

Eradication of Polio in Tribal Areas of Pakistan: A comparative analysis of the situation before and after the inclusion of Tribal areas into the Khyber Pukhtoon Khwa (KPK) province of Pakistan.

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Abstract

The study analyzes the eradication of polio in the tribal areas of Pakistan by employing a qualitative methodology for the collection of data and thematic analysis for subsequent analysis of the collected data. The data has been collected through a systematic literature review approach that includes the identification and review of scholarly articles that are relevant and credible in the context of the topic under consideration. It is analyzed that there are several factors that create barriers to the eradication of polio in the FATA region of Pakistan both before and after its inclusion into the Khyber Pukhtoon Khwa Province of the country. It is also found that a significant increase in the active cases of the polio virus has been experienced due to the Covid-19 pandemic because resources and efforts allocated to the polio eradication programs have significantly diverted towards halting the widespread of the Covid-19 pandemic internationally. Due to the Covid-19 pandemic's sensitivity, international agencies have suspended polio campaigns as of the beginning of 2020, which would cause a new wave of polio. Furthermore, the study has brought about several theoretical and practical implications and suggested that governments and other stakeholders need to take effective initiatives in order to eradicate polio from the tribal areas, especially through the initiation of programs to spread gross awareness among the general public of the country. In addition to that, certain limitations of the study are also highlighted, and recommendations are extended to future researchers to overcome these limitations in the future; for instance, future researchers should select multiple areas of Pakistan or more than one country as a sample to present more generalizable and replicable findings in the future.

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CHAPTER1: INTRODUCTION

1.1. Background

In the account of discussing the issues of Pakistan related to health, security, and social welfare, one prominent element which is in focus a lot in the last several years is related to the healthcare of the citizen of the state. In this regard various research and articles have been written via the systematic study of the previous literature, shedding light on the know and how of work and efforts puts into giving substantial health facilities to the citizen of Pakistan. One of the most prominent health issues associated with Pakistan in recent times continuing from the last two decades involves polio, hepatitis, dengue, COVID-19, hypertensive disorders, etc. Pakistan being a religious state and socially unstable along with economic suffering has always been vulnerable to providing the state with medical health necessities. The extremist nature of the citizens concerning religion, the socio-economic gap, and millions of displaced refugees settling in and around its border have created a vulnerable situation in eradicating polio from the country (Kamal, 2016). A research study conducted by Andrade and Hussain, (2018) inquires about and proposes the explicit and implicit factors that are threatening to derail the continuous efforts put forward after the year 1980 onward in the eradication of polio from the world. According to reports, it is evaluated that Pakistan has put strenuous effort after the year 2000 to derail the curse imposed upon humanity and the citizen of Pakistan by initiating more than 135 polio immunization campaigns across the world, aiming to eradicate the polio virus from the country and declaring it as a polio-free state.

Despite the continuous work and strategies build up in eradicating polio, Pakistan still is counted among the few countries that have a high ratio of polio as compared to other countries of the world (Bhutta, 2014). It is further reported that Pakistan is the largest reservoir of poliomyelitis

cases despite their hard work along with countries named Afghanistan and Nigeria. It is reported that in Pakistan, most cases are observed and recorded in the region of Federal Administered Tribal Areas (FATA), in the northwest of the country. It was a lawless and semi-autonomous region of the country previously, which was governed by tribal laws and customs showing a lack of accountability for the rule of law and government, refusing to benefit from the polio immunization vaccine (Roberts, 2012). It imposed a continuous threat upon the country and the world in outbreaking the polio virus again in the world, due to the political, religious, and economic factors that influenced the minds of the common tribes residing in this area. However, the recent merger of these federally administered tribal areas into the well-settled Khyber Pukhtoon Khwa Province of the country has brought about hope of light among the international communities and local healthcare institutions to boost the process of polio eradication from the country.

1.2. The rationale of the study

The research study serves the purpose to address the worse situation of medical health facilities related to polio in the tribal region of Pakistan. It narrates and highlights the issue faced by polio health workers and teams during the polio immunization vaccine. Additionally, it serves to explain the changing and diverse behaviour of tribal leaders toward the polio immunization vaccine and their welcoming attitude towards the healthcare workers in the tribal area in recent years. The research study focuses on and narrates the effort of the world health organization, and non-governmental health organizations in eradicating the poliomyelitis virus from Pakistan and across a few underdeveloped countries of the world. An emphasis has been put forward on portraying the efforts that are taken to reduce the polio virus along with creating awareness among the local leaders and population, especially after the merger of FATA into the Khyber Pukhtoon Khwa Province of Pakistan. Limelight has been shed on the situation across the Federally

Administered Tribal Areas before and after their inclusion in Khyber Pakhtunkhwa province, plus the changes that aided in the reduction of poliovirus cases across the early lawless region. Along with highlighting the issue and worse situation that the region has undergone and the surveillance it has viewed in past, it sheds light upon the efforts of the government of Pakistan that has been carried in past and continues to do in the present to minimize the risk of outbreak from the region. The research study highlights the inconsistent behaviour in polio cases across the years from the 1980s to the present times and the sudden upheaval during the year 2014 (Naqvi et al., 2017).

The world is continuously abductured in the process to eradicate the poliomyelitis virus raising concerns in the mind of nations across the world to think about eradicating poliovirus from the globe by mutually assisting each other in this long journey. Such endemic diseases which outgrow across the different regions of the world needs to be addressed seriously and their eradication is only possible through mutual assistance and efforts. As those presently carried out by the World Health Organization (WHO), Global Polio Eradication Initiative (GPEI) on the global level and national polio eradicating campaigns in Pakistan and strategies like National Emergency Action Plan (NEAP) aim in eradicating polio from the Pakistan and world by the year 2023. The merger of FATA into Khyber Pukhtoon Khwa Province has been initiated in 2018; therefore, a limited number of studies have been conducted to explore the possible improvement brought about by the polio eradication programs in the former FATA region of the country (Ullah and Khan, 2022; Saood and Salahuddin, 2022). Similarly, the present study attempts to conduct a comparative analysis between the pre-merger and post-merger scenarios, which would help in developing a grounded understanding by exploring the facts and figures concerning the possible improvements brought about by the polio eradication program in the country, especially in the FATA region.

1.3. Aims and Objective

Despite the efforts, initiatives and diverse strategies Pakistan is unable to set itself free from the curse of the poliomyelitis virus therefore this study aims to analyze the “eradication of polio in tribal areas of Pakistan, while conducting a comparative analysis between the pre-merger and post-merger scenarios of Tribal areas into the Khyber Pukhtoon Khwa Province of the country”. Moreover, in order to address the presented aim of the study, the following objectives have been outlined:

- To explore the status of the polio eradication program in the federally administered tribal areas before its merger into the Kyber Pukhtoon Khwa Province of Pakistan.
- To review the possible hurdles faced by healthcare authorities and international organizations in bringing awareness among the people of former FATA before and after its merger into the Khyber Pukhtoon Khwa Province of Pakistan.
- To explore the possible improvements brought about by the government authorities and other related healthcare institutions in the polio eradication program in former FATA after its inclusion into the Khyber Pukhtoon Khwa Province of Pakistan.

1.4. Research Question

The research study aims to inquire questions regarding the changes and improvements brought about by the polio eradication program in the former FATA after its inclusion in the Khyber Pukhtoon Khwa Province of Pakistan by comparing and contrasting the situations before and after its inclusion into the Khyber Pukhtoon Khwa Province. The research study and literature review were carried out with the help of already stated records and present facts, the study aims to answer the following research question.

1. Does the upheaval of Poliovirus and its association with the lawlessness in the Federal Administered Tribal Area have some hidden association of truth?
2. How has lawlessness affected the polio immunization process in the region of Federally Administered Tribal Areas?
3. How have the myths and religious misconceptions regarding the status of the polio immunization vaccine affected the process of eradicating the endemic polio virus before and after the inclusion of FATA into the Khyber Pukhtoon Khwa Province of Pakistan?
4. Does the inclusion of a Federally Administered Tribal Area in the province of Khyber Pakhtunkhwa bring a positive effect in reducing and eradicating the number of polio cases from the region?

1.5. Significance of the Study

Eradication of polio from tribal areas of Pakistan serves to be an area of research for many researchers and scholars aiming to highlight the principle and underlying causes and factors that are restraining countries across the world in putting an end to the endemic disease. This research paper explores the role of political doctrine, ideological thinking, the role of war, and associated conflicts in the upheaval of poliovirus. The research study conducts a comparative analysis of statistical records and past literature and reflects upon the improvement made in the country in controlling the outbreaks across the agencies of FATA, especially after its inclusion into the Khyber Pukhtoon Khwa Province of Pakistan. It also highlights the economic and political challenges that are being faced by polio immunization programs in the last twenty-plus years. It has been also evaluated that poliovirus cases are mostly recorded in the region which is continuously involved in the war. Furthermore, it has been recorded that polio is recorded in high proportion in areas having high conflict rates and unstable situations (Akil and Ahmad, 2016). The

research studies that have examined and investigated the areas of FATA, proclaimed that instability, involvement of land in war, political doctrine, lack of access to far flanging areas, lack of infrastructure, and poor economic growth in these areas along with the lawlessness have promoted the outbreaks and reemergence in such diseases in Pakistan. However, very few studies have been conducted on the prevailing status and possible improvements brought about in the polio eradication program in FATA after its inclusion into the Khyber Pukhtoon Khwa Province of Pakistan (Ullah and Khan, 2022; Saood and Salahuddin, 2022). Therefore, the findings of the present study would be of greater significance for the policymakers and academicians concerning the possible improvements in the polio eradication program or the new challenges posed to this program after its inclusion into the Khyber Pukhtoon Khwa Province of Pakistan.

1.6. The organization of the Study

The remaining study comprises on following chapters, chapter 2 provides a review of the empirical and theoretical findings across the past literature on the subject, chapter 3 presents the research methodology and data collection procedure employed in the current study, chapter 4 presents the analysis and findings of the study, and finally, chapter 5 provides the summary and conclusion of the study.

CHAPTER 2: LITERATURE REVIEW

2.1. Introduction

A meticulous inquiry has been carried out in reviewing the Polio virus, exploring the past literature accessing 1 the condition of the virus in tribal areas before their inclusion in Khyber Pakhtun Khwa and after submerging them in the province. The literature review in this section highlights the effect of the virus on society, especially in tribal areas and far-flinging areas, which haven't been accessed, to rescue them from the curse of the virus. Moreover, the study emphasizes the effects of the polio virus on small children and young adults, handicapping them for life long, and making them feel less confident and distressed in society. The present explorative study also examines the use of brute force, violence, and sheer imposition of trivial concepts, not allowing the resident of tribal areas to have the necessary vaccination for contagious and paralytic polio. This section of the study also highlights the reason for the dispersal of poliovirus in the tribal region proposing facts, regarding mismanagement and misconception on part of awareness and statistical reviews of the people published by various organizations including governmental institutes and non-governmental organizations of the world. The study of the earlier literature proposes facts and findings regarding the effectiveness of different vaccines and additionally provides necessary information regarding the mutant variants, and diverse forms of polioviruses. This study highlights the chunks of polio cases and the improvement work carried out in eradicating the polio virus from the world as well as highlights the appreciated efforts of Pakistan, especially in Federal Administered Tribal Areas of the country before and after their merger in the province of Khyber Pakhtunkhwa. The literature review also focuses on the attempt, that has been carried out in eradicating the curse of poliovirus from society by combining efforts of the local population, provincial government, the state, additionally world health organizations in the global

sphere. Besides this, it also discusses the efforts of the World Health Organization (WHO) and Global Polio Eradication Initiative (GPEI) and their declared strategies for future years. At last, this chapter highlights the effort of the Pakistan Health organization and acknowledges their programs like the National Emergency Action Plan (NEAP) for eradicating polio from the country till the year 2023.

