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## **Managerial and Operational Hindrances to Polio Eradication: A Case Study of Tehsil Katlang, Mardan, Pakistan**

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### **Abstract**

The study aims to analyse managerial and operational hindrances to polio eradication process in Tehsil Katlang, District Mardan using quantitative research method i.e. questionnaire and statistical analysis. A sample size of 200 respondents i.e. polio workers of health department, staff of WHO and UNICEF are selected through proportionate stratified random technique. Bi-variate analyses are conducted with the help of Chi-square test. The study results concludes a significant association between polio eradication process and maintenance of cold chain, lack of transportation facility to polio staff, accessibility with reference to locality, training opportunities of polio workers, lack of trained public health professionals, workers dissatisfaction from salaries, timely payment of NIDs remuneration, unnecessary bureaucratic interventions and influences in Expanded Program on Immunisation (EPI), lack of proper evaluation of National Immunisation Days (NIDs) campaign and security threats to polio workers. Further, a non-significant association is ascertained between polio eradication and timely availability of vaccines to EPI workers, effects of load shedding on maintenance of cold chain and proper monitoring of NIDs campaign. The findings state that the program needs proper management process for cold chain and transportation facilities. Salaries of the workers need to be increased and NIDs remuneration needs to pay on time. Various training programs should be initiated for workers and shortage of staff should be removed. Security arrangements for polio workers may be enhanced.

**Keywords:** Polio Eradication, Managerial Factors, National Immunisation Days, WHO.

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### **1. Introduction**

Polio eradication had been once a challenge for all countries in the world. However, recently, most of the countries overcame polio through vaccination, political will, and global support. The world is now polio free and there are few countries like Nigeria, Afghanistan and Pakistan where polio is still endemic (Andrade, Hussain, 2018; Shakeel, Brown, Sethi, & Mackey, 2019; Lamb, Chang, Chavez, Hameed, & Mixon, 2013). Pakistan is also facing the menace of polio but struggling to overcome it. Polio eradication process is facing a number of challenges due to which polio is not eradicated from Pakistan. The study at hand is aimed to identify the operational and managerial issues faced by front line polio workers and to ascertain the

association of these issues with polio eradication process. Drawing upon the data collected from front line polio workers, various issues and obstacles to polio workers are identified. These issues hinder polio workers from proper vaccination and immunisation and hence polio is not eradicated in Pakistan. Our main concern in this study is to focus on managerial and operational issues faced by polio workers. Therefore, this study is empirically designed with a specific focus to identify the managerial and operational factors hindering polio eradication process. Specifically, the study has tried to identify operational and managerial hindrances faced by polio workers and to ascertain association of managerial/operational issues with polio eradication process. Moreover, it seeks to forward suggestion for overcoming problems faced by polio workers.

## **2. Literature Review**

Before discussing issues, faced by polio workers, it is pertinent to know what polio is? Poliomyelitis (Polio) or infantile paralysis is a viral disease that attacks central nervous system of human beings. Its effects range from mild fever to complete paralysis over time. Children below the age of five years are the main victims of such diseases that may put them to death in certain cases (Naeem et al., 2012; Alexander, Zubair, Khan, Abid, & Durry, 2014). Keeping in view the seriousness and infectious nature of disease global level efforts were started to eradicate polio from the world. Various endeavours are made to overcome the issue and to make the world free from polio. For example, Global Polio Eradication Initiative (GPEI) was launched by World Health Organisation (WHO) in 1988 (Nadeem, 2016). It is considered as one of the biggest health projects in the history (Kazi, Khalid, and Kazi, 2014). GPEI is a public-private partnership led by national governments with five partners – the WHO, Rotary International, the US Centre for Disease Control and Prevention (CDC), the United Nations Children’s Fund (UNICEF) and the Bill & Melinda Gates Foundation. Its goal is to eradicate polio worldwide (Owais, Khowaja, Ali, & Zaidi, 2013).

