------|------------|-----------------|--|
| Literacy | Father | Cases | Literate | 11.8 % n=6 | p < 0.001 OR Literate = 1 Illeterate = 19.8 95 % CI = 8.2 – 47.6 |
| | | | Illiterate | 88.2 % n=45 | |
| | | Controls | Literate | 72.5 % n=290 | |
| | | | Illiterate | 27.5 % n=110 | |
| | Mother | Cases | Literate | 3.9 % n=2 | p = 0.06 OR Literate = 1 Illeterate = 3.6 95 % CI = 0.8 – 15.2 |
| | | | Illiterate | 96.1 % n=49 | |
| | | Controls | Literate | 12.8 % n=51 | |
| | | | Illiterate | 87.2 % n=349 | |

And continuing in the same tone further, the father's number of years of education was exerting significant inverse influence ($p < 0.001$, OR for +1 year= 0.75, 95% CI= 0.68–0.83) but mother's was not ($p = 0.06$, OR for +1 year = 0.81, 95% CI =0.64-1.02).

In the survey results, an inverse association existed between the number of children in the family going to school and poliomyelitis ($p = 0.006$, OR for +1 student in family= 0.5, 95%CI= 0.3 – 0.8).

7.1.3. Housing conditions and material possessions

House conditions were found to have an inverse association with poliomyelitis in family. A much higher percentage of case families lived in mud made houses (picture 3), with less number of rooms and either unavailable or unsanitary toilet conditions in the house. While on the other hand most controls had better brick made houses, with more number of rooms and modern efficient toilets inside the house. The association was found to be statistically significant (tables 17, 18, 19).

Table 17: "House structure" among cases and controls with odds ratios, 95% CI and p-value.

| | | | | |
|-----------------|----------|-------|-----------------|---|
| House structure | Cases | Mud | 58.8 % n=30 | p < 0.001 OR Brick = 1 Mud = 7.1 95 % CI = 3.8 – 13.1 |
| | | Brick | 41.2 % n=21 | |
| | Controls | Mud | 16.8 % n=67 | |
| | | Brick | 83.2 % n=333 | |



Picture 3: A mud house.



Picture 4: Living conditions inside a poliomyelitis case family's house.

Table 18: “Number of rooms in house” among cases and controls with odds ratios, 95% CI and p-value.

| | | | | |
|-----------------|----------|-----------|-----------------|---|
| Number of Rooms | Cases | 2 | 47.1 % n=24 | p < 0.001 For +1 room OR = 0.22 95 % CI = 0.13 – 0.36 |
| | | 3-5 | 52.9 % n=27 | |
| | | 6 or more | 0 % n=0 | |
| | Controls | 2 | 8.3 % n=33 | |
| | | 3-5 | 91.2 % n=365 | |
| | | 6 or more | 0.5 % n=2 | |

Table 19: “Toilet conditions in house” among cases and controls with odds ratios, 95% CI and p-value.

| | | | | |
|-------------------|----------|------------------|-----------------|---|
| Toilet conditions | Cases | No Toilet | 51.0 % n=26 | p < 0.001 OR: Modern efficient= 1 Inefficient= 11.1 (2.6-47.6 95%CI) No toilet= 66.5 (15.1-292.9 95%CI) |
| | | Inefficient | 45.1 % n=23 | |
| | | Modern efficient | 3.9 % n=2 | |
| | Controls | No Toilet | 8.8 % n=35 | |
| | | Inefficient | 46.5 % n=186 | |
| | | Modern efficient | 44.8 % n=179 | |



Picture 5: “naali” drainage system.

A higher percentage of cases lived in the house they did not own (a house on rent or owned by the employer), or lived in a conjoint family system with grandparents, uncles, aunts, cousins all sharing one house with them, thus making the living environment very congested. Controls mostly owned the house and lived in single family setup (tables 20, 21).

Table 20: “Ownership of house” among cases and controls with odds ratios, 95% CI and p-value.

| | | | | |
|--------------------|----------|-----------|-----------------|---|
| Ownership of house | Cases | Own house | 11.8 % n=6 | p < 0.001 OR Own House = 1 Not own = 5.6 95 % CI = 2.3 – 13.4 |
| | | not own | 88.2 % n=45 | |
| | Controls | Own house | 42.8 % n=171 | |
| | | not own | 57.2 % n=229 | |

Table 21: "Living setup" among cases and controls with odds ratios, 95% CI and p-value.

| | | | | |
|--------------|----------|---------------|-----------------|--|
| Living setup | Cases | Single family | 13.7 % n=7 | p < 0.001 OR Single Family = 1 Joint Family = 4.7 95 % CI = 2.1 – 10.7 |
| | | Joint family | 86.3 % n=44 | |
| | Controls | Single family | 42.8 % n=171 | |
| | | Joint family | 57.2 % n=229 | |

In addition to house and the living conditions, other common material possessions which represent the social status of family, were also found to be inversely related to disease status ($p < 0.05$), for example Television (OR=19.3, 95%CI= 7.5 – 49.8), Phone (OR=15.7, 95%CI= 6.5 – 37.8) and Car/bike (OR=37.3, 95%CI= 5.1 – 272.9).

7.1.4. Health care services utilization

Table 22 shows that cases were more inclined to folk sector and quacks as their first-contact services, while the controls had a higher percentage of families contacting the proper professional health care services, and the association was statistically significant ($p < 0.001$).

Table 22: “First health care contact” among cases and controls with odds ratios, 95% CI and p-value.

| | | | | |
|---------------------------|----------|--------------|-----------------|--|
| First health-care contact | Cases | Qualified | 31.4 % n=16 | p < 0.001 OR Qualified = 1 Folk, Quacks = 9.2 95 % CI = 4.9 – 17.4 |
| | | Folk, Quacks | 68.6 % n=35 | |
| | Controls | Qualified | 80.8 % n=323 | |
| | | Folk, Quacks | 19.2 % n=77 | |

This was further explained by the findings that cases had problems with the quality of the regular health services in their area, as shown in table 23 that in case families, fathers and mothers both ranked the services very low, while the control families expressed better trust in the quality of services in their areas.

Table 23: “View of quality of health care services” among cases and controls with odds ratios, 95% CI and p-value.

| | | | | | | |
|------------------------------------|--------|----------|----------|-----------------|--|---|
| View of quality of health services | Father | Cases | Bad | 82.4 % n=42 | p < 0.001 OR Ok, Good = 1 Bad = 24.1 95 % CI = 11.2 – 51.8 | |
| | | | OK, Good | 17.6 % n=9 | | |
| | | Controls | Bad | 16.2 % n=65 | | |
| | | | OK, Good | 83.8% n=335 | | |
| | Mother | Cases | Bad | 80.4 % n=41 | | p < 0.001 OR Ok, Good = 1 Bad = 10.8 95 % CI = 5.2 – 22.3 |
| | | | OK, Good | 19.6 % n=10 | | |
| | | Controls | Bad | 27.5 % n=110 | | |
| | | | OK, Good | 72.5 % n=290 | | |

Another important finding was that the door to door visitation by polio immunization teams during the regularly conducted National and Sub-National Immunization days (NIDs, SNIDs) was described as much more irregular and infrequent in case families than the controls (table 24). Though the finding was based on verbal response, as often no written evidence like the official immunization card was available to support.

Table 24: “Polio immunization team visits” among cases and controls with odds ratios, 95% CI and p-value.

| | | | | |
|--------------------------------|----------|-----------|-----------------|---|
| Polio Immunization team visits | Cases | Regular | 56.9 % n=29 | p < 0.001 OR Regular = 1 Irregular = 7.4 95 % CI = 3.9 – 14.3 |
| | | Irregular | 43.1 % n=22 | |
| | Controls | Regular | 90.8 % n=363 | |
| | | Irregular | 9.2 % n=37 | |

7.1.5. Health education

When stratified according to percentages, visible differences could be noticed in how the sources of health education differed between cases and controls (table 25). Mothers in both case and control groups were equally ignorant of the disease and a huge percentage claimed to have not gotten any health education about poliomyelitis from any source. Fathers in the control group showed much better access to information by different sources like the polio immunization teams, health personals, print and electronic media, and hearing from other people in the community. But these sources failed to reach fathers in the case families, who were mostly poor illiterate people with no good access to media or other common sources of health education, and we saw a significance of this association ($p < 0.001$). Especially important was to notice the very insignificant role of different information sources in reaching the women in general, whether they belonged to cases or controls.

Table 25: “Access to polio immunization information” among cases and controls with odds ratios, 95% CI and p-value.

| | | | | | | |
|--------------------------------------|--------|----------|---------------------------------|-----------------|---|--|
| Way of knowing of health information | Father | Cases | Never | 84.3 % n=43 | <p>p < 0.001</p> <p>OR</p> <p>Health personals, media, people = 1</p> <p>Never = 28.8</p> <p>95 % CI = 12.9 – 64.1</p> | |
| | | | Health personals, media, people | 15.7 % n=8 | | |
| | | Controls | Never | 15.8 % n=63 | | |
| | | | Health personals, media, people | 84.2 % n=337 | | |
| | Mother | Cases | Never | 92.2 % n=47 | | <p>p = 0.05</p> <p>OR</p> <p>Health personals, media, people = 1</p> <p>Never = 2.3</p> <p>95 % CI = 0.8 – 6.7</p> |
| | | | Health personals, media, people | 7.8 % n=4 | | |
| | | Controls | Never | 83.5 % n=334 | | |
| | | | Health personals, media, people | 16.5 % n=66 | | |

Questionnaire survey also included a question about “health education gathering”, that whether or not any member of family had ever attended any health education gathering, and surprisingly there was not a single observation in either cases or controls group; no father or mother ever went to any such formally arranged event.

Another important indicator for the health education status was people’s belief in vaccination in general. Similar to the situation about the sources of health education, fathers and mothers had different positions; fathers in control families were more trusting in the vaccination concept than fathers in case families, but still the percentage was not very high, the association is significant (p = 0.009). Mothers on both sides, in cases and controls, were very shaky in their belief in vaccination, most responded by either a straight No or they were undecided and unsure of its efficacy. (table 26).

Table 26: “Belief in vaccination” among cases and controls with odds ratios, 95% CI and p-value.

| | | | | | | |
|-----------------------|--------|----------|-----------------|-----------------|---|---|
| Belief in vaccination | Father | Cases | Yes | 17.6 % n=9 | p = 0.009 OR Yes = 1 No, Don't know = 2.6 95 % CI = 1.2 – 5.5 | |
| | | | No , Don't know | 82.4 % n=42 | | |
| | | Controls | Yes | 36.0 % n=144 | | |
| | | | No , Don't know | 64.0 % n=256 | | |
| | Mother | Cases | Yes | 11.8 % n=6 | | p = 0.322 OR Yes = 1 No, Don't know = 1.6 95 % CI = 0.6 – 3.8 |
| | | | No , Don't know | 88.2 % n=45 | | |
| | | Controls | Yes | 17.2 % n=69 | | |
| | | | No , Don't know | 82.8 % n=331 | | |

Father's knowledge of poliomyelitis was of inverse association with the disease status, but of mother's was not associated (table 27).

Table 27: “Knowledge of polio” among cases and controls with odds ratios, 95% CI and p-value.

| | | | | | |
|--------------------|--------|----------|-----------------|-----------------|---|
| Knowledge of Polio | Father | Cases | Yes | 15.7 % n=8 | p < 0.001 OR Yes = 1 No, Don't Know = 15.9 95 % CI = 7.2 – 34.9 |
| | | | No , Don't know | 84.3 % n=43 | |
| | | Controls | Yes | 74.8 % n=299 | |
| | | | No , Don't know | 25.2 % n=101 | |
| | Mother | Cases | Yes | 7.8 % n=4 | p = 0.11 OR Yes = 1 No, Don't know = 2.3 95 % CI = 0.8 – 6.7 |
| | | | No , Don't know | 92.2 % n=47 | |
| | | Controls | Yes | 16.5 % n=66 | |
| | | | No , Don't know | 83.5 % n=334 | |

7.2. RESULTS OF IN-DEPTH INTERVIEWS

7.2.1. Lay health perceptions

Perceptions about OPV drops, and vaccination in general

Belief in polio vaccination is found to be very shaky in the people, with many rumors and ideas circulating unchecked in the society. When people see a child getting the paralysis disease despite repeated visits by polio immunization teams, the doubts start appearing.

Q. These drops... what's their benefit?

A. I don't know, people say it is good for children's health, my child still has bad leg even though we have been giving him drops many times, they now say it will never be treated.

Q. Do you believe in vaccination? What do you think about it?

A. (thinks) I think it does not work as they say, all people here are getting drops for children, but still our children are getting diseases. If these drops are good then why my kid is not getting better.

Most commonly, the people are pointing fingers on the origins of the vaccine, as vaccine is being imported from the West so there has to have some conspiracy going on, like the West is trying to harm us Muslims by sending us vaccines with infertility medicine in it.

Q. These drops... what's their benefit?

A. they are no good, these drops.

Q. why?

A. they are being sent by English countries.

Q. so what about that?

A. these English are not angels to us that they keep on sending this, they send harmful things, I don't like these modern English medicine and these drops, who knows what bad effects they do to kids.

Q. so this is what you think about it?

A. yes yes, many people know that these English medicines have bad effects.

Q. who told you about this?

A. I know, my father and people used to go to Hakeems, and they were in good health, they lived long lives, now people run to these hospitals and doctors and get English medicines and like these drops, and they are still not good and healthy.

Q. what can these drops do?

A. nothing.

Q. so are your children getting these drops from polio teams?

A. not Earlier, but now for a year or two, kids uncle says they should take drops, so they are taking drops, but my son is still like earlier, there is not much improvement in him, these are just drops.

Q. Do you believe in vaccination? What do you think about it?

A. I am telling you these are all English countries things.

Q. how can these drops harm your children even if English countries are sending these?

A. these are family planning people, just so people let them do their scheme they say it's for diseases.

Q. is it for family planning? Why you say so?

A. yes, many people know these are from English people.

BBC NEWS

Impotence fears hit polio drive

By Ashfaq Yusufzai

Peshawar

Health officials in Pakistan say they have failed to immunise over 160,000 children against polio due to rumors the vaccine causes sexual impotence.

Story from BBC NEWS:

http://news.bbc.co.uk/go/pr/fr/-/2/hi/south_asia/6299325.stm

Published: 2007/01/25 17:11:38 GMT

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News report 1: Yusufzai, 2007.

One person put it very clearly in his interview when inquired about why he is blaming West (America);

Q. Why do you think America is doing such thing?

A. it's because they are enemies of Muslims, they want to harm us in every way, they do wars with Muslims and send these kinds of medicines.

Q. Does Islam allow vaccination?

A. I don't know, but we have to be careful, because these America and other countries are not our friends, they have their agendas to send us these things.

Q. Have you discussed this aspect with somebody?

A. many people know this, it is nothing hidden, our government does what America says, everybody knows.

An official vaccinator of the area summarized these views like this;

Q. Do people believe in vaccination system? Like you told that often it gets difficult.

A. (laughs) yes difficult, people now even say that you are giving us family planning drops, people don't have sense, they say you are doing (family) planning, and some people think that this is English system which you are running, putting us on wrong path, they want us to be impotent (laughs) so our generations doesn't increase, these English.

Q. really?

A. yes it is. I tell you a recent thing about it that there is this Malkani kallon area where I went, they said they are not getting it, we tried a lot with that woman, but that woman said no she is not getting it. Then we went to child's father, father said ask her from my side, phoned her, but she said no I am not getting it. (Laughs) her husband was in Karachi, he phoned, he came back, it all took half our day just to convince one person. These problems are there.

Government health authorities are blamed to be hiding the real information, and playing in Western hands; as described by this part of interview:

Q. Can these drops have any bad effect?

A. Allah knows better, these modern things have often bad effects with them, we don't know, the common people, because the government and city people hide these things from us.

Q. Why would they hide things from you?

A. sir, governments have their own agendas, they don't listen to people, it listens to what America says, it is saying give drops so they are giving.

Q. But why do you oppose to these drops?

A. yes people like here, we don't know these drops, maybe city people do, but we don't know what is this.

Also, the exact purpose of vaccine is being misunderstood, vaccines are being expected to cure their children's diseases, and failure to do so leads to mistrust by the people. Families with a child who is an already diagnosed case of poliomyelitis are especially disappointed because the repeated doses of OPV to the child are not making him any better.