2.2. Poliovirus

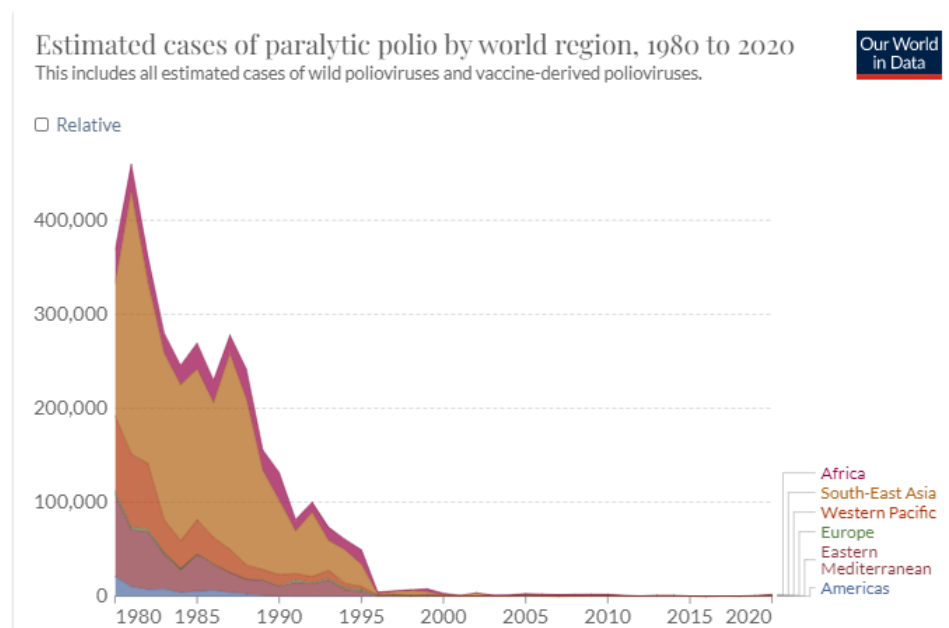
The discussion on the nature of the polio virus is evaluated by Mehndiratta et al., (2014), who extended a verdict proclaiming that poliomyelitis belongs to the family Picornaviridae of the virus, a highly infectious disease, giving it traces back to ancient Egyptian times and carvings. Kabir and Afzal (2022), stated that the poliomyelitis virus is a biologically poised solitary RNA strand with a cover of protein capsid, and has three stereotype antigenic forms including, type 1, type 2, and type 3. Additionally, the research describes the activity of the virus, it gets attached to the 155 CDA PVR receptor cells, may stay dormant, or show infectious symptoms and observation in quick succession of time (Alam et al., 2021). The symptoms of the polio virus in society can range from mild to severe; moreover, the polio virus attack is categorized into three main types. Firstly, the abortive attack which is a very mild attack, secondly, the non-paralytic attack which is also marked as aseptic meningitis, thirdly, the paralytic attack which paralyzes body parts may be arms, legs, lower body parts, or upper body parts (Mehndiratta et al., 2014).

2.3. Poliovirus in Pakistan

In 1988 with the launch of the Global Polio Eradication Initiative, the number and ratio of poliomyelitis dropped to 99% significantly. In earlier times polio was considered one of the endemic diseases that has spread across 125 countries of the world, along 5 distinct continents, paralyzing most of the human race below 5 years including children. In the 1980s and 1990s, the

non-governmental and governmental organizations of world health questioned exterminating the poliomyelitis virus from the world by the end of 2000. Additionally, scientists and biologists invented vaccines like IPV and OPV, which were successful in curing and preventing society on a comprehensive level from the curse of the polio virus (Kabir and Afzal, 2022). According to the research and facts proposed, by 2013, only 3 countries including Pakistan, Afghanistan, and Nigeria were left with the polio virus and were not able to set free themselves from the curse of a lifelong illness (Mehndiratta et al., 2014).

Figure 1: Paralytic polio cases across the world region from the year 1980 to 2020



Source: Dattani, Spooner, Ochmann, and Roser, (2017)

The given statistics affirm that in the year 1980, the world faced a continuous increase in the number of polio cases across all the regions, it was in the years after the 1980s and 1990s that the scientist and biologist of the world put their efforts in forming IPV and OPV to reduce the expansion of poliovirus cases across the globe.

In Pakistan, in recent years a lot of effort has been carried out to serve the cause of nobility in society, many health care workers have successfully guided the nation towards the eradication of polio from the country, but they have encountered certain hurdles in the meantime, on a certain occasion the healthcare personnel have lost their lives in rescuing the humanity from lethal contagious disease. According to the reports obtained from research studies, it is argued Pakistan is unsuccessful in eradicating itself from the curse of polio despite its continuous efforts, and it is continuously presenting hurdles in the journey of polio eradication (Albala, 2022). Additionally, the author also states that most of the cases reported in the world give their genetic roots in Pakistan. Furthermore, Roberts (2012) claims that Pakistan's tribal area under the title of federally administered tribal area residing close to the Afghanistan border is one of the serving habitats for poliovirus cases, in the South Asian region. It is further argued that despite Pakistan's continuous efforts, there are still major cities in Pakistan including Karachi, Peshawar, and Quetta, which are under the influence of poliovirus along with tribal areas, and reported several cases in recent years. Additionally, reports published declare 34 cases of polioviruses in different cities of Pakistan in the year 2014-2015 (Kabir and Afzal, 2022).

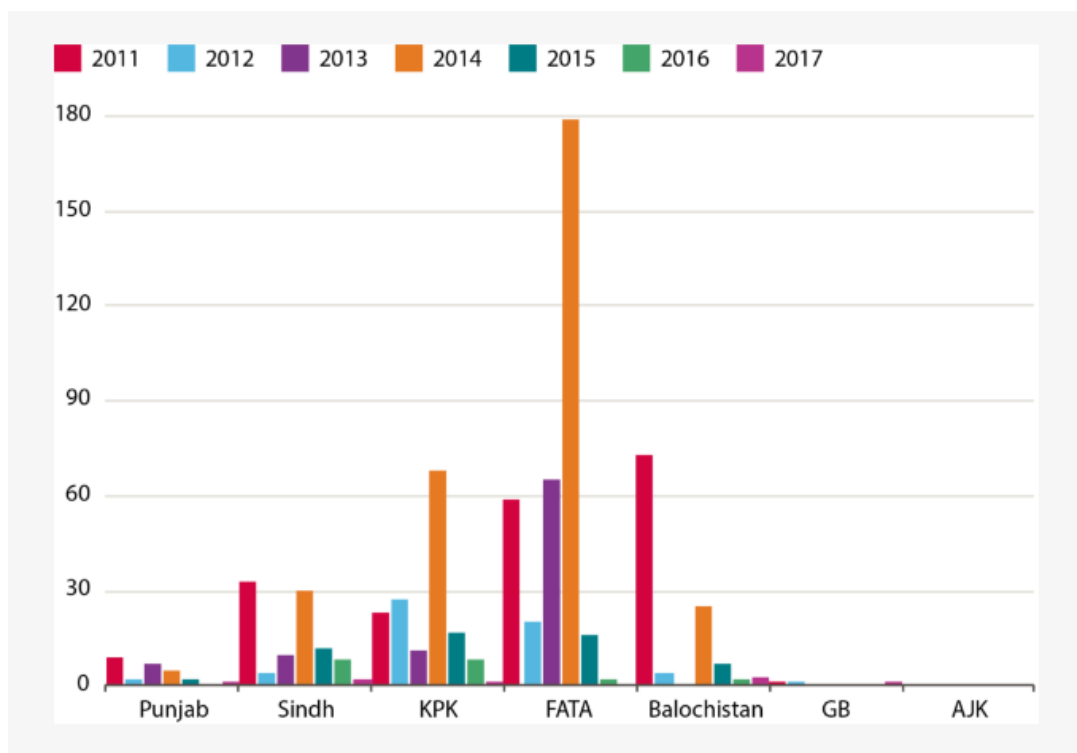
Pakistan is the most densely populated country in Asia, due to which it has to face many social issues related to awareness, education, employment, myths, supposition, false beliefs, and ill concepts related to poliovirus (Kabir and Afzal, 2022). Besides big industrial cities and metropolitan areas like Karachi, Quetta, Sukker, Peshawar, and Bajur region, there are also areas in Pakistan, which haven't understood the importance of the polio vaccine yet, and refuse to give their children the required doses now and then, it is mainly because of inaccessibility, lack of awareness, misconception, intricate reasons, lack of information, violence and many other cultural and tribal reason (Albala, 2022). Additionally, Vaccine is banned in a few tribal areas due to known

and unknown reason, a verdict was reported on 18 July 2012 made by a Taliban leader, declaring a ban on the vaccine in tribal areas controlled by them. The editorial narrates that it was done by sheer force and violence, several polio health workers have lost their lives due to Taliban attacks and threats imposed in these tribal areas ("Resistance to polio vaccination | The Express Tribune", 2012). The editorial states that Taliban leaders fear that intelligence agencies might implant spies in a disguised manner to operate US secret operations in the tribal areas administered by the Taliban.

Additionally, it is testified through reports that tribal areas of Pakistan near to Afghanistan border are also serving to be a habitat for the growing wild polio virus, which is deeply rooted in tribal areas of Pakistan and Afghanistan (Gulatee, 2012). Moreover, health organizations around the world have shown jeopardy in tribal areas of Pakistan and Afghanistan, claiming that the polio virus may break out in the world in new variants from these areas. The security issues, threats, and reason, imposed by various trivial and non-trivial organizations are playing their part to keep alive the polio virus, nourishing and accessing it to its mutant variant continuously over time. FATA is divided into 7 different regions to bring some order, uniformity, calmness, and law including the Bajur Agency, North Waziristan, Khyber Agency, Bara agency, and South Waziristan most renowned (Kamal, 2016). According to Kamal, (2016), it has been argued that the Global Polio Eradication Initiative (GPEI) has set a high budget of 5.5 billion dollars in an attempt to eradicate all sorts of viral health problems in Pakistan, the reports showed that it aimed to vaccinate 250 million children in Pakistan with the help of health care workers, who would go door to door to vaccinate children below 5 years. A research survey was carried out in Federal administered tribal areas intending to evaluate the possibility of people attaining the vaccination offered by a polio health worker and government, the research declared astonishing numbers and

results with only 25% of the local inhabitants trusting polio health workers and got benefited from the vaccine (Hussain et al., 2016). Moreover, Alexander et al., (2014) stated that the negative attitude build up in the minds of the residents of tribal areas and KPK is due to the misconception regarding the polio eradication campaign as they believe that it is foreign propaganda against them, and contains Haram composition in the vaccine which are prohibited in Islam. It was during such circumstances and unwanted times the number of polioviruses experience a significant upheaval in federally administered tribal areas in the year 2014.

Figure 2: Annual cases reported in FATA, and other provinces across different years.



Source: Chughtai and Tariq, (n.d.)

It has been reported by Mushtaq et al. (2015), that a few rebellious troops operating in the tribal region of the Afghanistan and Pakistan border have developed a wrong notion, supported by some religious preachers stating that it is a western plot against Muslims in the tribal region,

disguising them to implant some spies in the region and to commence operation like CIA performed in Abbottabad to kill Osama Bin Ladan, via fake Hepatitis campaign in 2011.