WHO and other global agencies invested considerable amount of energy and resources on polio combat and its outcomes are appreciable and productive in terms of restraining polio virus to just Afghanistan, Nigeria and Pakistan (Andrade, Hussain, 2018; Shakeel, Brown, Sethi, & Mackey, 2019). The GPEI is credited with saving the life of 250,000 children. Moreover, another 5 million kids can walk on their feet that would have been incapacitated to walk. (Baig, 2004; WHO, 2012). Pakistan is a signatory of the World Health Assembly (WHA) and officially launched GPEI in 1994. Pakistan is spending both human and financial resources to make Pakistan free of polio virus and to meet the goal of GPEI. A formal hierarchical setup is established with a motive to curb polio virus from Pakistan. Ministry of Health is responsible in coordination with other departments and is striving for polio elimination. A complete organisational setup ranging from secretary health to the field staff is maintained. Deputy Commissioner of the district serves as focal person and District Health Officer works for GPEI. The government of Pakistan is supported by following organizations to combat polio:

- The WHO coordinates the management and administration of the GPEI and provides technical and operational support to ministries of health at federal and provincial level. WHO is responsible for monitoring of progress and strategic planning?
- The U.S. Centre for Disease Control and Prevention (CDC) deploys epidemiologists, public health experts, and scientists to investigate outbreaks of polio, identify the strain

of polio virus involved, and pinpoint its geographic origin (Owais, Khowaja, Ali, & Zaidi, 2013).

- UNICEF buys polio vaccine and manages its distribution. The agency spreads the word about the benefits of vaccination to gain community acceptance; a process known as social mobilisation. On the ground, field workers immunise children with the help of local health workers and volunteers such as Rotarians.
- Bill & Melinda Gates Foundation is a core partner of the GPEI. It is the largest private funding source of the GPEI, contributing over \$1.9 billion to the fight against the polio. The Gates Foundation matched all donations to Rotary for polio with a ratio of two to one, and up to \$35 million per year through 2018.
- Global Alliance for Vaccination and Immunization (GAVI) is an international vaccine alliance that brings vaccines to some of the world’s poorest countries. It is working with the GPEI to introduce at least one dose of the injectable inactivated polio vaccine into the routine immunisation schedule (Hussain, Boyle, Patel, & Sullivan, 2016)

Pakistani government with the help of global agencies is mitigating proliferation of polio infection in the country. But still polio exists which threatens polio free world. In 2014, an alarming number of 306 cases has been reported in Pakistan followed by 54 cases in 2015. The number of reported polio cases is given below:

Table 1: Polio cases in Pakistan since 2014

Province	2014	2015	2016	2017	2018	2019
Punjab	5	2	0	1	0	5
Sindh	30	12	8	2	1	9
Khyber Pakhtunkhwa (including tribal districts)	68	33	10	1	8	61
Balochistan	25	7	2	3	3	7
Gilgit-Baltistan	0	0	1	1	0	0
Total	306	54	20	8	12	82

It is pertinent to mention that polio workers face various problems including abduction and targeted killing (Alexander, Zubair, Khan, Abid, & Durry, 2013; Kenedy, 2017). Fake vaccination campaign and Dr. Shakeel case in Osama Bin Laden operation also created hurdles for polio workers (Gostin, 2014; Kennedy, 2017). In addition, the front-line workers are also facing a number of issues in vaccination program. Therefore, they are unable to cover the issue and the vaccinate children. Non-coverage and non-vaccination resulted in the failure to eradicate the polio from Pakistan.

The available literature shows numerous factors that hinder goal achievement in Pakistan. The established hierarchal structure of polio eradication initiative in the country like Health Ministry, establishment secretaries, district administrations, health officers, and polio workers etc. in itself minimise the output of project. Similarly, lack of awareness among the general masses about the vaccine and the vaccination process, limited advocacy for immunisation program, load shedding, parental refusal, absence of trainings for polio workers, despicable maintenance of cold chain, deficiency of public health experts and limited transportation facilities for polio workers restrict complete achievement of the project targets (Basharat & Shaikh, 2017; Islam, 2013; Naeem et al., 2012,). Moreover, long standing delay in payment of salaries and other allowances to the polio workers, silent polio refusals, ghost vaccinators,

absence of coordination among stakeholders and timely availability of vaccines are directly associated with polio eradication process and subsequently responsible for fractional success of polio eradication (Mahmood & Aftab, 2013, Mushtaq et al., 2010). It has also been observed that most of the EPI staff members are not satisfied with pay rates being paid.