Q. Do you believe in vaccination?

A. these drops?

Q. Yes what do you think about these polio drops?

A. they are not having any effect on my son, he is still not perfectly well, even though they often come and give him these red drops.

Q. And your other kids?

A. they are already healthy, they get these drops but they are fine already.

Q. What do you think about these polio teams?

A. I don't stop them, they are doing their duty, so they come and give these drops, whether good or bad this only God knows.

Some people do not believe in modern "English medicine" in general, and are wary of the side-effects these English medicine produce so oftenly, so the idea of vaccination to be given to children is hard for them to accept due to fear of possible side-effects. One mother showed her concerns as following;

Q. Can these drops have any bad effect?

A. medicines always have some bad effect, especially this English medicines, they are hot, even sometimes for grown up persons. That's why I don't give my children these unless my husband says, later everybody blames the women if something happens to child.

Q. what do you mean hot?

A. hot, like if you eat something and you don't tolerate it, it's like that

Q. so do you like these drops, is it ok that they give to your children?

A. I don't know, I don't say anything, they come, I tell them that my husband is not at home so they bring him, I don't interfere.

One observation is that the people are not satisfied with medicine in the form of just 2 drops to be given orally, as they are used to injections and tablets or atleast syrup bottles, but this vaccination process of giving just 2 tiny drops to child is considered useless.

Q. Do you believe in vaccination? What do you think about it?

A. I don't know it is doing what. Allah (God) knows.

Q. So what will happen if children don't get these drops?

A. injections which children get are powerful, but I don't know about these drops, these are just one or two drops, it sometimes doesn't even go inside child's throat. so then how can they treat the children. They should give children injections or syrups, these drops are of no use.

Another father supported the view in these words;

Q. What do you think of these polio teams?

A. no, there is no use of these people, just showing off that government is giving facilities to public, but it has no use in real.

Q. what do you mean no use?

A. they give drops, and say it is medicine, Shah sahib (religious person) says how can two drops be medicine, if we think with brain, it is just show off.

Q. are your children getting these drops?

A. they come to my house, I told them we don't need that, they come again and again

Q. so what you do?

A. what can I do, if I am at home I tell them to go away, or like my children are not at home, but when I am at work then they come and give drops to children, but it's of no use.

Perception of the disease; role of God and fate

A general attitude is observed in the dialogue with common people about their diseases and social lives; an attitude to attribute happenings to fate and God. Poliomyelitis stays something mysterious to people, and they show the tendency to accept it and other diseases in general to come from Allah (God).

As is evident from this excerpt from an interview conducted from father of a poliomyelitis affected child;

Q. what do you think is the reason (for your son's disease)?

A. God's will, as He keeps us.

Q. what do you mean?

A. He gave us disease, it happens, He must have some reason, or He check people like this.

Q. check?

A. yes, He tests who is His follower in these hard times.

Q. how can children be protected from this disease?

A. what can a man do, we can pray to God that he keeps us and our children safe and healthy, it's His decisions who to get diseases and who to stay healthy.

Q. so do you just pray to God when somebody gets ill?

A. yes He controls these diseases and everything, he gives cure.

Q. what about getting treatments?

A. yes treatment we get but still if God does not want then who can get better.

Another father describes the similar views;

Q. how a child gets it?

A. whatever these diseases and things come, they are from Allah, we are nothing, it's all His control.

Q. from where do you think this polio disease comes?

A. everything is what Allah decides, it come from there (raises finger upwards-gesture towards God)

Q. so can we humans do something about diseases like polio?

A. (pauses) doctors make new medicines for diseases, but this is only in Allah's hands who to get well or not.

Q. how can we protect children from diseases like polio?

A. we go to doctor, but we pray to Allah so doctors medicine work.

And not only the occurring of disease is being connected to God and fate, but also the reason for disease is thought to be a test and a check by God, to see who is a good follower and who is not. Diseases are hard times and thus a time to prove to God that one is a believer in Him and His mighty powers to send and also cure the diseases. Getting treatments and going to doctors and hospitals are often labeled as “worldly ways”, otherwise the main power lies with God to give the cure or not. So the praying is considered the most important act in facing the diseases.



Picture 6: People offering daily prayers in a village mosque.

Health education

Health education is found to be considerably inadequate in the poliomyelitis high-transmission-zone areas, with a vast majority of people and families knowing nothing or very insufficient about the basic most information regarding poliomyelitis disease. People have often no idea about how the disease spreads, what are the ways of transmission of the virus, and what simple methods and changes can be adopted in general lifestyle to keep the children protected from getting the disease. The disease is often being labeled as “new disease”, and thus mysterious in nature. The fact that they are told that there is absolutely no cure once their children get it, further adds to its mysteriousness. Also, it is observed that despite the lack of knowledge about the disease and the continuous incidence of disease in the area, people are not very keen to ask and learn about it, owing mostly to their simple rural nature perhaps.

Q. what do you know about this disease polio?

A. it is a new disease, I didn't see it before.

Q. how it spreads?

A. don't know sir, if a person is weaker, he can get it.

Q. what do you mean by weaker?

A. (pauses) this child was weak in body so he got ill, others are good.

Q. from where did your child get this disease?

A. as God wishes, it is not like a flu that comes from other person, diseases come from God.

Q. how can children be protected from this disease polio?

A. (thinks) we pray to God that children stay good, take them to these doctors and give them medicine.

Q. Do you think (God forbids) other children can get polio?

A. who knows, May God does not do this. Others are healthy and active, only this one kid had this. Our neighbors have no such disease either.

Q. how can you protect your other children from this polio disease?

A. if we give right medicine which child can tolerate, they get fine, some doctors are very good with children, they know what to give child of what age, and some don't know and give children like adult medicines which are bad.

Q. Any other way to protect the children from this disease polio?

A. may Allah keep everybody's kids safe and healthy.

Poor households mostly don't have television or radio sets, and the very high illiteracy rates in poverty ridden rural areas makes other simpler forms of mass information like newspapers and advertisement brochures and leaflets non-comprehensible for the people. Not a single person in the randomly selected interviewees reported of ever attending any health education gathering arranged by people or government health department.

Q. Have you seen any polio advertisement on TV or in newspapers?

A. don't have TV sir, so don't know if there is an advertisement there on TV.

Q. and in newspapers?

A. no sir, I can't read, I am uneducated how can I read newspapers.

Q. Any place else where you saw something about polio?

A. (thinks) I was at home few times when polio teams came, I saw these teams, and they had boxes and other things, that's all I saw.

Q. any polio posters on walls of village?

A. (thinks) don't know sir, there are many posters, but of elections, don't know about polio posters.

Q. Have you ever attended any gathering where you were told things about your health?

A. no sir, I never heard of that, and I am at work usually day long, I think these team people visit houses, I saw both men and women, they give drops.

Sometimes even if they notice something, still due to inability to read, they don't get the complete message.

Q. Any place else where you saw something about polio?

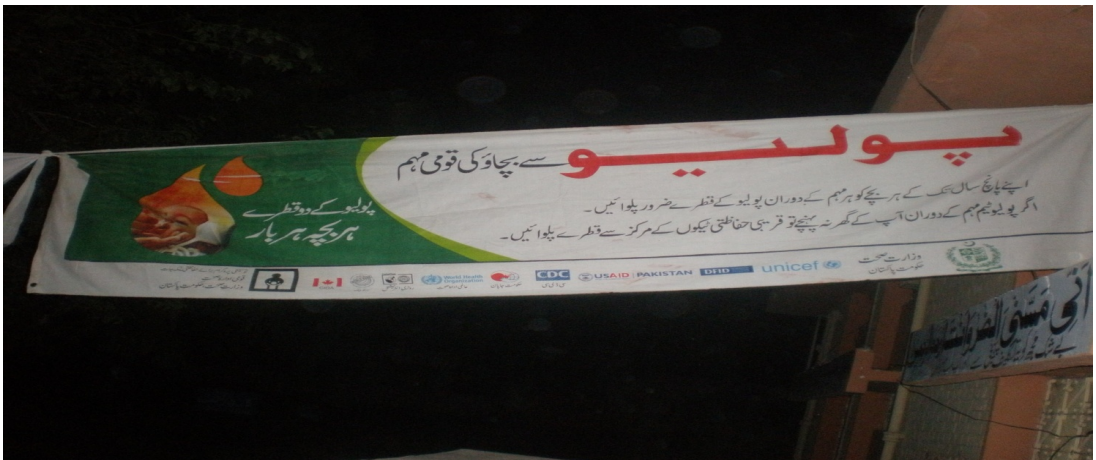
A. (thinks) when we took child earlier for physiotherapy in city; there I saw posters on walls with picture of children getting drops.

Q. Could you read that poster?

A. no sir, I can't read, but I knew that was polio drops picture.



Picture 7: Polio immunization campaign advertisement.



Picture 8: Polio immunization campaign advertisement.

Due to these limitations common rural people are often ignorant of the campaign activities as well, like the dates and schedule of the National and Sub-National Immunization Days (NIDs and SNIDs). The common perception is that the teams come once in few months, but even if they don't, still their absence is not missed very seriously. A house-wife shared her views like this;

Q. how often do they come to your house?

A. they have not come here for many months I think, maybe they have completed the course.

Q. what course?

A. medicine, course of medicine which they give, it might have completed so they are not coming more.

Q. do you know when polio teams are coming next?

A. no.

Q. ok, in past when polio teams had to come to your house and village, how did you know of it?

A. what can I say, I did not know that they are coming, they just come and knock on door.

Q. but if you did not know, have you ever missed it, like you were out of house?

A. may be, I went for one month to my parents place, I don't know if they came then or not.

Q. children were with you at your parents place?

A. yes we all went.

Q. and did polio people visit that house of your parents?

A. no, nobody came there.

Q. when you returned, did you ask anybody about their visit?

A. no.

Another indifference came like this;

Q. if they don't come to your house to give these vaccinations, what will you do?

A. they often come, I don't know if they miss or not, but its good if they do some better work.

Q. better work?

A. yes, they are health people, they should treat people and sit in their hospitals.

As also described later in the “Role of gender”, the conservative nature of society demands total segregation of men and women, thus making any sort of communication between the house-women and male polio immunization teams very difficult. Teams may be allowed to give OPV drops to the children of the family but there is usually no transfer of knowledge to the house hold. And as these teams visit during day hours, the men are usually out of house to work.

In addition, the trend of consulting quacks and religious elements practicing openly in the society also affects the health education status and quality. Wrong ideas, beliefs and rumors start emerging, circulating and getting roots in the society, as explained in “Belief in OPV and vaccination in general”.

One official vaccinator was inquired about his role or government’s role in telling people about the diseases, vaccination and health concepts in general;

Q. do you talk to parents about the benefits of polio drops when you go to their houses?

A. sometimes.

Q. do you tell people in area what is this disease polio, and how to protect from it?

A. it should be governments duty, I am a vaccinator, I do my job, I have big area to cover, and it is very difficult especially in summer.

Q. does government arrange any gathering of people to tell them about diseases or vaccinations?

A. no sir, maybe in cities these things happen, but not here, it’s a poor simple area, nothing much is done for people here.

7.2.2. Health seeking behaviours

Health care services utilization

In Pakistani society, health care services and practitioners are found to be divided into Professional, Folk and Quack categories, with professionals being the properly trained and educated medical doctors, staff and facilities, Folk category includes the faith healers and herbalists, while the quacks are the non-qualified persons without any or adequate medical training or medical education background, but still practicing modern medicine freely in the society. In their interviews, the rural populations in high risk areas for poliomyelitis showed a huge tendency to approach, consult and trust the quacks and folk healers and curers present in the society in various forms; Dispensers, Hakeems, Homeopaths, Peers, Moulvis etcetera. Different reasons are given for preferring them over professional qualified doctors and hospitals, for example;

Q. Where do you get treatment if you or your family gets ill?

A. This dispenser is good, he sits in the next street, we go to him and he gives us medicine.

Q. Why don't you go to hospital?

A. This dispenser is good to us; he lives nearby, day or night he is here. He gives cheap medicine.

Q. and what about hospitals?

A. there is this government dispensary but that is on other side of town, there they have these red blue syrups which are no good.

Q. what do you think about doctors there?

A. doctor is there but he comes only 2, 3 hours in a day and then there is a dispenser there.



Picture 9: A Hakeem's signboard.

One very common type of curers are Hakeems, which use herbs and other natural things as medicine, and learn from their father or uncle, so it stays a family affair. They are very well rooted in the society and people trust them with their health, for example;

Q. when your son got ill (with Poliomyelitis) then what did you do?

A. I took him to hakeem Nasar, he treated him.

Q. what treatment?

A. he gave some (mehlool) fluid to be given to child 3 times every day.

Q. and did he tell you about the disease? What is it?

A. he said child will get ok with fluid.

Q. anything else he said about the disease?

A. no, he said its fever, which happens to children, but he said child will get fine, he said he has seen many patients like this so his medicine will work.

Q. so did you give the child that fluid, what happened?

A. yes yes we give him fluid 3 times every day, we give him 3 days.

Q. what happened?

A. fever went away, but child had this weakness in one side of body, it contracts.

Q. so what you did then?

A. kid's uncle took him to hospital doctor, and they did tests and everything, and gave new medicine.

Q. you did not go with kid to hospital?

A. no, I went to Hakeem, I don't go to hospital, kid's uncle took him there to hospital.

Q. why don't you go to hospital?

A. Hakeem is good to me, he takes less fees, and he knows his work, very famous, his father was also a Hakeem and my father and uncles used to go to him in earlier days.

Q. and what about hospitals?

A. hospital is away from us and these nowadays doctors are no good, they are not that able, they don't know the diseases, and they just keep on doing the tests. Doctors there don't treat poor people well, there is no system.

Q. any other thing about hospitals and doctors you want to say?

A. just this that they are no good, they give very little time to the patients, and write very expensive tests, like in hundreds, they don't know us.

Q. what do you mean "they don't know you"?

A. they should think that we are poor people so give us medicines free, and they must not write these expensive tests, and their fees are very high too. They are not for us; they work for rich people only.

Q. how often do you go to main district hospital in city?

A. no, I don't go there, sometimes kid's uncle go there, but I don't.

Q. not at all?

A. I never go

Government's Basic Health Units (BHUs) in the rural areas are not well staffed and well equipped. Medical doctors are not regular and the units are being run by the paramedical staff, with limited quantity and quality of medicines at hand. Government's District Headquarter hospitals are often out of reach for poor people in far flung rural areas, with difficult, improper and expensive means of transportation. People try to avoid the costly journey and high expenses of hospital treatments by turning to these local quacks who are easily and cheaply available. After wasting crucial time, when local quacks finally realize that the patient is in really bad shape and keeping him further will be damaging for the

repute so they advise the family to take the patient to the city's government hospital. Often the people consider the advise as equivalent to the death sentence for the patient. As explained in this excerpt from an interview;

Q. What do you think of government hospital (Basic Health Unit) in your area?

A. there is no hospital in our town; there is just a small government dispensary type thing some distance away.

Q. What do you think of services there?

A. no I don't go there, it's not of use, there are not good medicine or anything there, they just have two three medicine which they keep on giving to everybody, earlier many town people were going there but nowadays very few go there, and the ones who go there are often told to take their patients to city as they have nothing here with them.

Q. And doctors? What you think of doctors there?

A. doctors are appointed there in town dispensary (Basic Health Unit) but they run away.

Q. What do you mean run away?

A. these young doctors want to work in big cities I think, they don't want to be in a town, people are very poor here so these doctors don't earn much, so they leave to cities where they can get big fees.

Q. If there is built a big hospital nearby, and then will you like to take your kids to hospital?

A. (pauses) sir I am telling you that these hospitals are for city people who can pay big feeses for these doctors and you know the tests which they do cost in hundreds, this is town of very poor people, we are all laborers and farmers kind of people here.

Q. But if it is free then will you go?

A. (pauses) don't know sir, I go to Qari sahib, and his prayers work, and he tells me straightforwardly if I need to go to city hospital or not, it's the way it is here, may God bless him more.