According to reports published on addressing and reviewing public reaction towards polio, it is evaluated that in federally administered tribal areas fewer children get the full dose of polio vaccine mainly because of lack of law and order situation in these areas, and further assisted by high birth rate and drop in oral polio vaccine (OPV) in these rebellious areas (Khalid and Akram, 2020). An extreme figure of poliovirus was recorded in tribal areas of North Waziristan after the local Paktuoon tribal Taliban leader named Hafiz Gul Bahadur imposed a ban on the polio vaccine, the number exceeded 300 as per reports (Hussain et al., 2016: "Afghanistan - Taliban gives nod to polio immunization in the south", 2010)). Additionally, other factors like target killing and kidnapping of polio health worker team aid these numbers to rise even more, already pen down facts like the area being governed by tribal leaders, absence of security forces, and absence of law and order in the region (Ghafoor and Sheikh, 2016; Yusufzai, 2016). The research highlights that lack of monitoring in tribal areas on the coast of the Pakistan and Afghanistan border, and not providing health organizations like UNICEF and WHO with proper discerning details and reports, also assists the growth of the unwanted virus, these organizations are not able to aid them with vaccination and inspection procedure because of security reason (Closser, 2012). Moreover, numerous natural factors aid in the nourishment of poliovirus cases over time, it includes the climate and geographical condition of Pakistan setting, it is narrated that oral facial transmission of poliomyelitis virus is more efficient in Pakistan's hot temperature supported by unhygienic conditions and poor sanitation and water treatment in densely populated metropolitan areas (Kamal, 2016). The outcome of such ongoing mishappening has increased the number of cases

reported, in tribal areas of Pakistan, troubling Pakistan with the endemicity of poliovirus, not being able to eradicate the endemic virus paralyzing the whole nation.

The core reason en-routed for eradicating poliovirus met failure due to certain facts, mainly including security reasons, mismanagement, and misinformation. Pakistan was among the few countries in the world that took the initiative to eradicate childhood diseases and provide them with a safe and healthy life and environment dating back to 1978, launching the EPI program (Alexander et al., 2014). Pakistan in its initial stages aims to provide better life and health to children and planned a program aiming to provide vaccination for 6 lethal contagious diseases which included polio at that time. Pakistan has been an active member in aiming to eradicate polio but still after its continuous efforts and spending huge sums of money is not able to set itself from the curse of viral infection, which seems quite unnatural. The core reason associated with an unnatural scenario regarding polio is always associated with the security situation in tribal areas and provinces of KPK and Balochistan, which haven't been accessed during the journey, the way they should be. The research studies propose facts stating that the situation in Pakistan was under control and it was near to ending the endemic of poliovirus with their continual efforts from 1994 to 2005, the author argues that a significant drop was seen during these areas and in the coming years up till 2010 (Chang et al., 2012). Additionally, Roberts (2012) reported the details, to support Chang's findings stating that the number of polio cases reported before 1980 was more than 3000, due to Pakistan's continuous efforts the number reduced to 198 in 2011, but again increased during the preceding years. After the incident of 9/11, the rivalry between Taliban leaders and the USA increased to an extreme level, resulting in the loss of lives and handicapping of numerous individuals in society by the use of sheer force and violence (CHAUDET, 2013). It was narrated that in the same years when the USA initiated drone attacks in tribal areas of Pakistan, a Taliban

leader named Hafiz Gul Bahadur, imposed a ban on polio vaccination (Hussain et al., 2016: "Afghanistan - Taliban gives nod to polio immunization in the south", 2010). Additionally, Chaudet (2013) declared that the USA was playing dual games with humanity and was not clear in its policies and strategies, it continuously engaged itself in drone attacks after the incident of 9/11 and in a parallel way was spending millions and trillions of money in curing humanity from polio and several lethal diseases by funding them in research projects, at the same instant was killing and curing humanity and acting as the sword of might for weaker states and organizations. These incidents and changing settings in the tribal areas of Pakistan nourished and stirred the polio cases along with a rise in war and terror in these areas. In the later years after 2011, there was a significant increase in Polio cases at a more rapid pace overtaking its neighbor India, stats show that from 2011 to 2022, KPK province recorded more polio cases as compared to other provinces of Pakistan ("Polio Cases Update 2020 | Across Pakistanu2019s Provinces", 2012).

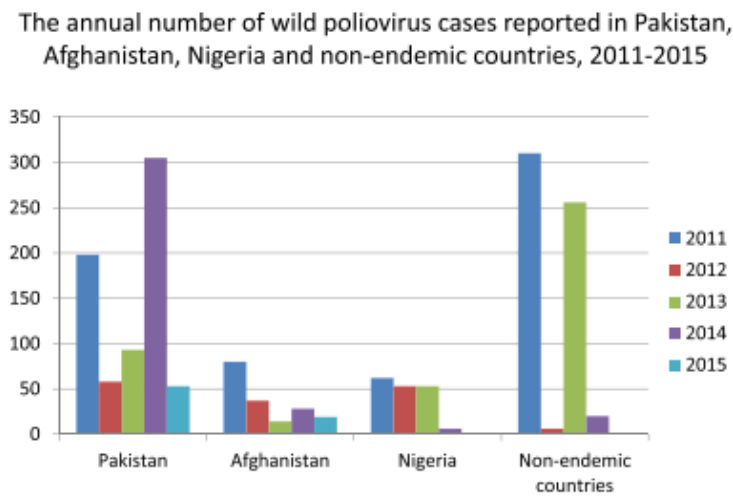
Among the other core reason involved for the high rate of poliovirus are mismanagement and misinformation on part of the strategy, recording numbers and details by governmental and non-governmental organizations related to healthcare facilities. Mohamed (2009), stated that mismanagement on part of the government proves to be one of the leading factors in the spreading of the polio virus, and further argued that numerous political leaders have initiated several ghost campaigns to help the nation and the world to eradicate polio, but these campaigns appear just for sake of getting political advantage and popularity, not doing any necessary work in controlling poliovirus and providing society with better health care opportunities. The authors further narrated that these organizations and movements need to be evaluated, and they must follow an accountability process, to serve humanity and society, not grasping them from their basic healthcare rights (Mushtaq et al., 2010). Additionally, it is narrated by the authors that healthcare

workers were not given payments and the necessary equipment to reach far-flung areas of countries and maintain the temperature of the polio vaccine, while the lack of interest and mismanagement proves on part of political leaders, proves to be the leading factors along with security reasons in tribal areas. A tremendous proportion of misconception and misinformation has been dispersed in tribal areas which makes, it difficult to collect and review the actual situations in the area, so that the required amount of healthcare facilities and vaccination doses can be provided to the people in remote areas (Ali et al., 2019).

2.4. Efforts in eradicating polio from Tribal areas of Pakistan and worldwide

The world has seen the worst situation over the decades and has been able to control them most effectively, scientist and biologists of the world have successfully proposed cures for several deadly diseases, which have perished the races of humanity. In the year 1988, with the initiative of the World Health Organization and Global Polio Eradication Initiative (GPEI), the world recognizes the need to eradicate polio on the global level (Habib et al., 2017).

Figure 3: Annual Cases reported in Pakistan, Afghanistan, Nigeria, and non-endemic countries.



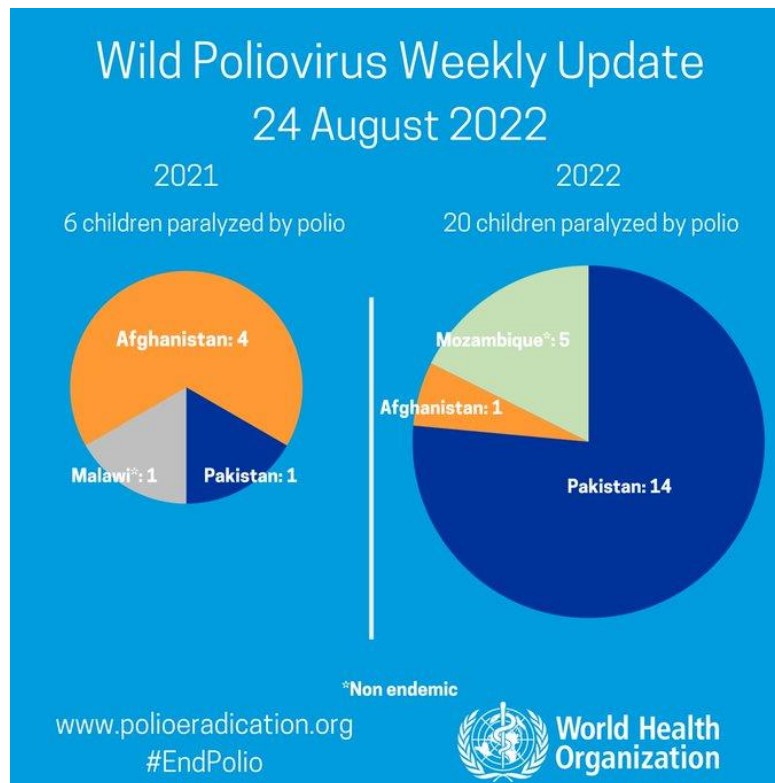
Source: Toole, (2016)

The authors additionally, reported that the number has reduced significantly from 350,000 in the year 1988 to less than 790 in year 2003 with a reduction in cases up to 99.7%, further it was reported that these cases were only viewed in areas of Afghanistan, India, Nigeria, and Pakistan. Furthermore, it was declared that by the year 2011, only one country was left with the highest number of cases i.e., Pakistan reported a high number of 144 cases, mostly reported in tribal areas (Manya and Qazi, 2015). Pakistan has pulled a lot of effort into eradicating polio from the world since 1978 but hasn't succeeded yet due to some trivial reasons found in far-flinging areas, presenting continuous hurdles to the good cause (Alexander et al., 2014). Pakistan polio management organization published its reports declaring that the number of cases has been reduced from 20,000 reported in 1980 to just 28 cases in the year 2005, furthermore in the year 2016 only 20, in 2017, 8 cases, in 2021 only 1 case of poliovirus was reported ("Polio Cases Update 2020 | Across Pakistanu2019s Provinces", 2020). Despite, Pakistan putting in so much labour and effort still most dangerous and mutant variants of polio have been found in Pakistan, it was reported that the most complex variant of poliomyelitis virus was found in the year 2014, during this wave 87% of the cases were found in Federal administered tribal area of Pakistan ("Polio Cases Update 2020 | Across Pakistanu2019s Provinces", 2020: Mushtaq et al., 2015)

Pakistan has launched its campaign in 1978 by inaugurating, the Pakistan Expanded Program on Immunisation (EPI) right after the World Health Organization (WHO) launched its EPI program in 1974 (Keja, 1988). Owais et al. (2013), declared that Pakistan has run more than 110 campaigns across the country to enhance immunization of the Pakistani children and society. The author further declared that with the running campaign across the country, Pakistan was successful in covering around 90% of the total geographical area, and 10% of Federal Administered Tribal Areas were left untouched. To bring law and order, the tribal areas were

merged into the province of Khyber Pakhtunkhwa, and last year in 2022, not a single case was reported in the tribal areas of Pakistan, which was a great achievement on part of the government (Shafique et al., 2021). Additionally, another important element that aided in controlling the polio virus in tribal areas was the fatwa declared by prominent Islamic leaders including the OIC, the National Islamic Advisory Group of Pakistan, and the Islamic Development Bank, stating that it is permissible and comes under the Islamic Shariat injunctions, so there is no harm in giving polio drops to children ("International Ulama Conference on Polio Eradication 2014.pdf | HPSIU PHKH", 2014). The polio eradication program of Pakistan is monitored and inspected under International scrutiny, mainly of its geographical position and importance in assessing countries with seaports and airports providing them with easy paths in trade.