In consonance to these issues, it is also believed that limited advocacy, campaigns, and shortage of means of communications stand as barriers in the way of successful intervention. The shortages of training institutions are also associated with the failure of the program as it results in an absence of basic information about oral polio vaccination among polio specialists and staff. Inadequate in-service training programs and capacity building of polio workers hinder the overall polio eradication process in the country (Mushtaq et al., 2010; Naeem et al., 2011; Shah et al., 2011).

Likewise, lack of enough number of public health experts and staffs is another vital side that is impeding polio eradication process. Lack of ownership and lack of inclusion of EPI workers in basic leadership also prolongs the polio eradication. Similarly, numerous studies also referred that polio workers cannot manage cold chain properly due to improper managements. Moreover, due to power outages and non airconditioned vehicles the vaccine does not stay effectual and viable. The absence of proper check and balance mechanism on one hand and unnecessary intervention of various implementing agencies on the other hand also restricts the achievements of the program (GPEI, 2011; Islam, 2013). Last but not the least the country's law and order situations, terrorist attacks on polio workers, regional disputes, geographical isolations, unfriendly and hostile mentality towards the workers and rejection of female polio workers in specific areas of the country could be blamed for failure in achieving the target of polio free Pakistan (Feten & Sherani, 2013; Mahmood & Aftab, 2013; Murakami, Kobayashi, Hachiya, Khan, Hassan, & Sakurada, 2014).

### **3. Research Methodology**

#### **3.1. Universe of Study**

The study in hand was conducted in Tehsil Katlang of District Mardan, KP, Pakistan. Tehsil Katlang as study universe was selected through purposively. The selection of the study universe is justified in following manner. Polio workers face problems in polio campaign and eradication process at Tehsil Katlang. Various anti-polio rumours were prevalent among the masses that resulted in refusal to polio vaccination. Some areas of Tehsil Katlang are rural with low literacy where some people of the area have less knowledge about polio campaign and importance of eradication process.' That is why Tehsil Katlang is considered suitable and logical this study.

#### **3.2. Sample Size and Sampling technique**

200 respondents were selected as a sample size. Sample size was determined through Sekaran's magic table. Proportionate stratified random sampling technique was used for this research as the respondents as there were various strata and population unequal too. It minimizes chances of over or underrepresentation (Bhushan and Asthana, 2007). Therefore, it was the deemed most appropriate one for this study. The formula is given as under:

$NI = Ni * n / N$  (Chaudhry and Kamal, 1996); where

NI = No of sampled respondents in each stratum

Ni= No of strata in the study area

N= Total population

n= Total sample size

Total population/ employees 434

Sample size by Sekaran 200

Category	No. of employees in stratum	No. of employees chosen
L.H.V.	230	106
L.H.S.	11	5
E.P.I. Technicians	17	8
In charge B.H.Us	10	5
Area in charge	42	19
Social workers	100	45
UNICEF/WHO and GAVI	24	12
Total	434	200

### 3.3. Research Instrument

Keeping in view objectives of the study and educational status of employees, questionnaire was used as a tool of data collection. A Likert scale questionnaire was developed with the help of the literature review. Questionnaire covered managerial and operational factors (independent variable) and polio eradication process (dependent variable). The first draft of the questionnaire was discussed with the experts of the field for its content validity which was improved accordingly.

### 3.4. Data Analysis

Data analysis is the examining, tabulating, categorizing, and recombining the evidences to address the initial propositions of the study (Leedy, 1993). The collected data was analysed through statistical package for social sciences (SPSS-20). Chi square test was used for measuring the association between variables under study. Chi-square ( $\chi^2$ ) test was used to test the hypothetical association between independent and dependent variables. The formula of Chi-square is noted as is outlined by Tai (1978).

$$X_{obs}^2 = \sum_{rj=1} \sum_{ck=1} \frac{(o_{jk} - \sum jk)^2}{\sum jk} \quad (I)$$

## 4. Results and Discussions

The managerial and operational factors with polio eradication are restricted to certain statements like availability of vaccines for children and maintenance of cold chain. Furthermore, load shedding, transportation facilities and accessibility of employees to every area are also considered for investigation. Similarly, trainings opportunities for employees, polio staff deficiency, employees' satisfaction from salary and resource allocation in program are also investigated. Moreover, unnecessary bureaucratic influences, week planned

monitoring and evaluation of national immunisation days (NIDs) and coordination among various preventive programs and security threats to polio workers are properly examined. All the mentioned factors are cross tabulated to know its association with dependent variable.