Q. Are you getting physiotherapy for this child's leg?

A. what sir?

Q. (I explain physiotherapy)

A. no I don't know.

Q. Did the city doctors tell you about it? Did they ask you to bring your kid to hospital again?

A. they asked to bring the kid few times, but who can go there this much, it costs a lot, they did lots of tests on him (kid), I work whole day and there is nobody else who takes him (kid) to city that many times, and who will bear the bus fare and everything.

Q. how often do you go to main district hospital in city?

A. no, may God save us from there.

Q. why are you saying this?

A. I am right because people from here go to city hospital when the disease is big and the patient is in bad condition, and the doctors there waste even more time in tests and rounds, old patients who are very ill often die there in the hospital and the doctors keep on doing rounds.

The District Head Quarter hospital (DHQ) which is situated in the capital city of the district area is not always easily accessible, especially for patients from rural areas. Government's ambulance services are very limited and the private ones are very expensive, so usually when it comes to taking a seriously ill patient from a far flung rural part of the district to the city hospital, families have to hire taxis, traditionally an open-back pick up taxi in which patient's home bed is placed instead of a proper medical stretcher or any other medical equipment or staff at hand. This rough and crude non-medical nature of transport makes the journey further disturbing for the patient, and also a very costly one for the family.

Q. how often do you go to main district hospital in city?

A. we try to get treatment here in village, like from this government dispensary here, but if God forbid if it is something serious then we may need to go to city.

Q. is it easy to go there, how do you go there?

A. it is a problem , especially to take patients, taxi costs so much, even more than the treatments.

Q. ambulance, do you use ambulance?

A. no there is no ambulances here, in city there are with the district hospital, but not here.

An official vaccinator of a poliomyelitis reservoir area shared his take on the situation as following;

Q. How are the health facilities in this area?

A. here is one BHU for 40,000 people, which is on one side of Union Council. In various areas it is like nothing, it is hell to come and go, if we get medicine from quacks here like dispensers, we spend 10 or 15 rupees there but when we go to BHU the travel cost is 30 rupees. It is our very big problem. For people there should be dispensaries nearby, like civil dispensaries in this district government, civil government. If there is a dispensary for 10 or 15,000 people then that is best, that is good, that can benefit the local people. There is not much benefit of a BHU at one side.



Picture 10: A government health care center in rural area, covering a big population.

Role of Moulvi (religious leader)

Moulvi is the equivalent of priest in mosque, and is regarded as the most prestigious person in the community, especially in the rural areas where people are more close to religion, and seek the advice and guidance of moulvi not only about their religious affairs

but also about the life in general. His views on health are taken seriously and are considered to be teachings of God and Islam. People also turn to him to get treatments as often these moulvi assume the role of cure-provider, and their blessing can make treatments work. Traditionally the moulvis are conservative in nature and are not always advocate of modern allopathic medicine, but instead they believe in treatment with natural things like herbs and dietary elements. "Dum water" is a commonly believed in and used method of treatment; moulvi recites some verses of the holy Quran and prays on the water and asks the patient to drink it, it is supposed to have healing powers for any disease, even for poliomyelitis. Similarly "Taweez" is a piece of paper with some holy verses written on it by the moulvi, is leather bound, and is worn by people in neck or arm, with the same purpose of protection from harms and diseases. As believed in by this man:

Q. do you talk to your moulvi sahib about health and diseases?

A. yes he is a good person, may Allah bless him, he always helps people.

Q. does he help people about health, how?

A. yes, he knows many things about diseases, he tells what to do or where to go if patient is severely ill, and he prays, and gives dam water.

Q. what is this dam water?

A. he reads Quran on it, patient gets strength from it.

Q. can this dam water treat polio?

A. yes, Allah can do everything, we couldn't take our child to him at right time, we kept on running after hospitals and tests.

Q. is his dam water better than medicine?

A. yes it has different effects, it strengthens the body.

Rural people trust their local moulvi, and usually their views and decisions are influenced by his advices, and to say something against his views can be considered blasphemy, so people generally avoid contradicting him even if they don't believe in his statements, but older people are more into mosques and moulvis than the younger generation;

Q. do you talk to your moulvi sahib about health and diseases?

A. no, my father sits there in mosque a lot every day, he is into moulvis and their stuff, he does, but I am at work whole day.

Q. does he guide you or people about diseases or treatments?

A. he always say something about everything, he leads the prayers and talks about religious things, everybody listens.

Q. what you think about that?

A. I don't know, I don't want to say anything against him.

As men and women go to consult moulvi, but women often also go to moulvi's wife or daughter, considering them equally pious and thus important.

A woman said;

Q. do you talk to moulvi sahib about health and diseases?

A. moulvi sahib's daughter is good with me and my sisters. We don't see moulvi sahib.

Q. does she guide you about diseases or treatments?

A. yes she is very wise and helping, if someone is ill she asks her father to write for her or give water.

Q. what writing ?

A. taweez, he then writes taweez so the person has God's protection from diseases and other things.

Q. do you wear that?

A. yes I wear, my children wear.

Q. do you see any effects?

A. yes it is very important, it keeps us safe from troubles, and diseases.

Q. and what about water he gives, what is that?

A. he recites verses on water and gives to needy.

Q. what happens with that?

A. it cures and it's a blessing.

Q. do you or your family uses these water and writing for diseases?

A. yes we do, it is very beneficial, our family is good.

Q. and other village people here, do they use this?

A. yes we all use it, moultvi sahib is very pious person, even people from other villages and from distances come to get taweez.



Picture 11: Polio child with taweez.



Picture 12: A taweez.

7.2.3. Role of women in decision making and health

Head of family is a man (husband, father, brother or even son), the entire decision power lies with him, not only does he govern the decisions regarding his health but also the health of the women in family. Women are often not expected to take part or even know about the matters. As is put by this man in his interview;

Q. and your wife? Do you involve her in decisions?

A. yes she is there in house when we talk, so she listens and knows what is going on.

Q. just listens? Don't you get her opinions like you get each other's?

A. it is men's thing to make decisions and handle the family.

Q. and women?

A. women take care of children.

Q. and decisions?

A. men make decisions, our wives listen, they tell us if they have to say something, but they cannot just do something without telling their men.

Q. what is the reason for that?

A. reason? God made it like that. it is like this.

Women's duty is to stay inside the house, do the house chores and raise the children, and listen to their husbands and obey their decisions. Living setup is commonly of a conjoint family, with parents of the husband sharing the house, and being the elders they are considered to have the right to interfere and make decisions for their children's families. Mostly they have more prominent role in the family matters than the daughter in-laws. Women have adjusted to their inferior role in families and they seldom raise complaints against it, especially in front of an outsider. A woman described her role in decision making like this;

Q. do you and your husband talk about polio or other diseases and health matters?

A. yes sometimes if we are ill.

Q. and in routine?

A. no.

Q. who makes decisions in house?

A. my husband makes decisions.

Q. do grandparents or other relatives interfere in decisions?

A. yes they say things, how to do things, elders have right.

Q. and you ? Do you take part in making decisions at home?

A. I am a woman, what do I know.

Q. what do you mean?

A. it is men's thing, they go out and see the world, they know things, what we women know, we are inside the house.

Q. do they discuss with you any decision making matter?

A. I don't know, sometimes.

Q. not always?

A. no brother.

Q. do you have complaint?

A. what complaint can i have brother, i am a woman, it is like this everywhere here, we women live inside house and raise children, men go out and work.

Women have to go to women doctors and women health personnel. Society does not accept and understand the need for a woman to go to a male doctor, unless it gets very necessary, and even then women are not supposed to go alone but are always to be accompanied by a male from her family, like the husband, father, brother or son.

Q. where does your wife take treatment from?

A. earlier there was a woman doctor coming from city every Sunday, she made clinic here, my wife was going there, but she stayed for just 2,3 months and moved.

Q. and now? Where does your wife go for treatment now?

A. she is fine nowadays.

Q. but if she gets ill?

A. there is a woman in our village who treats women, she knows treatments.

Q. is she qualified MBBS doctor?

A. doesn't know sir. (Later found out to be a Quack)

Q. do you allow your wife to go to male doctor?

A. she has never been so ill that she has to be taken to man doctor.

Q. but if needed?

A. we shall see then, it's not a custom here, women go to women doctors, it's the way it is here.

Q. what you think about it?

A. I don't take my wife or sisters to man doctor, it's not good.

Q. if it is something very serious?

A. they are fine, I don't want them to go.

Allowing a woman to go to a male doctor alone by herself is not an option, and is labeled to be an undue freedom, as one husband explains;

Q. if she needs can she go alone to doctor?

A. no, I go with her, women don't go alone.

Q. any reason for that ?

A. women need to be in limits, too much freedom is not good.

Q. but if it is to get treatment?

A. still, it's not wise, it's ok if I am going with her or my father or brother, she can't go alone.

Some men don't like it personally that their women go to male doctors, while some attribute it to the religion that God orders us to keep the men and women separated in the society, even for health matters.

Q. where does your wife take treatment from?

A. she goes to a woman nearby.

Q. what woman?

A. the woman knows women diseases, so women go to her, there is no lady doctor here where they can go.

Q. do you allow your wife to go to male doctor?

A. no, male doctors, they, no women here don't go there.

Q. why not?

A. it's not good, Islam forbids us to do that, this woman is available here so she must go to her.

Q. why is it forbidden?

A. it is God's order, we follow, men and woman should have distance, sir you are city guy, you have different things there, we don't send our women to men doctors.

In case of common illnesses, one routine practice is that the husband goes to the hospital, tells his wife's symptoms and gets the medicine for her, and she stays at home all along, without being even seen and examined by the doctor;

Q. What do you think of hospital (Basic Health Unit) in your area?

A. my husband knows about it, I don't go there.

Q. why don't you go there?

A. there is no lady doctor there, just males there, I can't go, if we have to get medicine from there for me, my husband goes and gets medicine for me.

Q. how he gets medicine for you from there when you don't go yourself?

A. he tells doctors there of my disease and they give him medicine, it is like this sometimes as there is no lady doctor there, so we women usually don't go there unless it's something big.

Same custom is applied to how women deal with polio immunization teams which visit from door to door during National and Sub-National Immunization Days (NIDs and SNIDs) to give OPV to all the children. These immunization teams visit during the day hours when the men are usually at work. Women use veil and do not come face to face with stranger men. Male team members are not allowed into the house and are not supposed to talk to women in the house. Children may get the drops but there occurs no communication between male team members and women in the house. The religion and

culture both act as barriers to any mixing up of genders, even if it undermines the transfer of health education.

Q. is it ok with you if your wife talks to these polio team people?

A. no, she does not need to, as I am here and Kabeer my son is here.

Q. so you don't allow her to talk to polio team, why?

A. it's not our custom here, women don't talk to other men.

Q. how people think about it if a woman talks to men health people to ask about health and treatments?

A. no, people don't think good, even if about treatments, because it is not good that women and stranger men talk, there must be distance, our God says so.

Q. God?

A. yes, it's in Islam that women and men should not behave that way.

Q. does she know things about polio which you know?

A. may be, I don't know.



Picture 13: Male vaccinators are usually not allowed into the house and are to stay outside.

And often the women don't do things without first taking permission from their husbands, like for example they may refuse the immunization team people unless they find the husband at his work place and get his permission;

Q. does your wife talk to them?

A. when they first came she asked them why are they here and why are they giving this drops to children, she asked them to come when I am at home.

Q. so what they did then?

A. this vaccinator later found me and came again to our house to give drops.

These inhibitions and the difficulties in dealing with women are evident in this interview from a housewife:

Q. do you talk to them?

A. no, no, I don't.

Q. why you don't talk to them, are these polio team people polite, how they behave?

A. I don't, I tell them to talk to my husband.

Q. does your husband talk to them?

A. yes he does, they find him at his work place and bring him home.

Q. when they go to bring him home?

A. when they come to give their medicine.

Q. but why do they bring your husband to home for that?

A. I tell them that he is not at home.

Q. don't they give drops to children even if husband is not at home?

A. they say but I don't know them, my husband knows.

Q. do you let them give polio drops to your children?

A. no, I don't know them, they are stranger men, how can I let them give something to my children.

Q. so what you say to them?

A. I tell them that he is at work; they come again when he returns or they try to find him.

Q. is it ok with you if you talk to these polio team people?

A. no, I don't talk much, they bring my husband and he talks to them.

Q. do they try to talk to you and tell you about polio or drops?

A. no, ask my husband, they talk to him, they don't need to talk to me, you are first doctor who is asking me these things, they only talk to my husband.

Q. do you ask your husband what team people told him about drops or polio?

A. he says it's some medicine which these people give, he himself does not know much what can he tell me, ask him.

Similar views were noticed when an official vaccinator of poliomyelitis reservoir area was interviewed;

Q. and is there any difference among men and women how they deal you and campaign?

A. men are often away in day times, so often women come on door, or we send some neighbor kid inside, but they are often afraid of doing this vaccination without first talking to their husbands, and they know nothing about vaccines or polio.

Q. so?

A. so we have to look for the husband or some other man in family.

Q. why do you think they behave like this?

A. they are women, they don't know these things.

Q. and what about men?

A. men know if they want their children to have this polio drops or not, we can talk to them.

Q. and how they behave usually to your talk?

A. depends, some who are learned they already know about it and let us do our work, but some are always a problem.

Q. problem?

A. yes, every time to try to convince them from zero.

7.2.4. Attitudes towards education

People in poliomyelitis high-transmission-zone areas displayed a very weak interest in getting their children education. Life seems to be revolving around getting an extra working and earning member in family as soon as possible, and sending the kids to schools is on one hand spending money from an already very tight family budget, and on other hand also missing a potential earner for the family. With employment opportunities very low for the educated people, the formal education in schools, high schools, colleges and universities is thought to be a very long and expensive process, and also fruitless if there is no job afterwards and the young educated person eventually has to return to join his uneducated father's small income hard manual work in rural village area.

Q. are your children going to school?

A. elder son was going to school earlier, but now he helps me with the shop.

Q. you stopped sending him to school?

A. yes, I need help in shop, he helps me here, and he is learning how to do things.



Picture 14: A village primary school for boys in Pakistan.



Picture 15: A school classroom.

Dissatisfaction in formal school education is evident from these statements;

Q. and boys (should they go to school)?

A. boys, boys go here, many boys are going to school, but whats the reason I don't understand.

Q. what do you mean?

A. there are no jobs, MA, BA (Masters and Bachelors degrees) pass people have no jobs, they have to do the same work of their forefathers.

Sons and daughters are thought to have different education needs, where sons are often either taken by father at early ages to accompany him to work or are sent to learn some other manual skill, and girls are encouraged to stay indoors and learn to do the house chores with mother, like cooking, cleaning, sewing. Formal education in schools is not what they think is needed for girls, as girls get married at young ages of 18, 19, 20, and also women play the role of house-wives instead of having any job.

Q. *should girls get education like boys do?*

A. *boys have to work and find jobs, but girls do not need that much education, they should learn things like how to sew and cook.*

Q. *how much girls should study?*

A. *Quran is important for them; girls should learn that, these schools are not needed for girls.*

Q. *why not the school education?*

A. *what can they get from schools, they don't need it.*

Q. *doesn't need it? Why?*

A. *schools don't teach anything good, just math, science, what girls have to do with math, she should be learning sewing or cooking cleaning, so it can help her whole her life.*

Another father described his views like this;

Q. *do you send your daughters to school?*

A. *no, I have only one daughter, she is not going to school.*

Q. *how old is she?*

A. *she is 9.*

Q. *why is she not going to school?*

A. *she stays at home, learns things from her mother.*

Q. *studying from mother?*

A. *no, the house things, like cooking, cleaning.*

Q. *should girls get education like boys do?*

A. *in cities there is trend, but not here.*

Q. *are you against sending girls to school?*

A. *(stays quiet) house education is good for girls.*

Q. *why not the school education?*

A. *girls who go to school just learn things which they don't need, and also they get different in behaviors in house.*

Q. *what do you mean different?*

A. *I mean they then don't listen to anybody, don't listen to elders. they become like city girls.*

Q. city girls?

A. yes, like city girls they get into fashion and clothes, we don't like these things in here.

Q. why not?

A. it's a town, people don't like such things here.

Though formal school education is deemed useless and “modern”, but religious education is considered very important and is given to all children, to both boys and girls, as a sacred duty in parenting. Children are sent to “Madrassa” which are religious schools found everywhere in every village, town and cities. Girls may get the religious education from within the home, like from mother or grandmother. Focus of these madrassa schools are to teach every child how to read the holy Quran, and advanced teachings include years of memorizing the entire holy book by heart and to understand the other elements of the religion. Students never learn any “worldly” science or arts subjects, thus making them practically ineligible for jobs later wards. They don't fit in the modern liberal parts of the society due to their ultra-conservative upbringing. This must affect their health attitudes and practices as well in addition to life in general.