Figure 4: WHO stats for August 2021 and 2022



Source: O'Leary, (2022)

Furthermore, World Health Organization (WHO), aims in eradicating the poliovirus from the world permanently, WHO has declared 5 regions of the world free from the poliomyelitis curse, the only regions left with the curse of polio in South Asia include Afghanistan, India, Pakistan, and Nigeria. Additionally, WHO reports of 2021 declared that few wild cases of poliovirus type 1 were reported in areas of Afghanistan and Pakistan, among the only few countries left with the endemicity of viral disease (Director-General WHO, 2022). According to WHO reports published on behalf of GPEI, it declares that the world is required to strictly adopt certain policies to permanently end the endemicity of poliovirus in the world. Among the key findings of the ‘Polio eradication strategy 2022–2026: delivering on a promise, it is argued that the world needs to implant accountability in the battle against polio and has to express a state of emergency to enhance the will of political leaders of countries like Afghanistan and Pakistan to pull some serious efforts (WHO, 2021). Secondly, it emphasizes creating awareness in minds of the society, becoming an acceptor of the vaccine, and benefiting themselves and humanity in evading the risk of the polio virus. Thirdly, ‘Polio eradicating strategy 2022–2026: delivering on a promise’ aims to enhance frontline healthcare workers and adopt the modernist approach while performing campaign operations in tribal and remote areas of polio-affected regions and around the globe. Fourthly, it focuses on creating expedited partnerships between countries to achieve better results and additionally focuses on providing better inspection and surveillance to identify polio-affected areas and individuals residing in those remote geographical settings. Pakistan has also taken initiatives like the National Emergency Action Plan (NEAP) aiming to eradicate polio in quick succession of time from all the metropolitan regions and tribal areas lying on the coast of the Pakistan-Afghanistan border (Tarar, 2022). According to NEAP 2021-2023, it is the strategy of the present government is to eradicate all forms of mutant poliomyelitis virus from Pakistan by the end of

2023 (Sultan, 2022). Tarar (2022), stated that the dream of eradicating polio initiated in the year 1978 is near being achieved, less than 1% left is now troubling Pakistan and Afghanistan by presenting them with hurdles like weak infrastructure, lack of resources, the conflict between the political and rebellious organizations, and poor health setup.

2.5. Conclusion

Based on the above discussion it is concluded that PolioMyelitis is an endemic disease, that has paralyzed humanity in the past, it has affected the world, losing precious human life, making them feel disgraced and investing huge sums of money in polio eradicating campaigns. The literature review declares the worst situation in tribal and metropolitan areas of Pakistan, and in countries like Afghanistan, India, and Nigeria, how continuous efforts carried on in these regions have reduced the poliovirus, diminishing the curse of polio and setting the world free from it in near future. The review of prior studies also emphasizes literacy rate, awareness, and guidance, which could prove effective in eradicating polio from the world and several alike diseases. Additionally, it supplies a brief history of the polio campaign carried out in Pakistan and especially in Federal Administered Tribal Areas (FATA), the role of tribal Taliban leaders and the USA, imposing a ban on the polio vaccine and spreading misconception and misinformation among the residents of these areas regarding the Halal status of polio vaccine. Lastly, it highlights the efforts and strategies adopted by World Health Organization (WHO), Global Polio Eradication Initiative (GPEI), and National Emergency Action Plan (NEAP) with aiming to eradicate polio from Pakistan by 2023.

CHAPTER 3: RESEARCH METHODOLOGY

3.1. Introduction

This chapter aims to discuss the research methodology adopted in the current study. For the purpose of collection of data, a qualitative technique is particularly ideal for the retrieval and evaluation of data on the issue under consideration because the study's objective is highly subjective in origin. Furthermore, by learning about the patterns of meanings and interactions between many aspects of the subject matter being studied, the qualitative methodology enables getting a detailed insight into the issue (Sofaer, 2002). The fact that the issue being evaluated in the present study is one that is still developing and has seen a number of transformations in the past makes desktop-based research using a methodical literature review technique the most appropriate method for carrying out the evaluation. First of all, this chapter discusses the research philosophy, then explains the research approaches, and afterward provides an overview of the research methodology. Furthermore, the chapter also explains the systematic literature review approach in detail, and finally presents the ethical considerations in section 3.5.

3.2. Research Philosophy

According to Thorpe and Lowe (1999), research philosophy is an important element since it aids researchers in selecting the best research design to use and its potential mechanisms. Furthermore, it is crucial to comprehend the various research philosophies since the key concepts they contain will affect the choice of research methodologies and research process. The word paradigm is derived from the Greek word "paradeigma," which means pattern, and Kuhn (1970) refers to the term "paradigm" as a research methodology that incorporates a set of shared values, premises, and ideas about the purpose, nature, and research conduct as well as according to Olsen, (2019) a paradigm is also a collection of ideas, presumptions, and principles in academia

and science. In addition, Gill and Johnson, (2010), and Saunders et al., (2009) stated that ontology and epistemology are two considerable philosophical subdisciplines for academics in the study of human behavior, whereas a person's worldview is relevant to ontology and epistemological elements as well as it affects how the perceived importance of different components of reality changes appropriately.

Moreover, Denzin and Lincoln, (1998) posit that ontology describes how things actually are and function and for ontology to function as a philosophy, the diversity of phenomena is a crucial concern, in simple words ontology is the study of what is, what it looks like, what pieces make it up, and how those parts interact. Additionally, Trochim, (2000) stated that the term "epistemology" derives from the Greek word "episteme," which means "knowing" in other words the philosophy of knowledge is epistemology, as well as the procedures for obtaining information and creating new theories or models, are included in epistemology. According to Grix, (2002) epistemology is classified into two types namely, positivism, and interpretivism, the author further stated that an epistemological perspective known as interpretivism is founded on the idea that there needs to be a plan in place to account for the differences between natural science objects and individuals while a perspective on epistemology known as positivism encourages the use of natural science techniques in fields other than social reality studies. As per Jones (2007), reality is objective, universal, and quantifiable from a positivistic point of view and this presents the idea that reality is quantifiable and predictable, irrespective of the experience. Moreover, for the purpose of completion of the present evaluation, an interpretivism philosophical method is used because it views the universe as a subjective reality and holds that learning about the world develops through subjective confrontations as a process of ongoing

understanding and learning, which is found high in consideration of the nature of the present study and exploration required in the current context.

3.3. Research Approach

The data collection and research design are part of the research strategy, which is also called the inquiry technique. Additionally, in terms of the research design component, the inductive method and the deductive approach are the two categories under which the research approach is divided. Furthermore, as per Saunders et al. (2009), the inductive strategy is used when scholars are attempting to gather information and formulate a theory as a finding of data testing, meanwhile, the deductive strategy is employed when the research is aimed at developing hypotheses via investigating and acquiring theoretical concepts while developing a research strategy to assess the hypotheses. In addition, another considerable distinction between inductive and deductive approaches is that deductive strategies progress from broader to more particular, meanwhile, inductive approaches proceed from particular to broader generalizations and theories. According to Saunders et al., (2009) it is crucial to link the research techniques with research philosophies, as the deductive and inductive research approaches are related to positivism and interpretivism research philosophies respectively because the data retrieved under the deductive and inductive strategies are carried out via quantitative and qualitative research methodologies, which are discussed in detail in the following section. Additionally, on the basis of the research philosophy employed in this study as well as based on the nature of the study, the inductive research approach was adopted as this strategy permits the current study to gain an in-depth understanding of the subject, which in turn aided in carrying out a thorough and in-depth investigation of the subject.

3.4. Research Methodology

The strategy used to obtain the information is a significant part of the overall approach to meet the aims and objectives, the data gathering sources identification, and any constraint consideration. Moreover, Saunders et al., (2009) categorized research techniques into ethnography, survey, action research, experiment, grounded theory, archival research, and case study. Additionally, the author argued that selecting a research strategy based on research questions, research philosophy, aims and objectives, and the extent of given knowledge is an important part of developing an efficient research method. Furthermore, research methods are classified into quantitative, qualitative, and mixed research methods, qualitative research is also called exploratory research which aims to fully understand opinions, motives, and reasons. It develops new perspectives or hypotheses for quantitative research and offers answers to challenges, whereas it also attempts to reveal patterns in beliefs and viewpoints. Since semi-structured or unstructured strategies are used, quantitative data collection techniques are not appropriate in the present context; therefore, a number of alternative techniques are available, including individual interviews, group talks, and observation/participation that was taken into account while selecting an appropriate methodological approach for the present study (Creswell, 2014).

It is provided that analyzing the gathered statistical data with the aid of mathematical techniques is essential to quantitative research, whereas the key components of this methodology are testing hypotheses and theories. To put it another way, the expectations are clearly stated before being compared to the facts (Wellington and Szczerbiski, 2007), and in order to test unbiased theories, it is necessary to look at the relationships between the variables as well as these variables can be monitored by particular tools, and then data can be analyzed and

interpreted using various statistical tools. Indeed, researchers that employ this method of research have assumptions on the deductive testing of the applied hypotheses, avoiding prejudice, preparing for alternate explanations, and summarising the findings (Creswell, 2014). Moreover, there is another research method known as mixed methods research, which is a mixture of both quantitative and qualitative methods; therefore, conducting research through this method has advantages over both qualitative and quantitative research that go beyond simply gathering and analyzing both forms of data rather an evaluation of the collected data is also performed thoroughly and exploratory under this methodology, which in turn strengthen the analysis and enrich the conclusion reached (Creswell and Clark, 2017).

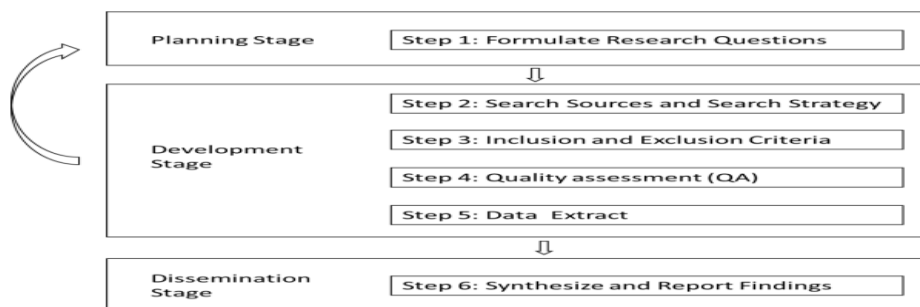
3.5. Systematic Literature Review

The most popular and well-accepted method for carrying out qualitative desktop-based assessments is a systematic literature review (SLR) (Kitchenham, 2007). It necessitates that the researcher uses a systematic methodical approach to locate, evaluate, and contextualize the prior research that has been conducted on the topic under consideration. Furthermore, for the purpose of analysis of the collected qualitative information, the study has employed a thematic analysis approach to help evaluate and interpret the collected data. This method calls for the recognition of common patterns or themes of meanings within the previously reviewed literature regarding the subject. A systematic literature review is a rigorous, thorough, and open process that aids researchers in assessing any topic of interest and arriving at a more knowledgeable and consistent conclusion (Munn et al., 2018). In addition, by fully grasping several aspects of the earlier literature, this method also aids in identifying any research gaps within prior studies, allowing future researchers to conduct more in-depth studies and get a better understanding of the topic at hand (Unterkalmsteiner et al., 2012).

A systematic literature review approach, as defined by Kitchenham (2007), consists of three primary phases: planning, execution, and reporting, and a few subcategories have been created within these three phases on the basis of the applicable procedures employed. In order to arrive at highly trustworthy and well-informed conclusions, Xiao, Watson, and colleagues (2019) defined the eight basic stages that must be followed in various types of systematic literature reviews, whereas formulating the research problem is the first step in this process, followed by establishing and testing the review techniques, literature searching, evaluating quality, screening for inclusion, retrieving and analyzing data, and synthesizing the results. Additionally, to achieve a thorough grasp of the subject matter, it is significant to keep in mind that the literature review process can be iterative, which means that every step must be followed over each study that was identified. In addition, a review of systematic literature strategy can only be useful if the research project includes clear objectives and established methods for evaluation and this will permit the scholars to gain a more in-depth comprehension of the topic and establish a clear understanding of each aspect to avoid confusion.

Moreover, the (i) planning, (ii) development, and (iii) dissemination stages of performing a systematic literature review, as well as the specific steps used during the given study in each of these stages, are graphically depicted in figure 1 below.