Table-3 shows the relationship of managerial and operational factors with polio eradication process. The results show a non-significant ( $P=0.395$ ) association between an in-time availability of vaccines to the EPI workers and polio eradication process. The reason for non-significant association is that in targeted area, vaccine is available in time to the respondents and hence it may not have affected vaccination. The findings of this study are in contrast with results of Naeem et al., (2011); Islam (2013); Shah et al., (2011) which reported that lack of in time availability of vaccines is a major cause of non eradication of polio it is strongly linked with polio eradication process.

In contrast, a highly significant association ( $P=0.000$ ) is identified between maintenance of cold chain and polio eradication process. The strength and efficacy of vaccines is only assured through the process of cold chain. In this process vaccines are kept in a temperature from the time of its manufacturing until their utilisation. However, these results deduced that proper cold chain maintenance is not available in the area that is hindering polio eradication process in the target area. That usually these vaccines are kept in small boxes within the ice. However, the population of the area is scattered. The facility of electricity is also not available to each part of the target area. Similarly, the area is facing severe problem of load shedding for the last ten years. Moreover, mostly EPI workers are using public transport where there is no facility of air-conditioning. Such associated factors may hinder the process of maintaining cold chains. These findings are in consonance to findings of Mushtaq et al., (2010) and Naeem et al., (2011) which concluded that cold chain is significantly linked with polio eradication and play vital role in the success of vaccination process.

Contrarily, a non-significant relationship ( $P=0.938$ ) is determined between load shedding and polio eradication process. It is an evident fact that load shedding is an existential problem in Pakistan. The maintenance of cold chain is directly dependent upon the electricity and level of load shedding. Though, some of the health institutions in the study universe may have an alternate source of electricity like generators that could ensure maintenance of cold chain within the health institutions. However, such alternate source of energy may not be available outside of the basic health units. This result is contradictory to the findings of Islam (2013) which reported a strong link of load shedding with polio eradication.

The study results revealed a significant association ( $P=0.005$ ) between the lack of transportation facility to polio workers and polio eradication process. Quick and convenient movement of the polio workers is dependent upon the available transportation facilities. Provision of proper transportation can increase and ensure the outreach of EPI workers to far flung areas of the country and hence polio can be eradicated. However, these results concluded the shortage of transport facilities affect performance of polio workers. It might be the reason that neither the state authorities are able to provide reasonable transportation facilities to polio workers nor their salaries are capable to avail suitable transportation. That is why they are usually dependent on public transportation; this not only reduce their productivity but also affects the overall process of maintaining cold chain. Similarly, some parts of the country also remain out of the reach of EPI workers. These findings are in consonance to previous studies like Arooj, Ali, Baber, Abbasi, & Ali, (2013); Islam (2013) and Shah et al., (2011) which reported that transportation facility is strongly linked with outreach of polio vaccination and

hence polio eradication. Cited studies further highlight that non-provision of transportation facility is detrimental for eradication of polio.

The study results further contended a highly significant association ( $P=0.000$ ) between proper training of polio workers and polio eradication process. Success of a project is dependent upon skills development of the concerned staff that could only be achieved through education, awareness, and proper training. Provisions of proper training ensure smooth running of activities and accomplishment of goals. It could be assumed that failure of the state authorities in polio eradication might be the result of such facilities that are required but not available to polio workers and official. These findings are in line with previous studies conducted by Khan & Qazi (2013), and Kazi, Khalid & Kazi (2014) which ascertained the link of number of employees and proper training with polio eradication process.

Moreover, a highly significant association ( $P=0.000$ ) is observed between worker's dissatisfaction from salaries and polio eradication process. Capitalistic economies are run through economic determination and material gains that could be achieved through enough number of available economic resources. The highly significant results of study might be the reason that the most relevant staffs linked with the process of polio eradication are not fully satisfied with their salaries that not only hinder their overall productivity but also lead towards goal failure. Moreover, such dissatisfaction of worker from wages may enhance turnover intentions among the employees. Further, it may result lack of interest in project activities and full devotion towards their duties and responsibilities. Keeping in view this scenario, Pakistan is still facing the polio problem that is affecting multitudes of children. These findings are analogous to Ansari, Khan & Khan (2007) and Mushtaq et al., (2010) which yielded almost similar findings about salary and polio eradication.