Q. are your children going to school?

A. yes, two elder ones go to school, the third one is very young.

Q. which school?

A. mosque school (Madrassa).

Q. why not to regular school?

A. they should learn Quran and Islam, these schools give nothing, and there are no jobs afterwards.



Picture 16: A madrasa (religious school).

8. Discussion

8.1. DISCUSSION OF THE FINDINGS

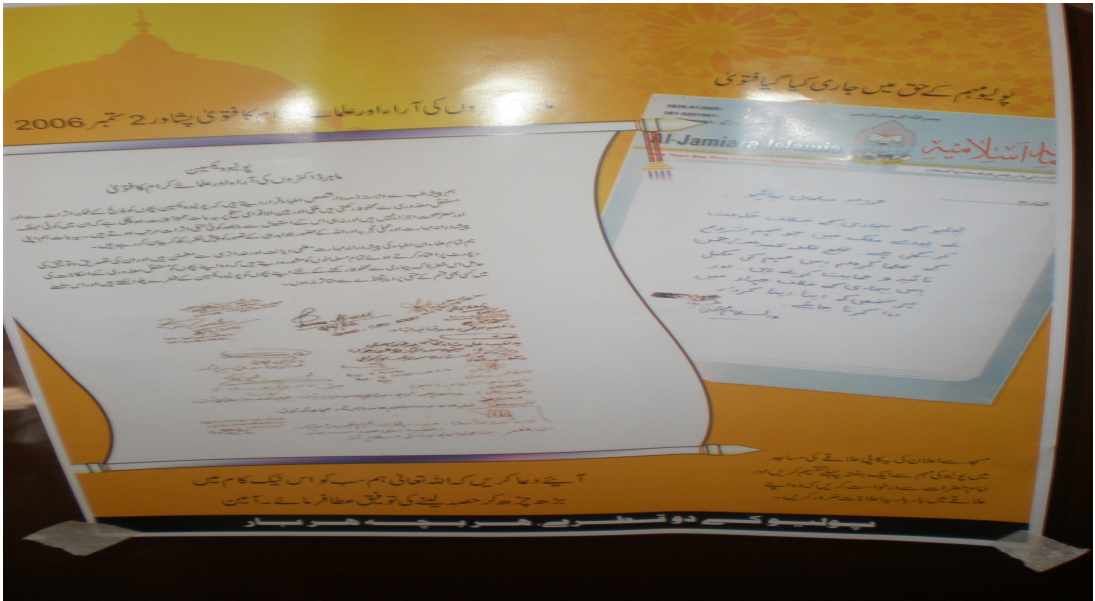
Study is comprised of data in multiple dimensions; the questionnaire survey, in-depth interviews, census records and then also supported by multi-media. The purpose of this methodological triangulation was to study the aimed phenomenon not just quantitatively or just qualitatively, but to get a broad multi-faceted, inter-linked approach and insight into it, and with the aim that it should give a clear informative picture of the social and cultural ground-realities to a reader from a totally different society and culture.

8.1.1. Lay health perceptions

These strong roots of folk sector and quacks in the Pakistani society contribute to rumors and perceptions, and influence the way laypeople behave and respond to health disorders and to professional sector's health improving activities. Gossip and ear to ear transfer of ideas and information among people seems stronger than the print and electronic media in these rural undeveloped areas which constitute high-transmission-zone for poliomyelitis. Poor economics and a very low literacy level do indeed play the role of further distancing people from the credible official sources of any health education. A huge proportion of the case and control families were found even ignorant of the dates of next "National Immunization Days" for poliomyelitis, despite the advertisement posters on the street walls and television announcements. Though a recent study by Obregon, et al. (2009) credited the media and social mobilization methods to have played a major role in increasing the awareness and changing the attitudes of people in different communities of Pakistan, but our results describe the general health education level of general public in polio high-risk areas as still very low.

Also the concerns about the vaccine safety and the fear of any side-effects as generally attributed to “English medicine” are evident in some parent’s responses. Meszaros, et al. (1996); Alfredsson, Svensson, Trollfors and Borres (2004); Bardenheier, et al. (2004); Gust, et al., (2004); Allred, et al. (2005); Flanagan-Klygis, Sharp and Fader (2005) have also associated these parental safety concerns about vaccines to the decreasing immunization coverage.

Similar to the issue raised by Srivastava (2007), and as described earlier, the religious leaders like Moulvis and Peers; and also the local level politicians like Nazims and Councilors; and other socially important figures cast a considerable influence in opinion formation of the general public of an area, and traditionally the religious leaders in rural Pakistan oppose the immunization activities labeling it as un-Islamic, a sin, and go as far as to blaming it to be a conspiracy of West against Muslims, replicating the finding of a study in India by Ansari, Khan and Khan (2007). They have instilled in people the concept of attributing the diseases and difficulties in life to fate and God’s will, and accepting it means being a true follower of God in difficult times. This philosophy further diminishes the vigor and zeal to pursue modern treatment options, and as seen in studies conducted in multi-religious India, the Muslim populations were found much more resistant and hesitant to the concept of vaccination and were with lesser immunization coverage status as compared to the people of other religions like Hindus living in the same communities (Bonu, Rani and Baker, 2003; Borooah, 2004; Obregon, et al., 2009). Government is trying to negate these fears by spreading the messages by religious leaders and health professionals in favor of polio vaccination activities, but then again the message misses out on reaching to a vast majority in rural areas due to their inability to read and understand.



Picture 17: A poster announcing the approval and trust by the medical doctors and religious leaders in polio vaccination process.

Immunization and health education activities of Government health department suffer from severely inadequate manpower and other logistic resources in the face of a rapidly growing population. Vaccinators – often the only contact of common people with practical immunization activities, are ill-equipped, especially in transport means, and are assigned to cover large areas of land with many villages filled of people. A recent study by Dasgupta, et al. (2008) also attributed these ill working conditions to the inferior quality performance by the vaccinators. For example; one vaccinator described his duties as to cover a population of about 40,000 people on a bicycle in an area with totally unpaved streets and scattered houses in an unplanned manner, resulting in less enthusiasm on part of the vaccinators and less time availability for educating the people during their immunization visits, thus ultimately affecting the efficacy of the entire disease eradication campaigns. Centre for disease control and prevention (1999) reported a significant positive impact on immunization coverage in Somalia by improving the transport and mobility of the vaccinators, while Davis, et al., (2001) and Tickner, Leman and Woodcock (2006) described

this shortage of time in dealing with parents to be a considerable barrier in communicating to parents. An alternative solution to this communication gap could be to organize special gatherings of people, especially in these rural areas, to spread the health education messages, and to answer and rectify any questions and confusions raised by the people about vaccination, the entire process and its benefits, but our survey did not find any family in these rural areas to claim to have attended any such gathering. This further highlights the differences in the theoretical and the practical realities of the eradication activities.

Thus these misperceptions, rumors and distrust by people of the need, usefulness and effects of polio vaccine require increased focus and persistence of health-educating and convincing efforts on part of the vaccinators and other health staff involved, as suggested by Zeitlyn, et al., (1992) and Borrás, et al. (2009).

8.1.2. Health seeking behaviours

In-depth interviews and the questionnaire survey from families in high-transmission-zone for poliomyelitis did confirm their strong inclination towards folk sector of health care providers, consulting “moulvis” and “hakeems” as their routine first health care contact, and a great level of dissatisfaction and distrust with the professional sector, owing mainly to its limited availability, the expensive costs of traveling and treatments involved, a prolonged duration of the diagnostic and therapeutic processes, and also due to a considerably low rapport level with the doctors and staff there as compared to the folk sector healers and curers. Kleinman’s (1986) description of how folk sector focuses on the illness rather than the disease is evident here in this glimpse of Pakistani society.

Moulvis are the religious figure-heads who command a high social importance and status especially in small undeveloped rural areas, and their role often encompasses the healing element as well, with people coming to them to get prayers and blessings of holy healing

effects or general medical advice of what to do and what not to do. The strong medical role of the religion seems much bigger and influential than that described by Kleinman's model of pluralistic health care systems (1980). Hakeem is another form of folk sector curer who uses herbs and other natural elements, these hakeems and their clients stay connected from generations to generations, and enjoy a great level of loyalty from their clients in Pakistani society and attract a big percentage of patients away from the professional sector. Similarly many other studies like Shaikh and Hatcher (2004); Qidwai and Tayyab (2004) also noted this cultural closeness of different folk sector operators to the rural populations. So these folk sector operators are casting a big shadow over the professional health sector, and dent the trust of parents in professional health care providers and activities. Chen (2004) also points to this much better trust level that the local technically non-medical people may hold over the general rural public as compared to the professional sector workers, and studies like Prislin, Dyer, Blakely and Johnson (1998) finds this distrust towards the professionals to be associated with perceived barriers to immunization.

In addition to these Kleinman labeled professional and folk health sectors, there exists another health care provider - "Quacks" who fake, fraud and pose as properly trained clinical science medical doctors, nurses or paramedical staff and run their private practices openly in the society. Government health departments in Pakistan have failed to get hold of this and it exists commonly throughout the country. And people consult them mainly because of their readily availability in their neighborhoods, cheaper treatment charges and also the more attention they receive, replicating the finding of Benin, et al. (2006) and Salmon, et al. (2005). It's usually when the suffering gets worse and the diseases get complicated that the patient and the family turn to the professional sector as the last resort, and so loyal is often the belief on these quacks and the folk sector that the blame comes upon the professional sector, further distancing people away from it. Kleinman's model (1980) does not elaborate this element of quacks in the society.

8.1.3. Role of women in decision making and health

This lack of association of mothers (education and employment) to the children's disease is of importance, as it points to the minor role of women in family and in decision makings about health of the family. Mothers are mostly uneducated and unemployed in both case and control families, and as explored in the in-depth interviews, they are not the prime decision makers in the families. Their opinions about immunization and other health matters are not sought after, and fathers, grand fathers or even other male members of the family control the decisions. So then their being illiterate and unemployed does not become an influence in how the disease is distributed, in this particular setting. Illiteracy and economic inactivity might be the reasons keeping women out of decision making process and contributing to their unimportant role in the families, and/or vice versa. As discussed by Mubarak, et al. (1990) that the working women have better say in the decision makings within the family as compared to the unemployed ones, and such control and influence of women on the family finances and decisions is associated to better health of children by many studies (Sathar, 1987; Pool, et al., 2006). Men, on the other hand, in our results, command authority in the family and decision-makings, and are with better education and employment status.

Conservative society with strict religious values in rural areas disallows any kind of mixing of genders, and women are rigidly guarded against any out of the family contact with men. So in this situation, and keeping in mind that it is usually day time when polio-immunization teams visit from door to door and then the male members of family are out of house for job or searching for job, they often face difficulties like: women don't come face to face to these stranger men, they don't talk, they don't allow vaccinator men to enter the house, outside the door street is where vaccinators see the children, they may not let their children get vaccination unless first asking their men, thus making the seemingly straightforward process of door to door immunization rather twisted. Like as described in the in-depth interviews by a male vaccinator that he has to sometimes return unsuccessful from

houses and then has to find and convince the husbands, which further adds extra time and efforts to an already overburdened vaccinator with limited resources. An exact similar finding was reported recently by another study (Obregon, et al., 2009), which told that the results of immunization services improved in those areas and instances in Pakistan where female health workers were used as vaccinators, as these women vaccinators were then better able to contact, communicate and convince the women in society, but then the same conservativeness of the society in Pakistan does not digest the women working and moving even as vaccinators. And then the dominant role of men in the society in general and in decision-making demands their involvement as very crucial, and bypassing them totally by making immunization a female-vaccinators-to-house-wives phenomenon only or directly may not be beneficial – a scenario worth further studying. Pool, et al. (2006) stressed this need to focus on men in such societies which are highly conservative and male dominant in nature.

And this barrier between genders is not just limited to vaccinators but it also applies to any easy male-female contact in other health settings as well, as seen in the interviews where women and men described that women usually consult women health practitioners and very often have to wait and suffer if there is none available nearby. During their visits to a male health care provider they are usually accompanied by a male member of the family, sometimes even a male child is preferred to going alone. Even if “taken” to male health practitioners then in addition to being accompanied to, they are also often even interpreted by a male family member. Booth and Verma (1992) Perry, Weierbach, Hossain and Islam (1998) and Shaikh and Hatcher (2004) discussed the same observation in their study as well. These practices make the flow of any health educating information from health care providers to the women a very difficult process, and in turn affect the overall health education status of the women in society. The vaccinators may be delivering the OPV drops to the kids in the house but there occurs no change in the way how the family’s women perceive the concepts and importance of immunization activities, before and after these vaccination visits. A finding shown in the results of questionnaire survey that the mothers

in both case and control groups are almost equally and hugely ignorant of the basic knowledge about the disease poliomyelitis, their belief in vaccination very feeble, and their sources of health information almost non-existent. So then the entire success of polio eradication “appears” to depend on approaching the men.

8.1.4. Living conditions

Census figures revealed that the population in these high-transmission-zone areas has been increasing at higher rate annually than the province as whole, thus adding extra load on an already limited living conditions. Several aspects of living conditions for case families contribute possibly to an infectious disease prone environment: small, congested mud-made houses with old fashioned, inefficient or totally absent indoor toilets; with inadequate and unhygienic sewerage and drainage system. Many studies explored the effects of living conditions on the health of the residents, and most were consistent in categorizing the congestion and unhygienic toilet and kitchen practices as of high significance in spread of infectious diseases (Brotons, Sanchez, Leal and Garcia, 1990; Tandon and Gandhi, 1992; Matthews and Diamond, 1997; Perry, Weierbach, Hossain and Islam, 1998; Szilagyi, et al., 2002; Bonu, Rani and Baker, 2003; Smith, Chu and Barker, 2004; Borooah, 2004; Shahrabani and Benzion, 2006; Tshikuka, Gueim and Diallo, 2007; Obregon, et al., 2009). Mud-made “katcha” houses are a common sight in these extremely poor areas, which are cheaper to build, and such badly constructed houses with cheaper material has been linked to poorer immunization status of the children previously as well (De la Hoz, et al., 2005). Fewer number of rooms accommodate big sized families, very often a joint-family system where everybody from grandparents to uncles and aunts and their families live together in one house sharing the rooms and kitchen and toilet. Even though presence of grandparents living together is reported to have positive effect on the immunization status of children by some studies (Brenner, et al., 2001; Pandey, et al., 2002) but our results does not indicate any such positive effect, and it should possibly be seen as an addition to an already congested housing conditions. 77 to 81 percent of these houses in case areas do not even have a

separate room as kitchen, and simply burning woods between few bricks in any open air corner of the house makes the everyday kitchen for them. Toilet conditions are even worse in these mud houses, sometimes a very raw version of toilet is used: a pit behind a wall in a corner of house without any proper disposal or drainage system, or another custom is that people don't have any toilet inside the house and they go out to fields or to use toilets of mosque. "Naali" system of drainage is very common. Naali is an uncovered path made in floor to drain the water and wastes from house to the bigger naali in the street. Though this system of drainage is common in urban areas as well but it is very unhygienic especially in poor rural areas. Such a congested, overburdened and unhygienic living environment and practices are proven to be the main collaborator in the faeco-oral route transmission of the poliomyelitis virus, as reported by studies in past (D'Souza, 1997; Obregón, et al., 2009).

The results also display that the most case families do not own a house, and are living either in a common extended family house in joint-family system or are living in a rented house, or some living on a property given by their employer; like a laborer who works for a farmer and lives in a small house in the land given by the farmer. This observation is somewhat similar in meanings to studies like Bardenheier, et al. (2004), which found public-housing to be adversely affecting the immunization status of the children (though the traditional concept of public-housing is not common in Pakistan).