Figure 5: Snapshot of the Stages involved in the Chosen Methodology



3.5.1. Planning Stage

The first and most important step in the process of a systematic literature review is to recognize the necessity for conducting research or reviewing previous publications for the mentioned purpose; therefore, scholars need to construct the essential protocols for conducting the review and describe the pertinent research questions for this purpose (Tawfik et al., 2019). The current study intends to assess the body of prior literature about polio eradication in the pre and post-inclusion scenario of FATA in the Khyber Pukhtoon Khwa Province of Pakistan, and for this purpose, the research question presented in chapter 1 has been formulated with the intention of identifying suitable review protocols. In addition, the research procedures are created based on the specified topics, and they mostly concentrate on the evaluation of prior literature with regard to the historical evolution of polio, its current status, and future development prospects. Therefore, in order to find a common pattern of meanings or themes relating to the eradication of polio in the present, past, and future, especially concerning the pre- and post-inclusion status of FATA in Khyber Pukhtoon Khwa Province of Pakistan, the scholar specifically investigated the prior literature pertaining to these particular areas of interest.

3.5.2. Development Stage

3.5.2.1. Search sources and strategy

While searching for relevant earlier studies on the subject, the search strategy was designed to incorporate the key phrases e.g., FATA, polio eradication, polio vaccination, etc. The search method was based on searching the journals that have published research papers on polio eradication in FATA and its interaction with the users in order to ensure the selection of high-quality primary papers and collect reliable data to address the research objectives. The researcher has also used two-level verification to confirm the validity and legitimacy of the information and

sources employed in the execution of the given study. These authentications include cross-checking the authors' qualifications to ensure that they are relevant to the field of study in question and checking the source's credibility, which was assured by choosing only articles that are published in reputable journals and peer-reviewed sources. In addition, several databases and sources were searched to find the most relevant literature on the subject that was being evaluated, whereas these sources and databases include Google Scholar, Taylor, and Francis, Elsevier, Springer Link, the Ministry of National Health Services, health departments KPK, Bill and Melinda Gates Foundation, Asian Development Bank, UNDP, WHO, World Bank, etc. Finally, the aforementioned keywords were employed to locate pertinent literature on the subject of the evaluation as well as only findings that meet the inclusion criteria, as listed below, were taken into consideration.

3.5.2.2. Inclusion and exclusion criteria

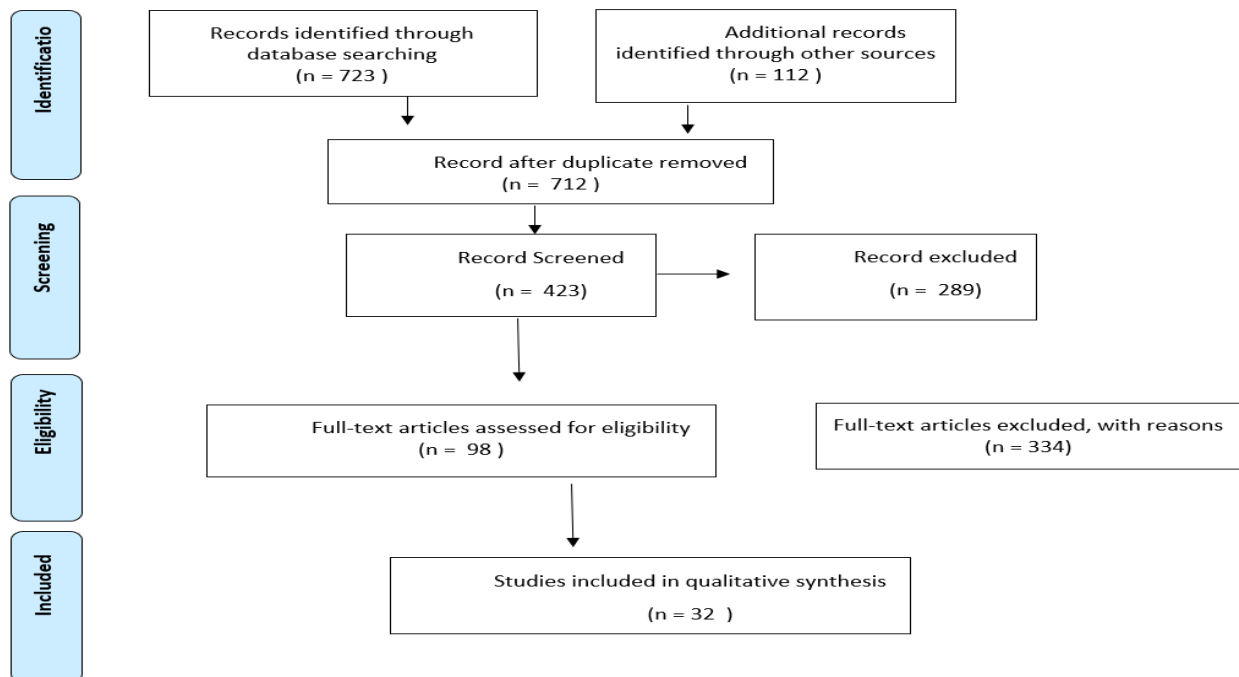
For the purpose of conducting a systematic literature review in the present paper, a total of 32 articles that were published between January 2010 and December 2021 were taken into consideration, and studies that presented firsthand information about national and international efforts to eradicate polio from FATA were considered. Furthermore, articles that were primarily published in the English language and reputable journals, newspapers, and official website reports, like that of WHO, and are peer-reviewed as well as those, which have discussed polio eradication-related obstacles and enablers have been taken into consideration. Kitchenham and Charters (2007) stated that before making a final decision, each article should be examined three times using the PRISMA-ScR method, looking for certain keywords and the applicability of the data presented in relation to the study in question. Therefore, the present study also adopted the PRISMA-ScR screening mechanism for reaching the final sample of 32 articles and reports that

were selected for performing the present systematic literature review. Furthermore, all such documents were excluded that don't fill the mentioned inclusion criteria, such as commentary pieces, editorials, opinion pieces, guidelines, analytic reviews, serological studies, and non-English publications.

3.5.2.3. *Quality assessment (QA)*

Researchers have made an attempt to include primarily publications that have used primary experimentation or evaluation as their methodology for completing the quality assessment since these studies typically provide highly dependable and pertinent information (Kitchenham,2007). Additionally, researchers have employed PRISMA-ScR as a technique for evaluating the quality of each source chosen for analysis and review in the current dissertation, and the screening procedure and the data gathered during the systematic literature review process are depicted in the following flow chart.

Figure 6: Studies Selected under Prisma-Scr Mechanism



3.5.2.3. Data extraction

The most crucial step in the process of a systematic review is the identification and retrieval of information, and for this purpose, the study has created a data-gathering form to ensure that all information is effectively collected and easily traceable in a subsequent independent audit trail (See appendix). In addition, this section's major goal was to appropriately record the information gleaned from the review using data extraction forms. Furthermore, each study had to be thoroughly scanned as part of this procedure, and relevant data had to be extracted using Microsoft Excel spreadsheets, while in doing so the present study has incorporated a number of aspects suggested by past data extraction techniques, including the research domain, research methodologies, theories, and polio eradication activities (Zeng and Gerritsen, 2014).

3.5.2.3. Dissemination Stage

In order to provide or extend an understandable and unambiguous meaning to the target audience, this stage entails a critical assessment of the outcomes produced throughout the review of systematic literature activity (Kraus et al., 2020). Castleberry Nolen, (2018) documented that the research studies usually employ a thematic analysis technique for the evaluation of several features discovered throughout the systematic literature review process. During the systematic literature analysis exercise, the scholar must discover the common patterns or themes of meaning, which are then given specific, individual codes. The researcher next looks for more evidence and justifications to focus the understanding on a particular feature, which is subsequently encoded with subthemes after the codes have been successfully assigned to common patterns of meanings or major themes (Walsh et al., 2019). In the end, potential connections between the themes are assessed, which provides the basis for additional evaluation

and establishing the study's outcomes summary, as well as the discussion that followed the findings of the study was aimed to validate them by logically contrasting and comparing the results of the present study with those of earlier evaluations that had been done on the issue under consideration.

3.6. Ethical Consideration

As ethical research is now a core value, it is the duty of every scholar to safeguard study participants. In addition to emphasizing the significance of choosing an acceptable research approach, the scholar must have taken ethical considerations into mind to avoid any unethical or immoral conduct. The importance of sustaining ethics throughout the whole research process has been highlighted by Card's (2016) study. In addition, it is the responsibility of the researcher to present actual facts and figures without manipulating the findings. Since in the present study secondary data was employed in order to avoid any unethical action, besides this, the study was considering all the moral values and ethical grounds throughout the selected research methodologies and approaches. In the same vein, the PRISMA Scr-Screening mechanism is used to screen all the sources in order to avoid weak validity and less credible articles. Furthermore, a systematic approach has been adopted for the collection of information and its subsequent analysis to avoid the potential chances of the exercise of the researcher's personal bias in the process of data collection and its subsequent analysis.

CHAPTER 4: FINDINGS AND DISCUSSION

The present study explores the measures taken for the eradication of polio in tribal areas of Pakistan through a comparative analysis of the situation before and after the inclusion of tribal areas into the Khyber Pukhtoon Khwa (KPK) province of Pakistan. The following sections contain an analysis of the collected information through a systematic literature review, along with the explanation of common themes or patterns found in the articles or selected studies as well as logical conclusions that have also been drawn from the characteristics or subthemes found against every primary Theme. It also contains a critical discussion to evaluate the validity of the findings of the present study by comparing and contrasting these findings with the findings obtained from earlier evaluations.

4.1. Search Strategy and PRISMA-SCR Results

In the present study, pertinent studies are searched, the key phrases are used which are explained in detail in section 3.4 and the findings of screening of the PRISMA-SCR framework are provided in Figure 6, which posit that a total of 723 articles were initially identified through initial database searches, along with additional 112 articles identified using other sources. Out of these articles, 712 sources were selected after removing the duplicate articles, and then screening was performed on 423 articles, while 289 articles were excluded at this stage, which were removed due to not meeting the relevance criteria with the topic. Furthermore, out of 423 screened articles, 98 full-text articles were assessed for screening for further eligibility, while 334 full-text articles were excluded due to not meeting the eligibility criteria. Moreover, upon further screening of the 98 articles, finally, 32 articles were selected for the purpose of performing the final systematic literature review, and the remaining 66 articles were excluded

due to not meeting the inclusion criteria mentioned above, especially with regard to the credibility of the source selected.

4.2. Thematic Analysis

During the earlier studies' critical review and analysis concerning the measures taken for the eradication of polio in tribal areas before and after their inclusion into the Khyber Pukhtoon Khwa Province of Pakistan, certain common patterns of meaning or themes have been located, while specific codes are further attributed to these patterns or themes. Moreover, the outcomes of the thematic analysis performed on the selected studies are presented in table 1.