Contrary to the above, a non-significant association ( $P=0.414$ ) is observed between resource allocation in EPI and polio eradication process. Financial and human resources are equitably distributed in targeted union councils and it does not affect polio eradication process. The results further indicate a highly significant association ( $P=0.000$ ) between bureaucratic influences and polio eradication process. The Weberian concept of bureaucracy in its totality is criticised for red-tapism in its structure (Ritzer, 2010). This could similarly be applied to polio eradication process as well. Moreover, unnecessary intervention and influence by irrelevant government officials and politicians may affect the activities of polio workers and polio eradication initiative. These results extracted bureaucratic influences and innervations as causative factor of non-eradication of polio, they need to be overcome. These findings are in line with the studies of Ansari, Khan & Khan (2007) and Arooj, Ali, Baber, Abbasi, & Ali, (2013) which reported that GEPI faces problem due to needless bureaucratic influences.

Findings reveal that monitoring of NIDs and polio eradication process are non-significantly ( $P=0.786$ ) associated. The answer for this non-significant association is that the monitoring may be proper and hence may not affect polio eradication. Polio workers are monitored by area in-charge. Employees of UNICEF are also involved in monitoring activities. These findings are not in line with Islam, (2013) and Murakami et al., (2014) whose studies reported that proper monitoring is significantly associated with polio eradication process. A highly significant association ( $P=0.000$ ) reveal between lack of proper evaluation of NIDs campaign and polio eradication process. Evaluation is a process that is conducted after completion of project while in case of polio eradication it is conducted after each round.

Table 3: Association of Managerial and Operational Factors with Polio Eradication

Statement	Attitudes	Polio Eradication Process			Total	Statistics
		Yes	No	Uncertain		
Timely availability of vaccines to EPI worker	Yes	185(92.5%)	5(2.5%)	3 (1.5)	193 ( 96.5)	$\chi^2 =4.080$ (0.395)
	No	5(2.5%)	1(0.5%)	0	6 (3.0%)	
	Uncertain	1(0.5%)	0	0	1(0.5 %)	
Maintenance of cold chain	Yes	176(88%)	6(3.0%)	0	182 (91 %)	$\chi^2 =92.176$ (0.000)
	No	14(7%)	0	1( 0.55)	15 (7.5%)	
	Uncertain	1(0.5%)	0	2(1%)	3(1.5%)	
Load shedding does not affect maintenance of cold chain	Yes	158(79%)	5(2.5%)	3 (1.5%)	166(83%)	$\chi^2 =0.800$ (0.938)
	No	28 ( 14 %)	1(0.5%)	0	29 (14.5%)	
	Uncertain	5 (2.5%)	0	0	5(2.5%)	
Lack of transportation facility to EPI staff	Yes	34(17%)	0	3(1.5%)	37(18.5%)	$\chi^2 =14.687$ (0.005)
	No	156((78%)	6(3%)	0	162(81%)	
	Uncertain	1(0.5%)	0	0	1(0.5%)	
Accessibility with reference to locality	Yes	156(78%)	1(0.5%)	3(1.5%)	160 (80%)	$\chi^2 =30.984$ (0.000)
	No	32(16%)	3(1.5%)	0	35(17.5%)	
	Uncertain	3(1.5%)	2(1)	0	5(2.5%)	
Proper training opportunities of polio workers	Yes	182 (91 %)	2 (1 %)	3(1.5%)	187(93.5%)	$\chi^2 =54.230$ (0.000)
	No	8(4%)	2 (1 %)	0	10 (5%)	
	Uncertain	1(0.5%)	2(1%)	0	3(1.5%)	
Lack/ deficiency of trained public health professionals	Yes	138(69%)	4(2 %)	0	142(71%)	$\chi^2 =40.116$ (0.000)
	No	51(25.5%)	0	3(1.5%)	54 (27%)	
	Uncertain	2( 1%)	2(1%)	0	4(2)	
Workers dissatisfaction from salaries	Yes	38(19%)	3(1.5%)	3(1.5)	44(22%)	$\chi^2 =46.494$ (0.000)
	No	151 (75 %)	1(0.5%)	0	152(76%)	
	Uncertain	2(1%)	2(1%)	0	4(2%)	
Timely payment of salaries	Yes	65(32.5%)	5(2.5%)	3(1.5%)	73(36.5%)	$\chi^2 =11.402$ (0.022)
	No	125(62.5%)	1(0.5%)	0	126(63%)	
	Uncertain	1(0.5%)	0	0	1(0.5%)	
You feel unnecessary bureaucratic influences in EPI	Yes	90 (45%)	1(0.5%)	0	91(45.5%)	$\chi^2 =22.667$ (0.000)
	No	91(45.5%)	2(1%)	3(1.5%)	96(48%)	
	Uncertain	10(5%)	3(1.5%)	0	13(6.5%)	
Proper monitoring of NIDs campaign	Yes	179(89.5%)	5(2.5%)	3(1.5%)	187(93.5%)	$\chi^2 =1.725$ (0.786)
	No	10(5%)	1(0.5%)	0	11(5.5%)	
	Uncertain	2(1%)	0	0	2(1%)	
Lack of proper evaluation of NIDs campaign	Yes	153(76.5%)	3(1.5%)	3(1.5%)	159(79.5%)	$\chi^2 =58.358$ (0.000)
	No	36(18%)	0	0	36(18%)	
	Uncertain	2(1%)	3(1.5%)	0	5(2.5%)	
Worse security conditions restrict access	Yes	159(79.5%)	3(1.5%)	3(1.5%)	165(82.5%)	$\chi^2 =17.616$ (.001)
	No	31(15.5%)	2(1%)	0	33(16.5%)	
	Uncertain	1(0.5%)	1(0.5%)	0	2(1%)	
workers refuse to continue their duties	Yes	174(87%)	4(2%)	0	178(89%)	$\chi^2 =31.028$ (.000)
	No	9(4.5%)	1(0.5%)	2(1%)	12(6%)	
	Uncertain	7(3.5%)	1(0.5%)	1(0.5%)	9(4.5%)	