Material possessions like telephone, television and vehicles are scarce in case families, which keeps them from easy access to media for any health information, and from easy access to health facilities at distances. These limited material possessions in case families obviously all point to poverty and very low socioeconomic status in the society and are labeled to be a factor in hindering disease eradication activities by previous researches as well (Choi and Lee, 2006).

8.1.5. Education

Education seems to be yet another issue in these rural based high-transmission-zone areas. Census puts these among the relatively less educated districts in the province, and as our questionnaire survey results displayed that the polio-case families are far less literate than the controls, this hints on one hand to the scarce availability and accessibility of education institutions in these areas and also on other hand to the general trend of downplaying the need and importance of education. Parents were found rejecting and ridiculing the idea of sending their children to far flung schools and colleges, spending on their education for years and years but then eventually ending up with degree-holder but job-less sons. The enrollment ratio and the student population percentage figures in the census depict a clear picture of this attitude towards education especially in these case areas.

Also the education's significance, needs and the alternatives for sons and daughters are perceived totally differently; where sons can be potential earners for the family instead of getting education, the daughters are groomed for their future role of a traditional housewife. Girls learn the house hold skills like cooking, cleaning, sewing etcetera from mothers, and boys are sent to work and learn some working skill (like in auto-workshop) or accompany father and help in his work. This culture of education leads to very low literacy rates in the society, and especially in women, as depicted by the census figures (also discussed later in "role of women"). According to the census the literacy rates for women are found to be considerably lower in the study areas than the average for the entire province Punjab, and our questionnaire survey does not display significantly different results for the case and control mothers, and thus no statistically significant association between mother's education status and children's immunization status. Cases and control data was collected from the predominantly rural areas which constitutes this high-transmission-zone, and the overall province figures include the highly populated urban districts as well, thus the traditional differences in rural and urban populations are to be considered here as well. A phenomenon also explained by another study conducted in

Pakistan by Mahmood and Kiani (1994) that the maternal education level is of significant association to children's health only in the urban areas of Pakistan, and there is no effect in the rural areas.

In the questionnaire survey the education level was very broadly divided into either literate or illiterate, where literate meant one who can simply read or write, and this basic classification showed the general differences between the parents of cases and controls. On the other hand the census data describes in more detail the different levels of educational attainment, and shows that slightly more people in these study areas stay limited to the lower levels of schools as compared to the overall province trends (though not a big difference in figures). This linkage and effect of paternal education to child's immunization status has also been described years earlier by many studies (Marks, et al., 1979; Mukhopadhyay, 1991) which found that children of higher/better educated parents were with better vaccination statuses, and an explanation for this phenomenon is described by many studies like Chincholikar and Prayag (2000); Pandey, et al. (2002), which evaluated the rural areas of India and concluded that it's because of their higher knowledge of the disease and of the schedules and other details of the vaccination process, that the higher educated parents possess, as compared to illiterates or lower educated parents in the same areas.

On the contrary to their views on modern school education, parents consider the religious education more important for their children, girls and boys both are taught the holy Quran and other basic Islamic teachings. Madrassa (religious schools) are many in numbers in these rural areas, and keep the society conservative in its lifestyle including its approach to health, as possibly this element of religiousness from an early age is what makes them trust and look up to the religious advisors and spiritual healers much more than the modern medical people. So these trends constitute a society which is more close to a moulvi and God than to a doctor and vaccinator.

8.1.6. Economic factors

Even though the economic situation and trends of these study areas are similar to the overall province figures according to census, but the poliomyelitis affected families are in far poorer conditions economically than the others, according to our survey. The cut-point for income was set to be 5000 rupees monthly which represents the utter poverty, and most case families were found to be living on this meager amount. Most control families were earning on average more sum monthly than this. Figure of 5000 rupees was used based on researcher's personal living experiences in the country. These income differences also translated into the sense of financial security by the family; case fathers and mothers were almost all very wary of the family's inadequate income situation, while the controls gave mixed opinions. Concerns were raised about the costly traveling to the hospitals and the costly expenditures of treatment there, a phenomenon identified by other studies as well (Mukhopadhyay, 1991; Zeitlyn, et al., 1992; Salsberry, Nickel and Mitch, 1994; Wood, et al., 1995; Taylor, et al., 2002; Sia, Kobiane, Sondo and Fournier, 2007). Majority of parents in the case group preferred to contact the less-costly local folk healers over traveling and paying higher to see a professional doctor or hospital. This effect of low income on pushing the family to certain type of health services is documented also by Shaikh and Hatcher (2004); Topuzoglu, et al. (2005); Teerawichitchainan and Phillips (2008). Even though the NID's are regularly being conducted to provide vaccination totally free of cost and at doorstep, but when the routine health contact of the families are the folk sector healers, the belief in the immunization concept or the need is very shaky, as seen in interviews of the people in study areas.

For questionnaire survey, the occupation type was classified very broadly into skilled or unskilled, and the results show that this division does not matter here and it's rather the employment status of the father that is making the difference. Unskilled jobs like construction or farming manual labor work on very low daily wages are common among the case fathers but it is observed commonly in the controls as well, but the control fathers

were working on much more regular basis than the case fathers who very often had a history of unemployment in the recent years. Though different studies conducted in different settings reported differently the connection of father's occupation to the immunization status of children, mostly that the fathers with low-income occupations are with underimmunized children (Nandon, et al., 1985), but ours does not find the linkage. But many studies (Nandan, et al., 1985; Waldhoer, et al., 1997; Stronegger, Freidl, Rasky and Berghold, 1998) did conclude the positive association of regular employment of father with better immunization coverage of the children, and vice versa.

Role of women is tricky in this scenario; according to the Census 98 to 99 % of women are economically inactive in the province Punjab as a whole, regardless of being in high-transmission or low-transmission zones. And this appears in the results of our questionnaire survey as well which shows that cases and control children have equally-economically-inactive mothers and thus the situation is not statistically associated to the presence or absence of disease in the families, mirroring the finding of a recent study by Borrás, et al. (2009). It's only the fathers whose being economically active or inactive is being the difference between cases and controls. Number of working persons in the family and the number of unemployed were found to be insignificantly associated to the disease, showing the general trend in the society that earning is father's duty, while mothers stay as housewives.

8.2. VALIDITY AND RELIABILITY OF THE STUDY

Questionnaire survey was used for data collection in the case-control study, where the cases and controls were from southern Punjab which is considered as high-transmission-zone for poliomyelitis in province Punjab. WHO Islamabad office identified the zone based on their disease surveillance operations. The control areas were also from the same high-transmission-zone areas of southern Punjab, thus with existence of similar exposure, transmission and immunity gaps, similar rural-based areas and populations, similar with respect to race, culture, religion and economic situations and trends, and with similar health care facilities. Controls were randomly selected from smaller villages of these areas to avoid the inclusion of any traditional rural-urban differences in data. This matching and randomization was intended to minimize any selection bias. The particular study design could be improved further if it was not for the unique hostile circumstances which lead to certain compromises, and also to be considered the phenomenon of potentially humongous undetected cases of this disease which were hard to settle in the study design.

The socioeconomic conditions were assessed by using several different indicators in the questionnaire, instead of a limited approach, to get more correct assessment (Liberatos, Link and Kelsey, 1988). Also the socio-economic characteristics of wives were included to get a better indication of the family's social class (Haug, 1973). Though the questionnaire was based on the one used in "Kuopio Ischemic Heart Disease" (KIHD) study, but with modifications done keeping in view the local settings. Questionnaire was tested on 5 families to ensure its easy understandability and to get the idea of the possible explanations required.

Unavailability of vaccination cards was observed, as many parents were not able to produce any, so then their response was based on pure recall, thus introducing the element of recall-bias about the immunization data (under-reporting or over-reporting) (Valadez and Weld, 1992).

As many respondents were totally illiterate so it became an oral process then, where the researcher was verbally asking every question and then also explaining the possible options, thus taking more time than that with the literate respondents, who needed little guidance due to the simple wording of the questionnaire. This difference in procedure for literate and illiterate respondents can possibly produce effects on the ease and detail of their response.

Woman in many instances did not appear face-to-face in front of researcher, often covered in veil or behind the doors, and often the husbands or other male members were the ones conveying the message and instructions to them, and not the researcher. This must have some bearing on the quality in the form of lost data, as it is not guaranteed how much and how accurate original response is being forwarded by the mediator.

Questionnaire survey was conducted by 5 researchers, all with a medical degree, and with good understanding of the disease and the study project. All these interviewers had similar proportion of cases and controls.

Pre-testing was done for the In-depth interviews as well; 10 men and women were interviewed to practice the art of probing and to understand the possible depths and directions of the responses. Later the actual interviews were conducted by the chief researcher in one area of high-transmission-zone, and randomly selected houses were approached. A father or mother, whoever was present and willing to participate was interviewed. Only one interviewer conducted all the in-depth interviews, thus avoiding any differences in technique and process. A semi-structured theme was used as foundation, with all the broad areas to study, and then probing was the tool of choice to dig deeper to extract the detailed ideas, opinions and stances of people. Interview process was stopped when saturation stage was reached, assessed by the constant comparative process. Similarly 3 vaccinators were also interviewed. Interviewer also noted in a diary the important gestures and body languages of the respondents (like raising of the index-finger upwards to point to God). All these efforts resulted in a significant pool of qualitative

information which was then broken down in smaller themes and patterns to be compared and analyzed.

Both in questionnaire survey and in-depth interviews, a casual, friendly approach in appearance, attitude and communication was used to get the trust of the respondents and in an attempt to minimize the phenomenon of response-bias such as social-desirability (Sjöström and Holst, 2002), (and without revealing favourism to any particular view).

The additional fact that the researcher was born and raised in the same province and thus with good understanding of the local language, customs and culture proved to be a benefit in reaching out to people and dealing with them in an easier way and getting a better clearer insight into their expressions. Also interesting is to consider the researcher's living experience in totally different modern western cultures which helped him in getting an outsiders point of view as well when looking into the lives of study subjects.

8.3. CONCLUSIONS AND RECOMMENDATIONS

Over the years the social and cultural influences are reported to be associated with many health disorders in various ways, and previous researches in different settings of the world have linked certain social factors and cultural phenomenon to poliomyelitis and its vaccination coverage and acceptance. This study with its many datas provides a picture of the lives of people living in high-transmission-zone areas for polio in Punjab, Pakistan; what kind of people are being affected by the disease; what are their attitudes and practices; and what are the their beliefs and logics that dictate these attitudes and practices which influence their health.

A typical family with a polio affected child appears to be with following features:

FAMILY

Low income; living in mud house, with lesser number of rooms, no toilet or an inefficient toilet; Joint family system; Folk sector and quacks as first health contact; irregular immunization team visits.

FATHER

Illiterate;
 Unemployed or part time employed;
 With feeling of financial insecurity;
 Very inadequate access to health information;
 Very inadequate knowledge of polio;
 Very weak belief in vaccination;
 Carries conceptual and cultural misperceptions about health-in-general and immunization;
 Considers quality of health services in area as bad;
 Has no idea of the reason for disease in family, or considers it just as God's will;
 Decision maker of the family about health and in general.

MOTHER

Illiterate (though equally so in both cases and controls);
 Unemployed or housewife (though equally so in both cases and control);
 With feeling of financial insecurity;
 Very inadequate access to health information (though equally so in cases and controls);
 Very inadequate knowledge of polio (though equally so in cases and controls);
 Very weak belief in vaccination (though equally so in cases and controls);
 Carries conceptual and cultural misperceptions about health-in-general and immunization;
 Considers quality of health services in area as bad;
 Has no idea of the reason for disease in family, or considers it just as God's will;
 Passive role in decision making in family about health and in general;
 Faces segregation in different aspects of life like health, education etcetera.

This understanding should be crucial in identifying and understanding the causes of failure to control and eradicate the disease; for example the Immunization efforts can be improved by adding an element of health education to the routine and supplementary vaccination services as well as the general professional health care sector, where the vaccinators and other health practitioners not just vaccinate or treat but also talk to the parents about the importance and need for immunization. The folk sector cannot be ignored altogether, and it should also be included in the process, but government's health department must take steps to control the powerful role of quacks in the society. Better, cheaper and readily

available public health services are the ideal solution but definitely not an easier one to establish without strong political will and adequate corruption free financial resources.

The particular rumours, misperceptions and fears found in the society against vaccines should be addressed strategically; religious and other influential figures in the society can be involved to a greater extent to get lay-people's attention and to win their trust; mosques should be used as centres for vaccinations and mosque's methods of public announcements and communication with people can be used to reach out to everybody including especially to those who are resistant to vaccination on religious grounds. It will also help in reaching the illiterate people who cannot understand the written posters and pamphlets, thus the oral messages can be much more beneficial than the written ones. Though ideally to improve the general literacy should be the goal, as most of the polio cases come from uneducated or less educated families, but of course that is a slow process and change comes after few generations.

More women workers should be employed as vaccinators in order to overcome the male-to-female gender barriers in contact and communications. But men should not be ignored altogether as they are the prime decision makers. Utilizing the mass media methods and arranging general public health education gatherings can be one solution, but even more important is to involve all the different sectors and stakeholders in this cause; for example to engage the traditional employers in the society to arrange provision of such health educating information at workplaces, and to involve schools, and even traffic-police can be useful. Thus by increasing the sources of transmitting the health-education, more people can be reached in the society and perhaps more effectively as well.

Better working conditions for the vaccinators, especially their transport should be invested in, as that can on one hand increase the mobility to cover large and difficult terrain areas and on other hand it will allow vaccinators to have more time to talk to and educate the families.

Areas and people with very low socioeconomic status need additional focus, as these are the ones not just with bigger burden of polio but with overall poorer health as well, as compared to the relatively economically well off people and families. Since to change their economic situation and living conditions altogether is practically a very long term process and with hundreds of other factors and hindrances involved, but at least their immunization coverage and other components of their lifestyles can be improved and can be made more healthy if they are given an increased attention in terms of health education.

Better understanding of these socio-cultural influences and the experiences of these hurdles in today's polio immunization activities will also be very important for designing and conducting the future eradication activities against newer vaccine preventable diseases especially in these societies.

9. Researcher's personal experiences during data collection

The researcher (Sohaib Khan) visited National Surveillance Cell, PEI, WHO office Islamabad in February, 2007, met National Polio Surveillance Coordinator Dr. Ubaid-ul-Islam (certificate attached). The study design was described, and guidance and permission was asked to get access to the required data, primarily the addresses of poliomyelitis confirmed cases from year 2000 to 2006. Few very important events are described in the following which happened during the data collection process from February 2007 to June 2007 in Pakistan, as each event tells us something very unique about the people, society and culture.

9.1. LAY PERCEPTIONS AND VIOLENCE

The researcher initially planned to also include in study the NWFP province- a tribal province bordering Afghanistan. One important high transmission area to get visited was "Bajourr Agency". But 17th of February 2007 newspapers published the story of a bomb attack on polio immunization team in Bajourr (news report 2). A doctor got killed and rest of the team badly injured. Reason behind that attack was that polio immunization had been labelled un-Islamic by religious leaders of the area, and polio immunization teams were threatened in past not to visit and vaccinate the children during the nation-wide door to door immunization campaigns. It is believed there that polio vaccination is actually a conspiracy of the West to control birth in the Muslim world, and that the people who die in an epidemic are martyrs. Similar rumours and beliefs have been seen in other parts of the world like in Nigeria, where in some Muslim areas the immunization activities were not

welcomed and were seen with suspicion. This threatening situation has resulted in a major setback to the polio eradication efforts in the country, as the immunization work cannot be done properly there, and ultimately that area becomes a source for exporting the virus to other areas also.

INTERNATIONAL
THE NEWS

Bajaur surgeon killed as polio vaccine termed 'Western plot' Saturday, February 17, 2007
Mushtaq Yusufzai

PESHAWAR: Surgeon in charge of Health Department in Bajaur Agency Dr Abdul Ghani Khan was killed while three health workers of his team were seriously injured when an improvised explosive device (IED) planted by unknown people blew up his official vehicle at Salarzai sub-division on Friday.

The surgeon along with other health workers was returning to Khar, the headquarters of Bajaur Agency, after his successful talks with tribal people to convince them to vaccinate their children against polio. A fresh anti-polio campaign would commence from Feb 19. Dr Ghani inaugurated administration of polio drops to some of the children and thanked the local residents for their support. Clerics in Bajaur and in most parts of NWFP have been campaigning against polio vaccination as according to them it was conspiracy of the West to control birth in the Muslim world.