Table 1: Theme Codification

| Sr No. | Themes | Description | Code | Publications |
|--------|--|---|-------|---|
| 1 | Polio eradication campaign | Due to Pakistan's role as the primary contributor to the current global spread of the wild poliovirus, its polio eradication program has drawn attention from around the world. This is due to ongoing organizational and budgetary problems as well as ongoing insecurity and conflict, which have prevented successful immunization campaigns and SIAs from successfully reaching every part of the nation. | PEC | Kabir and Afzal, (2022); Mehndiratta et al., (2014); Albala, (2022); Roberts (2012); Gulatee, (2012); Kamal, (2016); Hussain et al., (2016); Alexander et al., (2014); Mushtaq et al. (2015); Khalid and Akram, (2020); Ghafoor and Sheikh, (2016); Yusufzai, (2016); Closser, (2012); Chang et al., (2012); Chaudet, (2013); Mohamed (2009); Mushtaq et al., (2010); Ali et al., (2019); "Afghanistan - Taliban gives nod to polio immunization in the south", (2010); |
| 2 | Pre and post-inclusion progress toward polio eradication | Numerous initiatives have been put in place since 1994 in an effort to eradicate polio. In addition, the Expanded Program on Immunization (EPI), which covered immunization against polio and other diseases, was introduced in Pakistan in 1978, as well as the Pakistan Polio Eradication Programme; however, was started as an independent programme in 1994 with assistance from the GPEI. Later, the government takes new initiatives including the national emergency action plan (NEAP) and the national | P&PPE | Kabir and Afzal, (2022); Mehndiratta et al., (2014); Albala, (2022); Roberts (2012); Gulatee, (2012); Kamal, (2016); Hussain et al., (2016); Alexander et al., (2014); Mushtaq et al. (2015); Habib et al., (2017); Many and Qazi, (2015); Owais et al. (2013); Shafique et al., (2021); Tarar, (2022); Sultan, |

| | | | | |
|---|---|--|-------|--|
| | | immunization support program (NISP) to eradicate polio. | | (2022); Director-General WHO, (2022) |
| 3 | Barriers toward polio eradication in tribal areas | Negative socioeconomic characteristics, such as poverty, illiteracy, and difficulties accessing community health and immunization services, are strongly correlated with low immunization completion in addition to conflicts. Beyond the aforementioned social, political, cultural, and religious, challenges, there are numerous more real-world obstacles to vaccination, such as fraudulent finger marking, problems with the cold chain, staffing issues, etc. | BPETA | Habib et al., (2017); Many and Qazi, (2015); Owais et al. (2013); Shafique et al., (2021); Tarar, (2022); Sultan, (2022); Director-General WHO, (2022); "International Ulama Conference on Polio Eradication 2014.pdf HPSIU PHKH", (2014); Keja, (1988); "Polio Cases Update 2020 Across Pakistan 2019s Provinces", (2020); Toole, (2016); "Afghanistan - Taliban gives nod to polio immunization in the south", (2010); Dattani, Spooner, Ochmann, and Roser, (2017); "Resistance to polio vaccination The Express Tribune", (2012) |

Three patterns or themes of common meanings linked to the topic under observation have been identified by the critical analysis of the earlier research papers, it is analyzed that the only two nations where poliovirus transmission has never ended are Pakistan and Afghanistan; even though, polio eradication projects in these countries have received funding from a wide range of donors, including national governments, corporate non-governmental/ organizations donors, and multisectoral collaborations, due to the widespread interest in eliminating polio. According to the report of the Pakistan polio eradication program (2019), the polio virus cases have exhibited a notable decline by up to 99% from the early 1990s, when there were about 20,000 instances of wild poliovirus documented in Pakistan and there are a lot of incidents among Pashto-speaking people (Ataullahjan et al., 2021). Furthermore, the advent of the COVID-19 pandemic has presented a new challenge to efforts to eradicate polio, and in April 2020, routine immunization

programs and polio vaccination campaigns were suspended throughout Pakistan in order to slow the spread of COVID-19.

4.2.1. Theme 1: Polio Eradication Campaign

Before the beginning of the Global Polio Eradication Initiative (GPEI) in 1988, poliomyelitis paralyzed and killed tens of thousands of people and there are three extremely contagious serotypes of polio, 1, 2, and 3 (Global Polio Eradication Initiative, 2021). In addition, the two main modes of horizontal transmission are oral-oral and face-oral, and the majority of diseases are spread by fecal-oral contacts, particularly in areas with inadequate sanitation and hygiene (Pakistan Polio Eradication Programme, 2019). Due to Pakistan's role as the primary cause of the current global spread of the wild poliovirus, the country's polio eradication operation has drawn attention from across the world; therefore, a number of initiatives have been taken to eradicate the poliovirus from the state and specifically from the tribal areas of Pakistan because this area was home to over 64% of all polio cases in Pakistan.

4.2.2. Theme 2: Pre and Post-Inclusion Progress Toward Polio Eradication

The Global Polio Eradication Initiative (GPEI) was initially started in 1988, with the aim of containment and eradication of all vaccine-related, wild, and epidemic polioviruses around the globe; however, in Pakistan the effort of polio eradication launched back in 1994 via the beginning of Pakistan Polio Eradication Programme (Ataullahjan et al., 2021), and this program is a private-public partnership supported by GPEI partners such as CDC, UNICEF, BMFG, and WHO, and led by the federal government. Besides this, the provincial government also launched different programs in 2014 and 2015 such as Sehat ka Insaf, Sehat Ka Ittihad, and the Khyber Pakhtunkhwa Immunization Support Project (KPISP) with the goal of eradicating polio in tribal and other areas of Khyber Pakhtunkhwa.

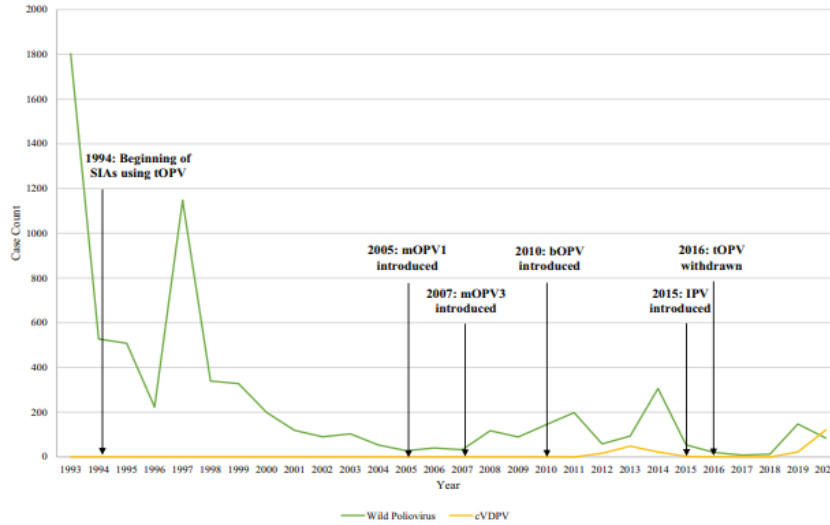
4.2.3. Barriers to polio eradication in tribal areas

There is a significant association between low immunization completion and negative religious, and socioeconomic factors as well as poverty, illiteracy, and polio virus eradication. Furthermore, the tribal areas have been considerably affected because of the war against terrorism and this region had been invaded by stateless characters. In addition, in process of immunization in tribal areas, religious fundamentalism is the main barrier because these religious clerics majorly hinder polio vaccination campaign implementation in some pockets of these areas (Ghafoor and Sheikh, 2016; Hussain; et al, 2016). Moreover, the covid-19 epidemic has had a considerable influence on the polio programs because resources and workforces are deployed to counter this novel disease and in this way, the campaign of mass immunization was suspended to reduce its spread.

4.3. Discussion

Polio is one of the major feared viruses of the twentieth century and consequently WHO started a worldwide initiative program in 1988 with the goal of eradicating polio (Ghafoor and Sheikh, 2016). In addition, polio is one of the few difficult problems Pakistan is dealing with, the expanded program on immunization was launched in 1978 with the fundamental goal to eradicate poliovirus in different areas of Pakistan. However, in 1994 the program of polio eradication officially began, which in turn shows significant outcomes as the cases were reduced remarkably, as the polio campaign has decreased the instances or active cases of polio virus by up to 99% from the early 1990s when there were about 20,000 instances of wild poliovirus recorded in Pakistan (Pakistan Polio Eradication Programme, 2019). Figure 7 shows the rate of poliovirus in Pakistan over different periods form 1994-2020.

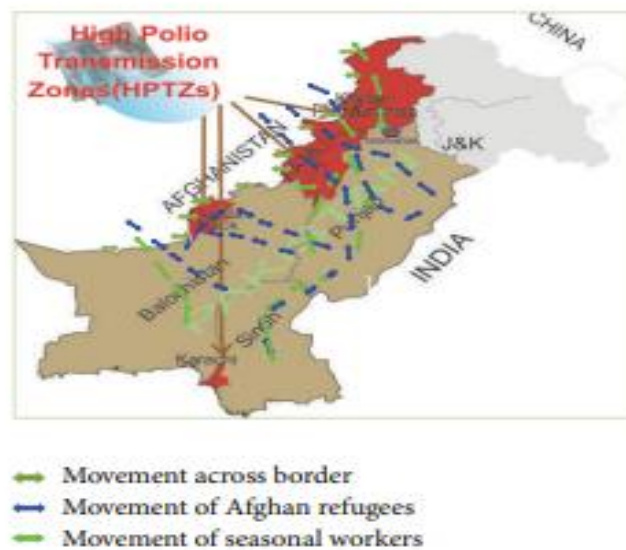
Figure 7: Poliovirus cases in Pakistan between 1994-2020



Source: Ataullahjan et al., (2021)

Furthermore, the tribal areas of Pakistan are among the high polio transmission zones (HPTZ) because these areas shared a border with Afghanistan which is among the most affected region by poliovirus (Ataullahjan et al., 2021), figure 8 shows the mobilization of Afghan citizens toward Pakistan.

Figure 8: Pakistan’s Map revealing HPTZ (23.24)

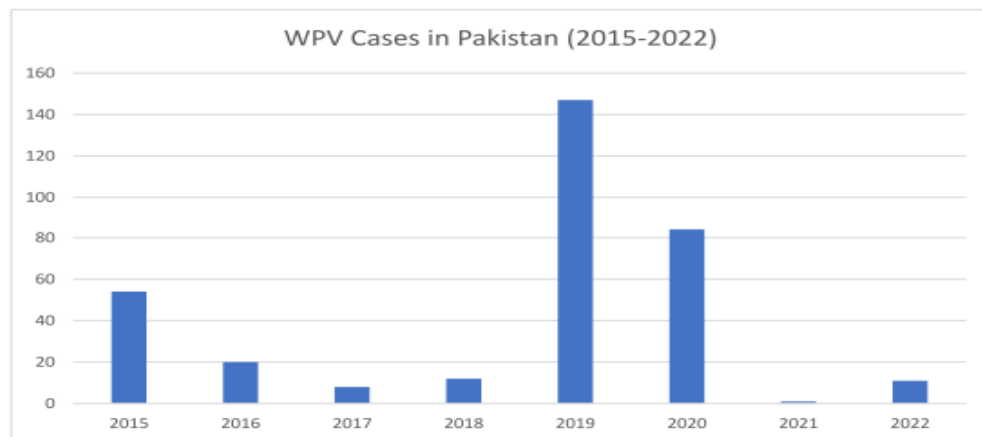


Source: Ataullahjan et al., (2021)

Moreover, the funding for polio eradication initiatives has come from a variety of sources, including national governments/non-governmental organizations, and multisectoral partnerships, whereas EPI provides the majority of the immunization services, with the private sector contributing only 3% of the total (Ghafoor and Sheikh, 2016). In addition, different programs are launched at the federal and provincial levels to eradicate polio from tribal areas of Pakistan, and these programs include the polio Endgame Strategy 2019-2023, the national immunization support program (NISP), Sehat ka Insaf, Sehat Ka Ittihad, and Khyber Pakhtunkhwa immunization support project (KPISP). In 2011, after Osama Bin Laden was executed in Abbottabad and discovered thanks to an American CIA operation that involved a local Pakistani doctor and a false hepatitis vaccine campaign, the politicization of the polio program reached a new high (Guardian T, 2011). As a result, this episode increased public mistrust of vaccine programs, notably polio vaccination efforts, and for many people, it reinforced their suspicion that CIA ploys were being used to eradicate polio (Dawn, 2016). Additionally, children were not immunized between 2009 and 2012 because of insecurity that prevented polio teams from accessing some areas of the region during that time (Tribune, 2012), in contrast, a different scenario was developing in tribal areas where local authorities banned all vaccination campaigns starting in July 2012 and continuing through 2013 as a result, approximately 200,000 children were put at a high risk of contracting polio because vaccination teams were unable to reach them (WHO Annual Report, 2012). In addition, the ban was imposed by Hafiz Gul Bahadur who stated that immunization would be suspended until the drone attacks ended Closser and Coburn, (2019), as well as in tribal areas, a violent attack on polio workers started during the past few years, prompting a review of the program's security measures and the

introduction of the initiative under a new security paradigm. According to the WHO report (2013), Pakistan's president declared polio eradication as a national emergency and formed the National Task Force on Polio Eradication in response, and since then, the number of polio infections has substantially decreased, as out of the 144 recorded cases in 2010, 100 instances originated from the country's western border regions afflicted by violence (FATA had 23 cases, with the remaining cases coming from KPK) (Shah, et al., 2011). These findings are found consistent with the evaluation of the present study concerning the Polio eradication program in Pakistan as a whole. In addition, Pakistan made significant progress in 2012, as evidenced by the fact that there were 58 instances as opposed to 198 the year before (Khan, and Qazi, 2013). Even though, eleven cases of polio have been reported in the tribal area in 2022, demonstrating the inability of government planning and policies to eradicate the disease even after the inclusion of the FATA into the KPK province (Shabbir et al., 2022). The rate of polio cases from 2015 to 2022 is shown in figure 9.