Such step identifies lapses and non-coverage in NIDs and hence important step in polio eradication activities. The absence of proper evaluation process might be the result of the aforementioned associated factors highlighted in the argument regarding monitoring and these mainly includes less wages, lack of timely payment of salaries, and security related issues existing in the area. These findings are in line with Arooj et al., (2013) and Fetene & Sherani (2013), which stated that evaluation of NIDs is proper and it is important for the success of polio eradication activities.

The association of accessibility of polio workers in worse security with polio eradication process is found highly significant ( $P=0.000$ ). It is obvious that worse security condition affects routine life and polio eradication is not an exception. Worse security situation makes certain areas inaccessible to polio workers. The reasons of worse security condition may be due to the presence of militants or blood feuds in the locality. Militants may deem polio un-Islamic and do not allow polio workers to perform their duties. This inaccessibility leads to non-coverage and hence non-eradication of polio. The findings of this study are in line with findings of Khan & Qazi, (2013) and Mehmood & Aftab, (2013) which reported that worse law and order condition restricts the activities of polio workers.

The table further depicts that refusal to duties and polio eradication process are observed to have highly significant ( $P=0.000$ ) association. After attacks on polio workers in certain areas, polio workers refuse to continue their duties. It is difficult to perform duties in life threatening conditions. It is evident that if employees do not work then it is impossible to be successful in polio eradication initiative. The results are in line with findings of Fetene & Sherani, (2013) and Naeem et al., (2011) which reported that refusal to duties has greatly affected polio combating activities.

## 5. Conclusion

The study shows that polio workers face problems in maintenance of cold chain for vaccines. EPI and other related staffs are also facing the problem of transportation and accessibility due to which outreach to certain parts of the target is affected. It is also evident from findings polio eradication program is having deficiency of trained health professionals and other support staff. Further, neither polio workers were satisfied from their salaries. They also complained about delay in payment of NIDs remunerations. Lastly, polio workers felt threatened and security/law and order situation also create hurdles in their operational activities. The key suggestions of the study are that proper arrangements may be made for cold chain maintenance at every stage. Adequate and timely transportation facilities should be provided to workers. The number of trained public health professionals and support staff may be increased. Increase in salaries and timely payment of NIDs remuneration may be ensured. Security arrangements for polio workers may be enhanced.

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