News report 2: Yusufzai, 2007.

INTERNATIONAL THE NEWS

Polio vaccination team members abducted in Hangu Updated at: 1245 PST, Monday, April 13, 2009 HANGU: The ministry of health has stopped its polio vaccination drive in district Hangu after kidnapping of eight members of polio vaccination team.

Health ministry officials told Geo News said the team was busy in vaccination of six thousand children in Darsmand area when eight team members were kidnapped. Police started search operation for the recovery of abductees.

News report 3: The News, 2009.

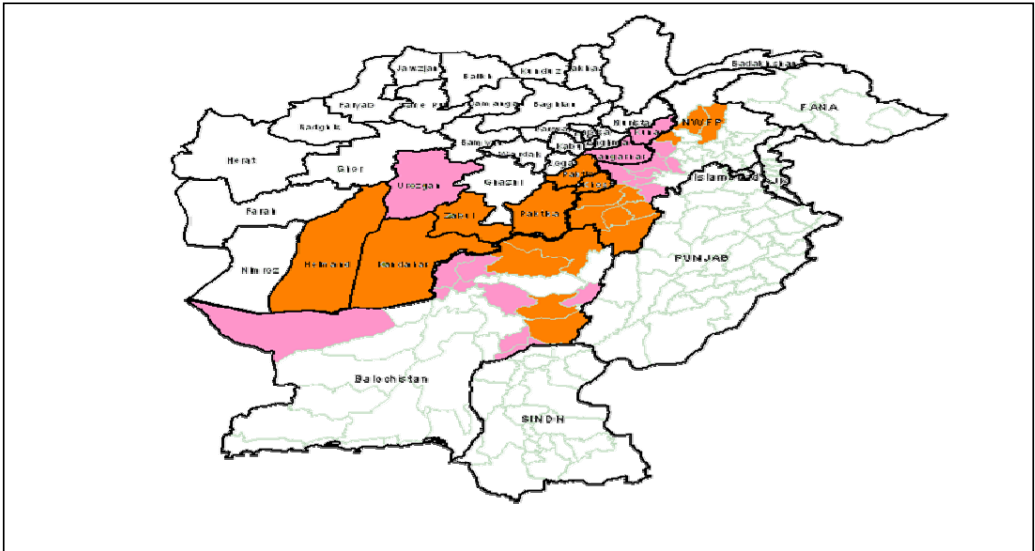


Figure 11: Security risk areas of Pakistan and Afghanistan, 2007 (The Communication Initiative Network, 2007).

9.2. CULTURAL DISREGARD

The researcher visited a family with poliomyelitis patient in district Muzaffargarh, but when he introduced the purpose as to do research about the disease which affected their child, the family members became very angry and they asked him to leave immediately. He came to know that few months ago a team of Pakistan national television (PTV) visited the family to make an advertisement for ongoing polio eradication efforts, they photographed and video-filmed the family's women without their veil (burqa), which is considered strictly immoral according to the rural and religious customs. When the advertisement was aired on television, the family was humiliated and taunted by fellow village people for women being shown immorally without veil on TV. So in these circumstances when I presented myself as yet another person to talk about the disease and their family, they were not happy. The event shows how important it is to understand and respect the cultural and religious customs of the area before approaching it. Disregarding these customs leads only to distrust and very hostile response from the people.

9.3. WRONG INCENTIVES

A family was visited in district Dera Ghazi Khan who were not willing to cooperate with the survey questionnaire. The reason found was their anger against the regional health department, who promised the family in past that the government would pay them “five hundred thousand rupees” as support money if they keep on bringing the child to district hospital for complete poliomyelitis diagnostic investigations, even though it has never been the government’s policy to give any financial aid in such situations. The lie was made only to get family's cooperation. This genuinely developed a strongly non-co operational attitude towards health personal of area. This particular event tells that an air of trust is so much important in dealing with people. Lies and false hopes dent this trust, leading to difficulties in relating to people, and in turn affecting the disease control programs.

9.4. DEALING WITH WOMEN

It was always much easier to talk to men as compared to women. Men did not need any special convincing to talk about the diseases and social conditions, but there was always a moment of hesitation on part of men to let me ask these same questions to their women. Women responded in different ways; sometimes from behind the door or veil (burqa)(picture 18), and sometimes even by having their husbands as their conveyor. Often cooperation was refused in case no man is present in the house and the researcher was asked to return at some other time when a man is present to deal with my purpose. Again this is a cultural and religious custom and it is to be followed and respected at all conditions, but this has to have some bearing in accessing all families and children during immunization activities.



Picture 18: Burqa clad woman in rural Pakistan.

9.5. DIFFICULT TO ACCESS AREAS

Most of these high-transmission-zone areas in province Punjab are basically the rural district areas. Majority of the polio confirmed cases (from year 2000 to 2006) are located in further undeveloped rural most parts of these districts. Addresses were often difficult to find even with the help of some local friend because there were no designated house numbers or street names. A peculiar fact to notice was that tribes are very important for identification of people, you need to know the tribe if you are looking for a person or family, otherwise you will end up chasing common names all over the area.

In most of these rural areas roads were often simply not present, with unpaved, unlighted streets and with no signboards or directions most of the time (picture 19). So often it was not the case that the visitor could reach directly in front of the required house all the way on a vehicle like car. And often the traveller had to visually spot the village and the way going to it as there were no signboards or directions given.



Picture 19: An unpaved way to a village.

General transport methods are not very modern in these rural areas (picture 20), and it was noticed by visiting the BHU's (Basic Health Units) that the vaccinators appointed to go from door to door to immunize children were not provided with any transport means by the official health department. Much later the Punjab Ministry of Health announced to

distribute motorbikes to vaccinators, but not all vaccinators got any. Most vaccinators were using bicycles, and were found complaining about this difficulty and stating that this affects their efficiency in covering large rural areas during immunization campaigns.



Picture 20: Rural transport.

9.6. UNDIAGNOSED PARALYSIS DISORDERS

Due to inadequate health facilities and very deficient health education level, there are a number of undiagnosed paralysis cases in such areas. Often it happened that the researcher was visiting a family with confirmed poliomyelitis case and some other child from the area with undiagnosed paralysis was brought to me assuming that he might provide them any medicine on the spot. When advised to, such families were never much keen to take their child to any big health care facility available in cities, owing mostly to expenditures, thus the child stays undiagnosed and untreated and adds to the poliomyelitis burden in the country.

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11.

Appendices

Appendix 1: Questionnaire

FAMILY:

1. status :

- 0. control
- 1. case

2. district :

3. Family's average monthly income?

- 0. less than 5000 rupees
- 1. more than 5000 rupees

4. children 0 to 5 years :

5. total number of children in family :

6. working persons :

7. students :

8. unemployed :

9. house structure :

- 0. mud
- 1. brick

10. toilet :

- 0. no toilet in house (use fields)
- 1. with inefficient sewerage

- 2. modern equipped with efficient sewerage

11. house status :

- 0. a residence of your own
- 1. not own (a rented residence, a residence owned by your employer, a residence of a relative, a residence of a friend, a common house for entire extended family)

12. living setup :

- 0. single family setup
- 1. combined family setup

13. number of rooms (kitchen included) :

14. phone :

- 0. no
- 1. yes

15. TV :

- 0. no
- 1. yes

16. car/bike :

- 0. no
- 1. yes

17. What level of health services do you contact first?

- 0. Professionals (primary health care, secondary health care, tertiary health care, private doctor)
- 1. Folk and quacks (hakeem, homeopathic, dispenser, faith healer)

18. Do you get visited by polio immunization teams?

- 0. regularly
- 1. irregularly, not at all

19. Does your child/children receive OPV?

- 0. yes all doses
- 1. missed some doses, not at all

FATHER:**20. What is your education?**

- 0. literate
- 1. illiterate

21. How many number of years you studied in total?

----- years

22. What is your current employment status?

- 0. employed full time
- 1. part time or unemployed

23. What is your present or past occupation?

- 0. unskilled
- 1. skilled

24. Have you been unemployed during last 5 years?

- 0. not at all
- 1. yes

25. What was your income last year?

- 0. less than 60000
- 1. more than 60000

26. Is your family financially secure?

- 0. secure
- 1. not secure

27. Have you ever attended any health education gathering?

- 0. Yes
- 1. No

28. Do you know about this disease polio?

- 0. No nothing
- 1. Yes

29. How did you come to know of the disease polio or its vaccination?

- 0. Never got the information
- 1. Media (Newspapers, Television/radio, Internet)
- 2. friends/people
- 3. health personals (doctors, Polio visiting teams)

30. Do you know how to protect your children from polio?

- 0. Yes and correct
- 1. No

31. Do you believe in vaccination?

- 0. yes absolutely
- 1. not sure/don't know what it is

32. What do you think about quality of health services in your area?

- 0. Bad
- 1. Ok, Good

33. What do you think is the reason that your child got this disease?

- 0. god's will
- 1. poor socioeconomic conditions
- 2. inadequate health facilities in your area
- 3. no idea
- 4. any other reason (state that reason)

MOTHER:**34. What is your education?**

- 0. literate
- 1. illiterate

35. How many number of years you studied in total?

----- years

36. What is your current employment status?

- 0. employed full time
- 1. part time, unemployed, house wife

37. What is your present or past occupation?

- 0. unskilled occupation
- 1. skilled

38. have you been unemployed during last 5 years?

- 0. not at all
- 1. yes, House Wife

39. What was your income last year?

- 0. less than 60000
- 1. more than 60000
- (0 if House Wife)

40. Is your family financially secure?

- 0. secure
- 1. not secure

41. Have you ever attended any health education gathering?

- 0. Yes
- 1. No

42. Do you know about this disease polio?

- 0. No nothing
- 1. Yes

43. How did you come to know of the disease polio or its vaccination?

- 0. Never got the information
- 1. Media (Newspapers, Television/radio, Internet)
- 2. friends/people
- 3. health personals (doctors, Polio visiting teams)

44. Do you know how to protect your children from polio?

- 0. Yes and correct
- 1. No

45. Do you believe in vaccination?

- 0. yes absolutely
- 1. not sure/don't know what it is

46. What do you think about quality of health services in your area?

- 0. Bad
- 1. Ok, Good

47. What do you think is the reason that your child got this disease?

- 0. god's will
- 1. poor socioeconomic conditions
- 2. inadequate health facilities in your area
- 3. no idea
- 4. any other reason (state that reason)

Appendix 2: WHO certificate

WORLD HEALTH ORGANIZATION



ORGANISATION MONDIALE DE LA SANTE

OFFICE OF THE WHO REPRESENTATIVE TO PAKISTAN

Cable address:

"UNISANTE" ISLAMABAD

Postal address:

P.O. Box 1013 ISLAMABAD

June 09, 2007

TO WHOM IT MAY CONCERN

This to certify that Dr. Sohaib Ahmed Khan has been in contact with National Surveillance Cell, Polio Eradication Initiative, Pakistan, with regard to his study about the relationship between socioeconomic conditions to the presence of Poliomyelitis in Pakistan.

We find his study very useful for the programme and important. We have proposed certain modifications in methodology. Overall, we are extremely satisfied with Dr. Sohaib's work so far and wish him good luck.

A handwritten signature in blue ink, appearing to read 'Obaid ul-Islam', written over a horizontal line.

Dr. Obaid ul-Islam
National Surveillance Coordinator
Polio Eradication Initiative, WHO,
Pakistan.

Appendix 3: Application to access WHO data

To

Deputy National Program Manager,
EPI

Subject: To get permission in order to collect data about poliomyelitis cases.

Sir,
It is stated that I am a PhD student/researcher at University of Kuopio, Finland. My research topic is about poliomyelitis in Pakistan. In this regard I am visiting Pakistan to get data about polio cases in Reservoir Districts in last 5 yrs. Kindly allow me permission to access the required data.

Thanking you.

26/2/07
10AM

Dr. Obaid
Kindly call
for your
signature

Dr. Sohail Ahmed
Researcher
University of Kuopio
Finland.
dated: 15.02.07.

Appendix 4: Risk categorization of districts/agencies

| Province | Sr. No. | High Priority | Medium Priority | Low Priority |
|---|---------|---|--|---|
| Islamabad <i>Total target pop.= 235,000</i> | 1 | | CDA | |
| | 2 | | ICT | |
| | | | Medium priority district (1 – 100%) Target population % of provincial target | |
| | | | 235 000 100 % | |
| Punjab <i>Total target pop.=16,395,755</i> | 1 | Multan | Rawalpindi | Attock |
| | 2 | Lodhran | Faisalabad | Chakwal |
| | 3 | D.G.Khan | T.T.Singh | Jhelum |
| | 4 | Rajapur | Jhang | Gujranwala |
| | 5 | Muzaffar Garh | Sahiwal | Hafizabad |
| | 6 | R.Y.Khan | Pak Pattan | Gujrat |
| | 7 | Bahawalpur (Tehsil APE) | Khanewal | Mandi Bahauddin |
| | 8 | | Okara | Sialkot |
| | 9 | | Vehari | Narowal |
| | 10 | | Bhawalpur (except APE) | Sargodha |
| | 11 | | Bhawalnagar | Mianwali |
| | 12 | | Chiniot | Khushab |
| | 13 | | | Lahore |
| | 14 | | | Sheikhupura |
| | 15 | | | Nankana Sahib |
| | 16 | | | Kasur |
| | 17 | | | Bhakkar |
| | 18 | | | Layyah |
| | | High priority districts (7 – 19%) Target population % of provincial target | Medium priority districts (11 – 31%) Target population % of provincial target | Low priority districts (18 – 50%) Target population % of provincial target |
| | 3 | 3 353 538 20 % | 5 797 620 35 % | 7 244 597 44 % |

Risk Categorization of districts/agencies

| Province | Sr. No. | High Priority | Medium Priority | Low Priority |
|---|---------|--|---|---|
| Sindh <i>Total target pop.= 7,782,993</i> | 1 | Karachi | Hyderabad | Tharparkar |
| | 2 | Ghotki | Matiari | Jamshoro (except Kotri) |
| | 3 | N.S.Feroz | T. M Khan | Khairpur (Taluka Nara) |
| | 4 | Larkana | Tando Allahyar | |
| | 5 | Kashmore | Badin | |
| | 6 | Shikarpur | Thatta | |
| | 7 | Jacobabad | Dadu | |
| | 8 | Kambar | Jamshoro (Taluka Kotri) | |
| | 9 | | Mirpurkhas | |
| | 10 | | Umekrot | |
| | 11 | | Sanghar | |
| | 12 | | Sukkur | |
| | 13 | | Khairpur (except Nara) | |
| | 14 | | Shaheed Benazir Abad | |
| | | High priority districts (8 - 35%) | Medium priority districts (13 - 57%) | Low priority districts (2 - 9%) |
| | | Target population | Target population | Target population |
| | | 4 169 959 | 3 010 584 | 602 450 |
| | | 54 % | 39 % | 8 % |
| NWFP <i>Total target pop.= 4,927,488</i> | 1 | Charsada | Bannu | Abbotabad |
| | 2 | Mardan | Batagram | Chitral |
| | 3 | Nowshera | Bunir | Hangu |
| | 4 | Swat | DirLower | Haripur |
| | 5 | Peshawar | DirUpper | Karak |
| | 6 | | Lakki Marwat | Kohat |
| | 7 | | Shangla | Mansehra |
| | 8 | | Malakand | Swabi |
| | 9 | | DI Khan | Kohistan |
| | 10 | | Tank | |
| | | High priority districts (5 - 21%) | Medium priority districts (10 - 42%) | Low priority districts (9 - 38%) |
| | | Target population | Target population | Target population |
| | | 2 367 052 | 1 287 812 | 1 272 624 |
| | | 48 % | 26 % | 26 % |