Figure 9: Poliovirus cases in Pakistan between 2015-2022



Source: Shabbir et al., (2022)

The Islamic Advisory Group (IAG) approved a new anti-polio action plan in 2015 that included advocacy and communication initiatives in response to false claims that vaccines are incompatible with Islamic Shariah Law (Pakistan Polio Eradication Programme, 2015). The routine vaccination schedule contained one dose of IPV, the national EPI strategy was updated in 2015, and the security plan for polio workers was updated with the use of civil security agencies and armed forces for increased security protection in response to persistent attacks against workers of polio (Federal Expanded Program on Immunization, 2015). The NISP, which was launched in 2016, gave the Pakistani government extra cash to improve the country's EPI program and a number of partnerships were established between 2016 and 2019 between the polio program and public and private organizations to support program efforts, including Zong, K-Electric, Survey of Pakistan, and Coca-Cola Pakistan, (Ataullahjan et al., 2021). The relevance of polio has also been promoted through collaborative initiatives with celebrities like well-known cricketers Shahid Afridi and Wasim Akram Pakistan Polio Eradication Programme, (2019), and the GPEI unveiled the Polio Endgame Strategy 2019–2023 in 2019, with only two polio-endemic nations remaining (Hakeem and Hussain, 2022).

Moreover, eradicating polio is still at risk from a variety of variables despite Pakistan's significant achievement in minimizing the number of infections. The government has worked to enhance access to vaccines and raise public awareness, but occasionally cultural beliefs, norms, and traditions trump public health priorities and cause vaccine rejection (Basharat and Shaikh, 2016). Some of the justifications offered by parents for not vaccinating their children include concerns about side effects, the idea that medical professionals are not getting vaccinated their own toddlers, harmful byproducts that are strictly forbidden in Islam, negative impacts on infertility or adolescence, and the concern of why our ancestors were never immunized (Khan

and Ahmad, 2015; Shah et al., 2016). Furthermore, Pakistan's tribal territories have long experienced political, social, and economic marginalization, which is also one of the major causes of the failure of polio eradication programs there (Maqsood 2019; Naseemullah, 2014). Furthermore, it is also observed that in retaliation for what they perceive to be federal government marginalization, local communities in the area are utilizing vaccination refusal as a weapon of leverage, and tribal groups have organized around these problems. In addition, their key requests include the provision of free food distribution, basic health services, roads, electricity, mosquito net distribution, and infrastructure, as well as the elimination of police charges against members of the tribes. In light of this, efforts to eradicate polio frequently serve as a "battleground" for larger political issues (Hakeem and Hussain, 2022), and as a result, vaccine refusal in the area is motivated by security concerns.

The polio program's governance and monitoring faced serious difficulties that hampered the execution of the campaign and in the fight to eradicate polio, low staff morale and dissatisfaction at work were mentioned as problems. Moreover, Several studies emphasized complaints from polio workers about their inadequate pay (Closser et al., 2015; Mangrio, 2008; Mushtaq et al., 2010). Polio eradication efforts have been hindered by terrorism and insecurity for a long time and bans on vaccinations, such as those in tribal areas in 2012, restricted access to populations in some areas as well as assaults on healthcare professionals have made them fearful (Ataullahjan et al., 2021). However, as management and governance problems started to get better in 2012, terrorism and instability spread throughout Pakistan. Furthermore, violent attacks on polio teams eventually resulted from rising threats of violence against polio workers, and in 2012, 22 polio workers lost their lives; therefore, one of the biggest obstacles posed to polio immunizations was security and access. In addition, the rise in polio refusals and the spread of

rumors were indicators of broken community confidence and unmet needs in child and mother health services, whereas insufficient community-based measures only made the issue worse. Furthermore, the main barrier to the eradication of polio worldwide is Pakistan due to its rising polio case count. Military action in tribal areas in June 2014 facilitated access to areas where the preponderance of polio cases was centered (Independent Monitoring Board of the Global Polio Eradication, 2014).

The FATA regions, which had been overrun by stateless individuals, have been severely impacted by the war against terrorism, and given that only 3% of women are literate, which makes the puzzle more difficult. Since 2004, drone assaults that result in mass deaths have been focused on these places (1900–2900 people) as well as security issues and anti-vaccination rumors prevented the polio campaign from reaching some areas of tribal areas for three years. According to WHO data, nearly 38% of children in Khyber Agency, a region of FATA, were not reachable for polio vaccine in 2011; however, that number fell to 20% the following year (2012) (Roberts, 2012). Additionally, local religious leaders' opposition to polio workers and immunization has had a significant negative impact on the pace of eradication (Khan and Ahmad, 2015). The unwillingness of parents to have their children immunized (up to 74%) is another major problem, and Pashtuns from both low- and high-income groups refuse to vaccinate their kids as Pashtuns from low-income groups have been shown to be less willing to immunize their children in SIAs than non-Pashtuns from low-income groups due to an absence of polio awareness, a lack of belief in the efficacy of vaccines, misconceptions about vaccines, and an absence of trust in polio personnel (Morrish, 2020; Hakeem and Hussain, 2022). Hence making these findings are consistent with the present study's findings that the polio eradication program has significantly suffered due to several barriers posed to it in the FATA region before and after

its inclusion into the KPK province. Furthermore, the present study has extended the existing pool of literature by suggesting that one more thing that prevents the Pashtuns from vaccinating their children or makes them refuse to do so is the strong influence of a religious person.

Counseling the male members about being the primary decision-makers is essential to convince for vaccination, thus, it is determined that a considerable portion of the population is still unvaccinated due to a lack of awareness regarding vaccinations as the primary cause and that religious misconceptions exist in particular ethnic groups are likely to be the secondary cause (Hakeem and Hussain, 2022).

The region is also regarded as having the longest-lasting male-dominated population in the nation. Getting an education, choosing a spouse, when to have offspring, or deciding whether to vaccinate their pupil is frequently not allowed rights for tribal women. The present main problem in the tribal areas is the lack of female employees to assist in immunization campaigns. Female immunizers are a crucial component of polio campaigns, but tribal custom forbids women from working outside the home, especially for NGOs. Since the tribal custom forbids men from knocking on a house's door if the male resident of the household is not home, it is difficult to vaccinate the infants of a family even without female staff (Hakeem and Hussain, 2022). Moreover, the tribal region's illustrious historical culture is likewise isolated and the migrating Afghan people from tribal areas are the ones that hold these ideas the most frequently as well as there is little doubt that Islam is the sole religion practiced in the tribal area, giving the region's religious authorities an advantage in enforcing religious principles and laws. In addition, Tribal people take an uncompromising stance towards Islam, especially when it comes to acting swiftly to protect their religious integrity from outside religious interference. They also believe that receiving foreign aid for local development, free healthcare, or vaccinations is against Islam

and is forbidden. Foreign aid is generally rejected by people with strong religious convictions (Morrish, 2020). According to Khan and Sahibzada (2016), certain tribal peoples do not permit their children to receive vaccinations because they believe it to be haram (i.e., not an acceptable practice) and un-Islamic (i.e., not a permissible practice).

International organizations have suspended polio campaigns as of the start of 2020 in consideration of the COVID-19 pandemic's sensitivity. Therefore, it has been evaluated that the pandemic will cause a new wave of polio and other contagious diseases, according to health experts as well as in order to combat the spread of the COVID-19 pandemic, the GPEI, located in Geneva, has halted the polio vaccine program. The post-COVID-19 situation, according to the secretary-general of the Pakistan Medical Association, will be worse because of the impending threats of other infectious diseases, which are being disregarded in order to combat the pandemic, and because the number of cases of polio increased in 2022, as shown in figure 9. In order to combat the COVID-19 pandemic and protect polio workers going door to door and the population from the risk of coronavirus infection, the WHO reports that the polio campaign has been paused for two reasons (Janjua 2020). Furthermore, the emergency operation center for the eradication of polio's national coordinator announced that they will change the polio campaign to lessen the negative effects of missed time (Shabbir, 2020), however, there is growing concern that the decision to halt the polio eradication effort may encourage the illness' comeback (Khalid and Akram, 2020).

CHAPTER – 5: CONCLUSION AND FUTURE RECOMMENDATIONS

The aim of this study is to analyze the eradication of polio in tribal areas of Pakistan through a comparative analysis of the situation before and after the inclusion of Tribal areas into the Khyber Pukhtoon Khwa (KPK) province of Pakistan. In order to address the presented aim, the current study employed thematic analysis and the findings of the study suggest that the rate of polio increased after the inclusion due to covid-19 pandemic. In addition, the analysis has shown, there are many contributing factors that make it difficult to eradicate polio in tribal communities, such as the war on terror, religious factors, etc, and it is crucial to take into account the multitude of variables that have impeded attempts to eradicate polio. Moreover, these characteristics have always existed throughout the polio programme, but they have occasionally become more prominent due to certain circumstances or occurrences. In addition to that different initiatives have been taken by governments at the national and provincial levels with the help of government and non-government organizations to address these issues, but the failure of policies and programs has increased the number of polio cases. Moreover, it is examined that polio vaccine myths and mistrust are widespread in tribal communities, as well as the environment in which polio vaccination takes place is largely shaped by geopolitics, and military intervention, which further hurts the success of immunization programs in the target region. In addition, it is not unexpected that Pakhtun communities have been the main source of polio refusals given that a large portion of them reside in or are originating from regions that have experienced the most drone attacks, terrorism, and foreign military intervention. Recent polio eradication attempts have suffered greatly from conflict and insecurity, particularly in tribal areas, which serve as the nation's primary wild poliovirus reservoirs.

5.1. Implications of the Study

The present study findings have brought about several practical and theoretical implications because it has conducted a comparative analysis, which provides a relatively unique insight into the existing policy initiatives and improvements brought about after the inclusion of FATA into the Khyber Pukhtoon Khwa Province of Pakistan. In terms of practical implications, it has been provided that the polio eradication effort in tribal areas can build on these successes by addressing the glaring disparities in its facilities and strategic planning, working to change anti-vaccination attitudes through more coherent community engagement and outreach programs, and tackling vaccine hesitancy with tools like mass media initiatives. Increasing partnerships with significant religious organizations can indeed aid in reducing the political and religious aspects of vaccine reluctance in tribal areas. Moreover, polio awareness presentations can be held in schools, engaging both instructors and students, and these workshops, which are typically held during polio vaccine campaigns, are highly helpful in spreading awareness among the general public concerning this deadly disease and the efficiency of polio vaccination in coping with this disease. Resistance has been largely attributed to a concentration on polio vaccination at the expense of other health and social issues, and it is crucial that immunization workers cooperate and collaborate with local stakeholders to identify and address other health and social issues in order to foster trust, as a result, this can emphasize the satisfaction of fundamental needs, which are also polio's environmental causes. In the context of tribal regions, a fast ethnographic assessment might be seen as a crucial tool for gathering factual data, spotting significant gaps, and filling those in a way that would allow the immunization program to advance and other fundamental healthcare requirements to be met in the future; thus, the main stakeholder would be selected prior to such contextual appraisal and later included in order to

understand the fundamentals of tribal society for future implementation of the instrument. Additionally, to eradicate polio from tribal areas stakeholders must have to develop a mechanism for mobilizing people to Afghanistan, besides this for tribal areas to be polio-free and for the GPEI to succeed, it is essential to address these societal and institutional weaknesses.