Risk Categorization of districts/agencies

| Province | Sr. No. | High Priority | Medium Priority | Low Priority | |
|---|--|--------------------------------------|------------------------------------|---------------------------------|------------|
| FATA Total target pop.= 1,180,707 | 1 | Bajour | F.R Bannu / Lakki | Kurram | |
| | 2 | Khyber | Wazir-n | Orakzai | |
| | 3 | Mohmand | Wazir-S | FR Kohat | |
| | 4 | F.R. Peshawar | FR Darazanda/Tank | | |
| | | High priority Agencies (3 - 43%) | Medium priority Agencies (2 - 29%) | Low priority Agencies (2 - 29%) | |
| | | Target population | Target population | Target population | |
| | | 865 201 | 67 100 | 248 406 | |
| | | 73 % | 6 % | 21 % | |
| | Balochistan Total target pop.= 2,206,439 | 1 | Jaffarabad | Jhal Magasi | Awaran |
| | | 2 | Nasirabad | Killa Saifullah | Bolan |
| | | 3 | Lasbella (Tehsil Hub) | Loralai | Chagai |
| | | 4 | Killa Abdullah | Mastung | Dera Bugti |
| | | 5 | Pishin | Musa Khail | Gwadar |
| | | 6 | Quetta | Sibi | Kalat |
| 7 | | | Hernai | Kech | |
| 8 | | | Sherani | Kharan | |
| 9 | | | Zhob | Khuzdar | |
| 10 | | | Ziarat | Kohlu | |
| 11 | | | Barkhan | Lasbella (except Hub) | |
| 12 | | | | Nushki | |
| 13 | | | | Pangoor | |
| 14 | | | | Washuk | |
| | High priority districts (6 - 20%) | Medium priority districts (11 - 37%) | Low priority districts (13 - 43%) | | |
| | Target population | Target population | Target population | | |
| | 1 051 838 | 391 787 | 762 814 | | |
| | 48 % | 18 % | 35 % | | |

Risk Categorization of districts/agencies

| Province | Sr. No. | High Priority | Medium Priority | Low Priority |
|---|---------|---------------|-----------------------------|-----------------------------------|
| AJK Total target pop. = 625,331 | 1 | | | Muzaffarabad |
| | 2 | | | Kotli |
| | 3 | | | Mirpur |
| | 4 | | | Bhimber |
| | 5 | | | Sudhnuti |
| | 6 | | | Poonch |
| | 7 | | | Bagh |
| | 8 | | | Neelum |
| | 9 | | | Haveeli |
| Gilgit Baltistan Total target pop. = 199,891 | 1 | | | Low priority districts (9) - 100% |
| | 2 | | | Target % of provincial target |
| | 3 | | | 625 331 100 % |
| | 4 | | | Gilgit |
| | 5 | | | Skardu |
| | 6 | | | Diamer |
| Pakistan Total target pop. = 33,553,604 | | | | Target % of provincial target |
| | | | | 199 891 100 % |
| | | | | Low priority districts (6) - 100% |
| | | | | Target % of provincial target |
| | | | | 199 891 100 % |
| | | | | Low priority districts (59) - 43% |
| | | | Target % of national target | |
| | | | 10 956 113 33 % | |
| Inclusion criteria: - | | | | |
| High priority districts: Highest frequency of infection in the last 5 years, having endemic circulation or part of the epidemiological zone, high percentage of inaccessible children due either to insecurity or weak operations, high population density and frequent population movement with active transmission zones | | | | |
| Medium priority: High probability of importation from high priority districts based on trends (of transmission) in the last 5 years. | | | | |

Appendix 5: Cases 2000-06 Southern Punjab

| IRONSSET | PROVINCE | DISTRICT | TEHSIL | URN-NAME | ADDRESS | SEX | AGE | DONSET | DNCT | DOI | DOBES | DOBES2 | DOBES3 |
|----------|----------|----------|--------------|-------------|---------|-----|-----|------------|------------|------------|-------|--------|--------|
| F | 2000 | PUNJAB | RAJANPUR | EP82000001 | | M | 11 | 03/10/2000 | 11/01/2000 | 14/10/2000 | 0 | 2 | 2 |
| M | 2000 | PUNJAB | MUZAFFARGHAR | FB83000003 | | F | 36 | 25/02/2000 | 03/03/2000 | 03/03/2000 | 0 | 3 | 6 |
| M | 2001 | PUNJAB | MUZAFFARGHAR | FB83001006 | | M | 15 | 02/04/2001 | 06/04/2001 | 06/04/2001 | 0 | 3 | 4 |
| M | 2001 | PUNJAB | MUZAFFARGHAR | FB83001010 | | M | 24 | 20/05/2001 | 30/05/2001 | 30/05/2001 | 1 | 6 | 6 |
| M | 2001 | PUNJAB | RYHAN | FB872010017 | | M | 48 | 16/06/2001 | 17/06/2001 | 17/06/2001 | 3 | 6 | 11 |
| M | 2001 | PUNJAB | DOGHAN | FB810010017 | | M | 7 | 20/06/2001 | 25/06/2001 | 25/06/2001 | 3 | 6 | 11 |
| M | 2001 | PUNJAB | DOGHAN | FB81001019 | | M | 13 | 14/07/2001 | 15/07/2001 | 15/07/2001 | 3 | 6 | 11 |
| M | 2001 | PUNJAB | DOGHAN | FB81001020 | | M | 48 | 24/08/2001 | 25/08/2001 | 25/08/2001 | 3 | 6 | 11 |
| F | 2001 | PUNJAB | DOGHAN | FB81001021 | | F | 6 | 16/06/2001 | 20/06/2001 | 20/06/2001 | 2 | 2 | 4 |
| F | 2001 | PUNJAB | RAJANPUR | FB820010009 | | F | 12 | 01/06/2001 | 11/06/2001 | 11/06/2001 | 1 | 0 | 3 |
| M | 2001 | PUNJAB | RAJANPUR | FB82001012 | | M | 13 | 01/06/2001 | 11/06/2001 | 11/06/2001 | 1 | 0 | 3 |
| M | 2001 | PUNJAB | RAJANPUR | FB82001015 | | M | 7 | 14/06/2001 | 14/06/2001 | 14/06/2001 | 0 | 1 | 3 |
| M | 2001 | PUNJAB | MUZAFFARGHAR | FB83001026 | | M | 23 | 08/06/2001 | 24/06/2001 | 24/06/2001 | 2 | 1 | 3 |
| F | 2001 | PUNJAB | MUZAFFARGHAR | FB83001028 | | F | 23 | 08/06/2001 | 15/06/2001 | 17/06/2001 | 3 | 6 | 6 |
| M | 2001 | PUNJAB | RAJANPUR | FB820010146 | | M | 13 | 01/10/2001 | 02/10/2001 | 02/10/2001 | 0 | 0 | 3 |
| M | 2001 | PUNJAB | DOGHAN | FB81001022 | | M | 24 | 04/10/2001 | 11/10/2001 | 12/10/2001 | 3 | 6 | 6 |
| M | 2001 | PUNJAB | DOGHAN | FB81001023 | | M | 12 | 02/10/2001 | 11/10/2001 | 13/10/2001 | 3 | 4 | 7 |
| M | 2001 | PUNJAB | DOGHAN | FB81001024 | | M | 20 | 06/10/2001 | 11/10/2001 | 13/10/2001 | 0 | 7 | 7 |
| F | 2001 | PUNJAB | DOGHAN | FB81001025 | | F | 12 | 06/10/2001 | 11/10/2001 | 12/10/2001 | 3 | 4 | 7 |
| M | 2001 | PUNJAB | RYHAN | FB720010021 | | M | 14 | 04/10/2001 | 06/10/2001 | 06/10/2001 | 1 | 6 | 7 |
| M | 2001 | PUNJAB | RAJANPUR | FB82001023 | | M | 36 | 06/10/2001 | 12/10/2001 | 12/10/2001 | 1 | 1 | 2 |
| M | 2001 | PUNJAB | DOGHAN | FB81001026 | | M | 11 | 20/10/2001 | 30/10/2001 | 31/10/2001 | 0 | 4 | 4 |
| M | 2001 | PUNJAB | DOGHAN | FB81001027 | | M | 7 | 25/10/2001 | 30/10/2001 | 31/10/2001 | 0 | 0 | 2 |
| M | 2001 | PUNJAB | DOGHAN | FB81001028 | | M | 12 | 30/10/2001 | 02/11/2001 | 02/11/2001 | 0 | 0 | 2 |
| M | 2001 | PUNJAB | RAJANPUR | FB82001024 | | M | 10 | 15/10/2001 | 21/10/2001 | 22/10/2001 | 3 | 5 | 8 |
| M | 2001 | PUNJAB | RAJANPUR | FB82001027 | | M | 7 | 27/10/2001 | 30/10/2001 | 30/10/2001 | 0 | 0 | 0 |
| M | 2001 | PUNJAB | RAJANPUR | FB82001028 | | M | 30 | 31/10/2001 | 02/11/2001 | 02/11/2001 | 1 | 5 | 6 |
| F | 2001 | PUNJAB | RAJANPUR | FB82001029 | | F | 24 | 01/11/2001 | 03/11/2001 | 05/11/2001 | 0 | 1 | 1 |
| M | 2001 | PUNJAB | RAJANPUR | FB82001030 | | M | 9 | 01/11/2001 | 03/11/2001 | 05/11/2001 | 0 | 2 | 2 |
| F | 2001 | PUNJAB | DOGHAN | FB81001031 | | F | 18 | 06/11/2001 | 10/11/2001 | 12/11/2001 | 0 | 2 | 2 |
| F | 2001 | PUNJAB | DOGHAN | FB81001032 | | F | 30 | 04/11/2001 | 08/11/2001 | 10/11/2001 | 2 | 3 | 5 |
| F | 2001 | PUNJAB | RYHAN | FB720010028 | | F | 9 | 14/11/2001 | 14/11/2001 | 15/11/2001 | 3 | 4 | 7 |
| M | 2001 | PUNJAB | RAJANPUR | FB82001040 | | M | 24 | 23/11/2001 | 30/11/2001 | 01/12/2001 | 0 | 0 | 0 |
| M | 2001 | PUNJAB | RAJANPUR | FB82001041 | | M | 30 | 25/11/2001 | 01/12/2001 | 02/12/2001 | 3 | 9 | 12 |
| M | 2001 | PUNJAB | RYHAN | FB872010031 | | M | 36 | 30/11/2001 | 03/12/2001 | 04/12/2001 | 1 | 5 | 6 |
| F | 2001 | PUNJAB | DOGHAN | FB81001040 | | F | 12 | 25/11/2001 | 08/12/2001 | 10/12/2001 | 1 | 6 | 7 |
| M | 2001 | PUNJAB | RAJANPUR | FB82001044 | | M | 10 | 19/12/2001 | 14/12/2001 | 15/12/2001 | 0 | 2 | 2 |
| M | 2002 | PUNJAB | RAJANPUR | FB82020004 | | M | 12 | 05/10/2002 | 10/01/2002 | 11/01/2002 | 2 | 3 | 5 |
| M | 2002 | PUNJAB | DOGHAN | FB81020006 | | M | 36 | 05/02/2002 | 08/02/2002 | 11/02/2002 | 0 | 3 | 3 |
| M | 2002 | PUNJAB | RYHAN | FB72020004 | | M | 18 | 08/02/2002 | 07/03/2002 | 07/03/2002 | 0 | 2 | 2 |
| M | 2002 | PUNJAB | DOGHAN | FB81020008 | | M | 16 | 31/03/2002 | 05/04/2002 | 06/04/2002 | 2 | 7 | 9 |
| F | 2002 | PUNJAB | DOGHAN | FB81020015 | | F | 16 | 12/05/2002 | 16/05/2002 | 17/05/2002 | 0 | 3 | 3 |
| M | 2002 | PUNJAB | MUZAFFARGHAR | FB83020017 | | M | 24 | 28/06/2002 | 08/07/2002 | 10/07/2002 | 0 | 3 | 3 |
| M | 2002 | PUNJAB | DOGHAN | FB81020024 | | M | 24 | 28/06/2002 | 07/10/2002 | 08/10/2002 | 1 | 1 | 2 |
| M | 2002 | PUNJAB | DOGHAN | FB81020028 | | M | 11 | 23/10/2002 | 24/10/2002 | 25/10/2002 | 1 | 4 | 5 |
| M | 2002 | PUNJAB | RAJANPUR | FB82020018 | | M | 12 | 17/11/2002 | 18/11/2002 | 19/11/2002 | 0 | 0 | 0 |
| M | 2003 | PUNJAB | MUZAFFARGHAR | FB83030035 | | M | 12 | 07/07/2003 | 23/07/2003 | 25/07/2003 | 0 | 0 | 0 |
| M | 2003 | PUNJAB | MUZAFFARGHAR | FB83030048 | | M | 11 | 01/11/2003 | 03/11/2003 | 05/11/2003 | 0 | 5 | 5 |
| M | 2003 | PUNJAB | JATO | FB83030050 | | M | 12 | 08/11/2003 | 15/11/2003 | 17/11/2003 | 0 | 6 | 6 |
| M | 2004 | PUNJAB | MUZAFFARGHAR | FB83040002 | | M | 15 | 11/01/2004 | 23/01/2004 | 23/01/2004 | 0 | 1 | 1 |
| M | 2004 | PUNJAB | MUZAFFARGHAR | FB83040003 | | M | 11 | 23/01/2004 | 28/01/2004 | 28/01/2004 | 0 | 5 | 5 |
| M | 2004 | PUNJAB | RAJANPUR | FB82040020 | | M | 36 | 13/08/2004 | 18/08/2004 | 18/08/2004 | 0 | 15 | 15 |
| M | 2004 | PUNJAB | MUZAFFARGHAR | FB83040042 | | M | 18 | 17/11/2004 | 19/11/2004 | 20/11/2004 | 0 | 7 | 7 |
| M | 2004 | PUNJAB | RAJANPUR | FB82040030 | | M | 8 | 22/11/2004 | 28/11/2004 | 28/11/2004 | 0 | 2 | 2 |
| M | 2004 | PUNJAB | RAJANPUR | FB82040032 | | M | 12 | 04/12/2004 | 09/12/2004 | 07/12/2004 | 3 | 3 | 6 |
| M | 2004 | PUNJAB | MUZAFFARGHAR | FB83040049 | | M | 11 | 13/12/2004 | 12/12/2004 | 14/12/2004 | 1 | 7 | 8 |
| M | 2005 | PUNJAB | DOGHAN | FB81050012 | | M | 10 | 11/04/2005 | 15/04/2005 | 16/04/2005 | 3 | 5 | 8 |
| M | 2005 | PUNJAB | DOGHAN | FB81050019 | | M | 24 | 10/05/2005 | 12/05/2005 | 12/05/2005 | 1 | 15 | 18 |
| M | 2005 | PUNJAB | DOGHAN | FB81050021 | | M | 25 | 20/05/2005 | 21/05/2005 | 21/05/2005 | 0 | 12 | 12 |
| M | 2005 | PUNJAB | DOGHAN | FB81050031 | | M | 6 | 08/06/2005 | 11/06/2005 | 13/06/2005 | 0 | 4 | 4 |
| F | 2005 | PUNJAB | RYHAN | FB72050051 | | F | 8 | 21/07/2005 | 28/07/2005 | 28/07/2005 | 0 | 1 | 1 |
| F | 2005 | PUNJAB | DOGHAN | FB81050059 | | F | 29 | 17/10/2005 | 08/10/2005 | 07/10/2005 | 0 | 15 | 15 |
| F | 2005 | PUNJAB | DOGHAN | FB81050062 | | F | 24 | 28/11/2005 | 28/11/2005 | 07/12/2005 | 0 | 12 | 12 |
| F | 2006 | PUNJAB | MUZAFFARGHAR | FB83060043 | | F | 18 | 21/07/2006 | 21/07/2006 | 22/07/2006 | 0 | 12 | 12 |

| DLOPV | DSTOOL1 | DSTOOL2 | DSTSENTZ | FEVER | ASPM | PROGRES | DCRES | LABNO | DSTLAB1 | DSTLAB2 | F1 | P2 | PS | ENTERO | FLIP | FUP | ERC | CLASS | DIAG | OTHER | ADEQ |
|------------|------------|------------|------------|-------|------|---------|---------------|-------|------------|------------|----|----|----|--------|--------------|------------|-----|-------|------|-------|--------|
| 30/11/1999 | 04/03/2000 | 05/03/2000 | 07/03/2000 | | 1 | 1 | 10/03/2000 | 114 | 08/03/2000 | 20/01/2000 | 4 | 4 | 4 | 2 | 07/03/2000 | 1 | 1 | 1 | | | ADEQ |
| 17/03/2001 | 15/04/2001 | 15/04/2001 | 18/04/2001 | | 1 | 1 | 03/05/2001 | 318 | 10/04/2001 | 18/04/2001 | 4 | 4 | 4 | 2 | 25/04/2001 | 1 | 1 | 1 | | | ADEQ |
| 23/02/1998 | 17/08/2001 | 18/08/2001 | 18/08/2001 | | 2 | 1 | 18/08/2001 | 114 | 21/08/2001 | 21/08/2001 | 4 | 4 | 4 | 2 | 18/10/2001 | 1 | 1 | 1 | | | ADEQ |
| 17/04/2001 | 26/09/2001 | 27/09/2001 | 28/09/2001 | | 9 | 1 | 25/10/2001 | 84 | 21/09/2001 | 20/09/2001 | 4 | 4 | 4 | 2 | 20/11/2001 | 1 | 1 | 1 | | | ADEQ |
| 21/08/2001 | 26/09/2001 | 27/09/2001 | 28/09/2001 | | 2 | 1 | 17/10/2001 | 1173 | 20/09/2001 | 20/09/2001 | 4 | 4 | 4 | 1 | 20/09/2001 | 1 | 1 | 1 | | | ADEQ |
| 22/08/2001 | 26/09/2001 | 27/09/2001 | 28/09/2001 | | 1 | 1 | 17/10/2001 | 1182 | 03/10/2001 | 03/10/2001 | 4 | 4 | 4 | 1 | 20/11/2001 | 1 | 1 | 1 | | | ADEQ |
| 27/08/2001 | 26/09/2001 | 26/09/2001 | 01/10/2001 | | 1 | 1 | 18/10/2001 | 1183 | 01/10/2001 | 01/10/2001 | 4 | 4 | 4 | 1 | 27/11/2001 | 1 | 1 | 1 | | | ADEQ |
| 16/08/2001 | 13/09/2001 | 14/09/2001 | 14/09/2001 | | 2 | 1 | 17/11/2001 | 1108 | 15/09/2001 | 15/09/2001 | 1 | 4 | 4 | 1 | 2/09/12/2001 | 1 | 1 | 1 | | | ADEQ |
| 23/08/2001 | 26/09/2001 | 30/09/2001 | 02/10/2001 | | 1 | 1 | 17/11/2001 | 1107 | 15/09/2001 | 15/09/2001 | 1 | 4 | 4 | 1 | 2/09/12/2001 | 1 | 1 | 1 | | | ADEQ |
| 20/08/2001 | 16/09/2001 | 16/09/2001 | 20/09/2001 | | 2 | 1 | 25/11/2001 | 1141 | 21/09/2001 | 21/09/2001 | 1 | 4 | 4 | 4 | 2 | 08/11/2001 | 1 | 1 | | | INADEQ |
| 26/08/2001 | 04/10/2001 | 05/10/2001 | 05/10/2001 | | 1 | 1 | 12/15/10/2001 | 1215 | 06/10/2001 | 06/10/2001 | 4 | 4 | 4 | 1 | 2/04/12/2001 | 1 | 1 | 1 | | | ADEQ |
| 25/08/2001 | 14/10/2001 | 15/10/2001 | 17/10/2001 | | 1 | 1 | 17/11/2001 | 1260 | 18/10/2001 | 18/10/2001 | 4 | 4 | 4 | 1 | 2/04/12/2001 | 1 | 1 | 1 | | | ADEQ |
| 27/08/2001 | 13/10/2001 | 14/10/2001 | 15/10/2001 | | 1 | 1 | 18/11/2001 | 1278 | 18/10/2001 | 18/10/2001 | 4 | 4 | 4 | 1 | 2/04/12/2001 | 1 | 1 | 1 | | | ADEQ |
| 25/08/2001 | 14/10/2001 | 15/10/2001 | 15/10/2001 | | 1 | 1 | 18/11/2001 | 1277 | 18/10/2001 | 18/10/2001 | 4 | 4 | 4 | 1 | 2/04/12/2001 | 1 | 1 | 1 | | | ADEQ |
| 25/08/2001 | 13/10/2001 | 14/10/2001 | 15/10/2001 | | 1 | 1 | 18/11/2001 | 1278 | 18/10/2001 | 18/10/2001 | 4 | 4 | 4 | 1 | 2/04/12/2001 | 1 | 1 | 1 | | | ADEQ |
| 25/08/2001 | 13/10/2001 | 14/10/2001 | 15/10/2001 | | 2 | 1 | 17/11/2001 | 1279 | 18/10/2001 | 18/10/2001 | 4 | 4 | 4 | 1 | 2/04/12/2001 | 1 | 1 | 1 | | | ADEQ |
| 21/08/2001 | 31/10/2001 | 01/11/2001 | 02/11/2001 | | 1 | 1 | 2/21/11/2001 | 1383 | 03/11/2001 | 03/11/2001 | 4 | 4 | 4 | 1 | 2/20/12/2001 | 1 | 1 | 1 | | | ADEQ |
| 21/08/2001 | 04/11/2001 | 05/11/2001 | 05/11/2001 | | 1 | 1 | 12/11/2001 | 1373 | 05/11/2001 | 05/11/2001 | 4 | 4 | 4 | 1 | 2/20/12/2001 | 1 | 1 | 1 | | | ADEQ |
| 25/08/2001 | 23/10/2001 | 23/10/2001 | 23/10/2001 | | 1 | 1 | 15/11/2001 | 1389 | 08/11/2001 | 08/11/2001 | 4 | 4 | 4 | 1 | 2/20/12/2001 | 1 | 1 | 1 | | | ADEQ |
| 25/08/2001 | 31/10/2001 | 01/11/2001 | 02/11/2001 | | 1 | 1 | 2/21/11/2001 | 1323 | 24/10/2001 | 24/10/2001 | 4 | 4 | 4 | 1 | 2/20/12/2001 | 1 | 1 | 1 | | | ADEQ |
| 25/08/2001 | 03/11/2001 | 03/11/2001 | 03/11/2001 | | 1 | 1 | 15/11/2001 | 1384 | 03/11/2001 | 03/11/2001 | 4 | 4 | 4 | 1 | 2/20/12/2001 | 1 | 1 | 1 | | | ADEQ |
| 25/08/2001 | 03/11/2001 | 03/11/2001 | 03/11/2001 | | 1 | 1 | 15/11/2001 | 1374 | 05/11/2001 | 05/11/2001 | 4 | 4 | 4 | 1 | 2/20/12/2001 | 1 | 1 | 1 | | | ADEQ |
| 09/11/2001 | 09/11/2001 | 07/11/2001 | 07/11/2001 | | 1 | 1 | 03/12/2001 | 1387 | 08/11/2001 | 08/11/2001 | 4 | 4 | 4 | 1 | 2/01/01/2002 | 1 | 1 | 1 | | | ADEQ |
| 09/11/2001 | 09/11/2001 | 07/11/2001 | 07/11/2001 | | 2 | 1 | 03/12/2001 | 1406 | 08/11/2001 | 08/11/2001 | 4 | 4 | 4 | 1 | 2/01/01/2002 | 1 | 1 | 1 | | | ADEQ |
| 09/11/2001 | 13/11/2001 | 13/11/2001 | 14/11/2001 | | 1 | 1 | 03/12/2001 | 1418 | 15/11/2001 | 15/11/2001 | 4 | 4 | 4 | 1 | 2/01/01/2002 | 1 | 1 | 1 | | | ADEQ |
| 09/11/2001 | 13/11/2001 | 13/11/2001 | 14/11/2001 | | 1 | 1 | 03/12/2001 | 1388 | 15/11/2001 | 15/11/2001 | 4 | 4 | 4 | 1 | 2/01/01/2002 | 1 | 1 | 1 | | | ADEQ |
| 27/08/2001 | 08/11/2001 | 10/11/2001 | 10/11/2001 | | 1 | 1 | 12/11/2001 | 1414 | 15/11/2001 | 15/11/2001 | 4 | 4 | 4 | 1 | 2/05/03/2002 | 1 | 1 | 1 | | | ADEQ |
| 08/11/2001 | 12/11/2001 | 13/11/2001 | 14/11/2001 | | 1 | 1 | 27/11/2001 | 1450 | 25/11/2001 | 25/11/2001 | 1 | 4 | 4 | 1 | 2/17/01/2002 | 1 | 1 | 1 | | | ADEQ |
| 08/11/2001 | 12/11/2001 | 13/11/2001 | 14/11/2001 | | 1 | 1 | 17/01/2002 | 1503 | 04/12/2001 | 04/12/2001 | 1 | 4 | 4 | 1 | 2/24/01/2002 | 1 | 1 | 1 | | | ADEQ |
| 08/11/2001 | 03/12/2001 | 03/12/2001 | 03/12/2001 | | 1 | 1 | 20/12/2001 | 1505 | 05/12/2001 | 05/12/2001 | 4 | 4 | 4 | 1 | 2/24/01/2002 | 1 | 1 | 1 | | | ADEQ |
| 27/08/2001 | 04/12/2001 | 04/12/2001 | 04/12/2001 | | 1 | 1 | 20/12/2001 | 1519 | 07/12/2001 | 07/12/2001 | 4 | 4 | 4 | 1 | 2/24/01/2002 | 1 | 1 | 1 | | | ADEQ |
| 07/11/2001 | 07/11/2001 | 07/11/2001 | 07/11/2001 | | 1 | 1 | 18/12/2001 | 1580 | 14/12/2001 | 14/12/2001 | 4 | 4 | 4 | 1 | 2/25/01/2002 | 1 | 1 | 1 | | | ADEQ |
| 08/11/2001 | 25/12/2001 | 26/12/2001 | 27/12/2001 | | 1 | 1 | 2/30/01/2002 | 1575 | 28/12/2001 | 28/12/2001 | 4 | 4 | 4 | 1 | 2/14/02/2002 | 1 | 1 | 1 | | | ADEQ |
| 08/11/2001 | 11/01/2002 | 12/01/2002 | 12/01/2002 | | 1 | 1 | 1/30/02/2002 | 30 | 10/01/2002 | 10/01/2002 | 4 | 4 | 4 | 1 | 2/05/03/2002 | 1 | 1 | 1 | | | ADEQ |
| 05/03/2002 | 06/03/2002 | 06/03/2002 | 06/03/2002 | | 1 | 1 | 07/03/2002 | 153 | 13/02/2002 | 13/02/2002 | 1 | 4 | 4 | 1 | 2/10/04/2002 | 1 | 1 | 1 | | | INADEQ |
| 06/03/2002 | 06/04/2002 | 06/04/2002 | 06/04/2002 | | 1 | 2 | 02/05/2002 | 239 | 11/03/2002 | 11/03/2002 | 1 | 4 | 4 | 2 | 2/10/04/2002 | 1 | 1 | 1 | | | ADEQ |
| 06/03/2002 | 15/05/2002 | 16/05/2002 | 17/05/2002 | | 1 | 2 | 17/05/2002 | 546 | 18/05/2002 | 18/05/2002 | 1 | 4 | 4 | 1 | 2/15/07/2002 | 1 | 1 | 1 | | | ADEQ |
| 04/08/2002 | 10/08/2002 | 11/08/2002 | 11/08/2002 | | 1 | 2 | 11/08/2002 | 1391 | 12/08/2002 | 12/08/2002 | 1 | 4 | 4 | 1 | 2/25/11/2002 | 1 | 1 | 1 | | | ADEQ |
| 08/11/2001 | 14/02/2002 | 15/02/2002 | 16/02/2002 | | 1 | 1 | 15/11/2002 | 1472 | 20/02/2002 | 20/02/2002 | 1 | 4 | 4 | 1 | 2/28/12/2002 | 1 | 1 | 1 | | | ADEQ |
| 14/10/2003 | 08/11/2003 | 08/11/2003 | 08/11/2003 | | 1 | 1 | 03/12/2002 | 1622 | 23/11/2002 | 23/11/2002 | 2 | 4 | 4 | 1 | 2/18/01/2003 | 1 | 1 | 1 | | | ADEQ |
| 14/10/2003 | 08/11/2003 | 08/11/2003 | 08/11/2003 | | 1 | 1 | 03/12/2002 | 1238 | 20/07/2003 | 20/07/2003 | 2 | 4 | 4 | 1 | 2/01/01/2004 | 1 | 1 | 1 | | | ADEQ |
| 24/01/2004 | 25/01/2004 | 25/01/2004 | 25/01/2004 | | 2 | 1 | 18/02/2004 | 1806 | 08/11/2003 | 07/11/2003 | 1 | 4 | 4 | 1 | 2/09/01/2004 | 1 | 1 | 1 | | | ADEQ |
| 24/01/2004 | 25/01/2004 | 25/01/2004 | 25/01/2004 | | 2 | 1 | 18/02/2004 | 186 | 28/01/2004 | 28/01/2004 | 1 | 4 | 4 | 1 | 2/20/05/2004 | 1 | 1 | 1 | | | ADEQ |
| 08/10/2004 | 08/10/2004 | 16/08/2004 | 20/08/2004 | | 2 | 1 | 27/02/2004 | 135 | 06/02/2004 | 06/02/2004 | 1 | 4 | 4 | 1 | 2/24/03/2004 | 1 | 1 | 1 | | | ADEQ |
| 03/12/2004 | 03/12/2004 | 03/12/2004 | 03/12/2004 | | 2 | 1 | 18/12/2004 | 1425 | 21/12/2004 | 21/12/2004 | 1 | 4 | 4 | 1 | 2/13/10/2004 | 1 | 1 | 1 | | | INADEQ |
| 30/11/2004 | 08/12/2004 | 10/12/2004 | 10/12/2004 | | 1 | 1 | 30/12/2004 | 2804 | 07/12/2004 | 07/12/2004 | 4 | 4 | 4 | 1 | 2/24/01/2005 | 1 | 1 | 1 | | | ADEQ |
| 30/11/2004 | 17/12/2004 | 18/12/2004 | 20/12/2004 | | 1 | 1 | 30/12/2004 | 2887 | 11/12/2004 | 11/12/2004 | 4 | 4 | 4 | 1 | 2/04/02/2005 | 1 | 1 | 1 | | | ADEQ |
| 19/04/2005 | 18/04/2005 | 18/04/2005 | 18/04/2005 | | 1 | 2 | 03/05/2005 | 2801 | 21/12/2004 | 21/12/2004 | 1 | 4 | 4 | 1 | 2/11/02/2005 | 1 | 1 | 1 | | | ADEQ |
| 22/05/2005 | 23/05/2005 | 24/05/2005 | 24/05/2005 | | 1 | 1 | 03/06/2005 | 1322 | 20/04/2005 | 20/04/2005 | 1 | 4 | 4 | 1 | 2/13/06/2005 | 1 | 1 | 1 | | | ADEQ |
| 24/07/2005 | 27/07/2005 | 28/07/2005 | 28/07/2005 | | 1 | 1 | 07/06/2005 | 2189 | 25/05/2005 | 25/05/2005 | 1 | 4 | 4 | 1 | 2/24/07/2005 | 1 | 1 | 1 | | | ADEQ |
| 24/07/2005 | 27/07/2005 | 28/07/2005 | 28/07/2005 | | 1 | 1 | 15/08/2005 | 3442 | 30/07/2005 | 30/07/2005 | 1 | 4 | 4 | 1 | 2/25/09/2005 | 1 | 1 | 1 | | | ADEQ |
| 28/09/2005 | 28/10/2005 | 31/10/2005 | 31/10/2005 | | 2 | 1 | 15/11/2005 | 5431 | 02/11/2005 | 02/11/2005 | 1 | 4 | 4 | 1 | 2/18/11/2005 | 1 | 1 | 1 | | | ADEQ |
| 25/07/2006 | 22/07/2006 | 23/07/2006 | | | | | | | | | | | | | | | | | | | |

SOHAIB AHMED KHAN

*Poliomyelitis
in Socio-Cultural Context*

Study from Province Punjab, Pakistan

Poliomyelitis is an infectious disease, which is endemic in four countries in the world: Pakistan, India, Afghanistan and Nigeria. Eradication activities focus mainly on the mass immunization of children under 5 years age with OPV (Oral Polio Vaccine). This study explored the disease and vaccination in context of social conditions and cultural influences in province Punjab, Pakistan. Better understanding of these social processes should lead to improvement of the disease eradication activities.



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