Furthermore, concerning the theoretical implications, the present study has conducted an extensive review of the past literature conducted on the polio eradication program in Pakistan, especially in the FATA region of the country. Furthermore, the comparative analysis conducted in the present study concerning the pre and post-inclusion of FATA into the Khyber Pukhtoon Khwa Province of the Country has brought about an extensive pool of literature highlighting the historical developments in the polio eradication programs and initiatives in FATA, along with the challenges posed to the success of such programs over time. Hence, the findings of the present study can be used by academicians and future researchers as credible sources of information for their academic and research purposes. It also serves as a guiding document for the academicians and researchers to help explore the major causes of long-standing polio virus presence in the FATA region of the country and how its inclusion into the Khyber Pukhtoon Khwa province recently in 2018 made improvements, if any, in these programs.

5.2. Limitations of the Study

The present study has been conducted through a qualitative research methodological approach only, which makes its scope and findings inherently limited in the context of reliability and credibility. In qualitative research, scholars usually use judgments and personal experiences in the interpretation and collection of information because the data collected under such methodology is mostly descriptive or theoretical in nature, which necessitates the active involvement of the researchers in the process of data collection and its subsequent analysis. This

in turn increases the chances of personal bias and exercise of the researcher's personal prejudice in processing and analyzing the collected information, which could bring biased or impaired findings. Furthermore, the present study has conducted a comparative analysis on the FATA region of the country alone, which limits its scope in terms of generalization of these findings on the other regions that have been consistently reporting active cases of the polio virus in the country, i.e., Karachi and some areas of Balochistan Province. Similarly, the findings of the present study cannot be effectively replicated in the context of other countries.

5.3. Recommendations

Keeping in view the limitations posed to the findings and processes involved in the present study, certain recommendations are provided to future researchers to help them overcome these limitations and reach more thorough evaluations in the future. It is recommended that future researchers should adopt a mixed-method approach that would include the characteristics of both qualitative and quantitative methodologies simultaneously so that more detailed and thorough evaluation can be performed to reach certain extensive insight in the future. Similarly, safeguards should be considered to reduce or possibly eliminate the potential bias or prejudice of the researcher in the process of data collection and its subsequent analysis. Furthermore, in order to overcome the limitation concerning the generalizability of the study and its scope, future researchers should select a wider sample size that would comprise of either more than one country, i.e., Afghanistan and Pakistan, or at least include several cities of Pakistan, so that the findings obtained can be generalized or replicated effectively in the future.

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Appendices

Appendix – 1: Data Gathering Form

| Sr. No: | Author | Title of the Study | Methodology | Findings |
|---------|--------------------------|---|---|---|
| 1 | Albala (2015) | Thematic Analysis of the Culture of UNICEF in Response to Polio Eradication Efforts | This study employed qualitative research methodology and data was collected through a systematic literature review. | The community's perspectives on OPV and polio are initially documented in all of their complexity, but this detailed knowledge is lost at the highest level of recording. This suggests an optimistic culture that can prevent people from thinking critically and strategically. |
| 2 | Alexander et al., (2014) | Progress and Peril: Poliomyelitis Eradication Efforts in Pakistan | Review Paper | To stop the reintroduction of WPV into other regions of Pakistan and the rest of the world, it will be vital to protect children in places with active conflicts and degraded security. |
| 3 | Ali et al., (2019) | Polio Vaccination controversy in Pakistan | Review Paper | The main element preventing anti-polio vaccination is the general public's reluctance to vaccinate their children in significant numbers. |
| 4 | Chang et al., (2012) | Eradicating Polio in Pakistan and Afghanistan | Report | A renewed focus on coordinating and bolstering the efforts of all partners is a crucial first step, but sustainability will be the key obstacle for both nations. |
| 5 | Chaudet, (2013) | Using polio as a weapon: an attack by the 'moderate' Taliban on Pakistan | Review Paper | The Taliban's threat against the anti-polio effort is potentially as dangerous as it is long-lasting because they appear to be powerful enough to impose their will on the Pakistani countryside. |
| 6 | Closser (2012) | We Can't Give Up Now'': Global Health Optimism and Polio Eradication in Pakistan | In this study, qualitative research methodology was adopted, and, interview transcripts, and fieldnotes were used to retrieve data. | The culture of optimism around polio eradication protects the project's survival by persuading both donors and government officials that eradication is imminent. |
| 7 | Dattani et al., (2017) | Polio | Report | It is surprising that the number of paralytic polio cases declined sharply as reporting standards improved over time and a greater |

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| | | | | number of cases were discovered and reported. |
| 8 | Director-General WHO (2022) | Poliomyelitis eradication | Report | This illness has plagued people for thousands of years. We are now on the verge of completely eliminating it. |
| 9 | Ghafoor, and Sheikh, (2016) | Eradication and Current Status of Poliomyelitis in Pakistan: Ground Realities Eradication and Current Status of Poliomyelitis in Pakistan: Ground Realities | Review Paper | The number of reported instances has been increasing over the last few years. |
| 10 | Gulatee, (2012) | Global Polio Eradication – A Critical Review of Literature in ‘PAIN’ Countries (Pakistan, Afghanistan, India, and Nigeria) | In this study, the qualitative research methodology was used and data was collected through a systematic literature review. | The findings suggest that as per GPEI's progress, polio eradication is possible if the necessary advances are taken and timely interventions are performed in regard to social mobilization, the caliber of SIAs, and surveillance improvement. |
| 11 | Habib et al., (2017) | Knowledge and perceptions of polio and polio immunization in polio high-risk areas of Pakistan | The study employed a mixed research methodology, and data was retrieved through a questionnaire and in-depth interviews. | The results indicate that there are still holes in the routine immunization programmed that need to be filled. |
| 12 | Hussain et al., (2016) | Eradicating polio in Pakistan: an analysis of the challenges and solutions to this security and health issue | Review Paper | Increasing partnerships with significant religious organizations and leaders can also aid in reducing the political and religious aspects of vaccine reluctance in Pakistan. |
| 13 | Ullah and Khan (2022) | Assessment Level of Knowledge about Supplementary Polio Immunization in Mothers Presenting to Pediatric Population | The study used quantitative research methodology and data collected through a questionnaire | Mothers' level of knowledge about supplementary polio immunization is strongly correlated with their educational status. |
| 14 | Kabir, and Afzal (2016) | Epidemiology of poliovirus infection in Pakistan and possible risk factors for its transmission | Review Paper | Low literacy rates, inadequate health infrastructure, a lack of planning, natural disasters, the economic crisis, counterinsurgencies, and almost no protection for polio health workers are major barriers to eradication. |
| 15 | Kamal (2016) | Fighting Against The Reemergence of Polio in the Federally Administered Tribal Areas of Pakistan | Review Paper | There are many fundamental causes such as security, misinformation, and mismanagement for the resurgence of polio in Pakistan. |

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| 16 | Keja et al., (1988) | Expanded programme on immunization. | Review Paper | The Pan American Health Organization is conducting an initiative to eradicate poliomyelitis from the Americas by 1990 as a result of the effectiveness of poliomyelitis vaccine campaigns. |
| 17 | Khalid and Akram, (2020) | Polio Resurgence in Pakistan: Challenges and policy options. | Review Paper | The report recommends a coordinated effort to lessen polio's effects in the future, as well as tying social protection programs to polio campaigns and paying more attention to vaccination quality. |
| 18 | Manya and Qazi, (2015) | From Pakistan a line of hope for 'The Polio Eradication and Endgame Strategic Plan 2013–2018' | Review Paper | The declining number of cases in Pakistan also creates a new possibility of complete success for the GPEI programed. Pakistan is the world's most significant remaining polio virus reservoir. |
| 19 | Mehndiratta et al., (2014) | Poliomyelitis: Historical Facts, Epidemiology, and current challenges in Pakistan. | Review Paper | Global cooperation between all governments and the WHO in the fight against poliomyelitis will pave the path for the eventual eradication of other infectious diseases. |
| 20 | Mohamed (2009) | Independent evaluation of major barriers to interrupting poliovirus transmission. Executive Summary. | Review Paper | The eradication of polio should be implemented in conjunction with other public health initiatives that the local population can readily identify as having a positive impact on their health. |
| 21 | Mushtaq et al., (2015) | Polio in Pakistan: Social constraints and travel implications | This study employed qualitative research methodology and data was collected through a systematic literature review. | The main societal elements that contribute to the failure of any vaccination programed have been recognized as being religion, politics, awareness, insecurity, equity, governance, and social responsibility. |
| 22 | Mushtaq et al., (2010) | From their own perspective - constraints in the Polio Eradication Initiative: perceptions of health workers and managers in a district of Pakistan's Punjab province. | The qualitative research methodology was employed and in-depth interview and focus group discussion was used to retrieve data. | The findings of the study suggest that the cold chain's overall state of disrepair, the lack of expertise and authority in managing resources and people, and the limited advocacy, etc. |
| 23 | Owais et al., (2013) | Pakistan's expanded programme on immunization: | Review Paper | In-depth initiatives are required to quickly enhance |

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| | | An overview in the context of polio eradication and strategies for improving coverage | | resource injustices addressed by the EPI infrastructure and governance. make sure that vaccine coverage statistics are correct, and increase the population's need for vaccinations. |
| 24 | Pakistan Polio Eradication Program | Polio Cases Update 2020 | A report published on the official website Endpolio.com.pk. | The report shows the cases reported over the years in the provinces of Pakistan. |
| 25 | Express Tribune | Resistance to polio vaccination | Article published in a newspaper | Children from tribal communities are the most affected by this, as they have, at any rate, been denied immunization for far too long as a result of the conflict happening in the area where they reside. |
| 26 | Roberts (2012) | Fighting Polio in Pakistan | Article | If the programmed can maintain pace and find a way to reach the children in FATA, Pakistan will be in the best position to complete the job. |
| 27 | Shafique et al., (2021) | Attitude and perception towards vaccination against poliomyelitis in Peshawar, Pakistan | The study employed quantitative research methodology and study used a questionnaire to retrieve data | The results point to a lack of understanding and unfavorable attitudes toward the polio vaccine as the primary reasons the polio eradication mission has failed. Religious convictions, unrestricted migration across the Pakistan-Afghanistan border, and ignorance about the polio vaccine are all listed as major obstacles to the elimination of polio. |
| 28 | Bhutta (2014) | Infectious disease: Polio eradication hinges on child health in Pakistan | Review Paper | Instead of allocating resources to international travelers, the government and concerned organizations will focus their efforts on stepping up full immunization efforts among these marginalized and displaced groups. |
| 29 | Tarar (2022) | Update on Pakistan Polio Eradication Initiative | Review paper | Two cases of acute flaccid paralysis caused by type 1 poliovirus have been recorded in the province of KPK in April 2022. |
| 30 | Toole (2016) | So close: remaining challenges to eradicating polio | Review Paper | It seems obvious that the global population would benefit from this disease's eradication. |

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| 31 | Yusufzai (2016) | Taliban militants kill doctor working to eradicate polio. | Review Paper | The results imply that religious leaders' assistance could make it easier for vaccination to take place in militant-controlled regions of the nation. |
| 32 | Sultan, (2022) | Pakistan Polio Eradication Initiative National Emergency Action Plan | Review Paper | In Pakistan, efforts to stop the spread of the wild poliovirus have achieved significant headway. The fewest annual instances ever documented occurred in 2021 when only one case was found. |