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Study the proportion of traumatic neuritis in year 2017 among children under 15 years in rural and urban areas of Afghanistan

Dissertation Submitted in partial fulfilment of the Requirement for the award of the degree of Master of Public Health

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Certificate

Certified that the dissertation the Study the proportion of traumatic neuritis in year 2017 among children under 15 years in rural and urban areas of Afghanistan is a record of the research work undertaken by Dr. Sayed Ashoqulla Sadat, in partial fulfillment of the requirements for the award of the degree of Master of Public Health under my guidance and supervision.

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Declaration

I hereby declare that this dissertation Study the proportion of traumatic neuritis in year 2017 among children under 15 years in rural and urban areas of Afghanistan, is the bonafide record of my original field research. It has not been submitted to any other university or institution for the award of any degree or diploma. Information derived from the published or unpublished work of others has been duly acknowledged in the text.

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Abstract

Background

Proportion of traumatic neuritis was not clear at rural and urban areas of Afghanistan and there was no information for the vulnerability of age groups and sex.

The goal of this study is to know the situation and impact of health services on magnitude of traumatic neuritis in rural areas an urban area among children <15 years in whole Afghanistan in year 2017.

Study has been designed and used the AFP surveillance data for the year 2017 (Secondary data usage). Over all 3,009 AFP cases were recorded in 2017 by WHO AFP Surveillance network and sampling made by systematic sampling method and 426 records has been selected (Separate Questionnaire has been used).

Objectives:

- To know the proportion of traumatic neuritis in rural areas compare to urban areas in 2017, to identify the vulnerable groups for traumatic neuritis in Afghanistan.
- To identify the provinces, have more occurrence of traumatic neuritis or unsafe injection.

The hypothesis of this study was; Proportion of Traumatic neuritis in rural higher compare to urban areas of Afghanistan.

Method

Secondary data review for the year 2017

Results

Collected data analyzed on Xcel pivot table and the result shown that the relative risk of traumatic neuritis is 1.2 those are living in rural compare to urban areas. The most vulnerable groups for traumatic neuritis was <1 year and followed by 1-4 years' age groups in Afghanistan in 2017. The risk of traumatic neuritis is more among boys compare to girls especially in Herat, Kabul, Nangarhar, Baghlan, Kandahar, Helmand, Ghor, Takhar, Balkh, Kunduz and Farah provinces.

Conclusion

In this study, it cannot be measured the qualification of injectors (Health workers), Type of drugs, duration of residual paralysis and the main reason for choosing buttock areas for injection particularly in children <3 years, these issues need other study to find out the main reason for the above mentioned questions. There was no data since 2003 while basic package of health services (BPHS) program is established to compare the impact of BPHS programs on traumatic neuritis.

Key word

Traumatic neuritis, Proportion, AFP cases, Surveillance, Afghanistan

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List of Acronyms

AFG	Afghanistan
AFP	Acute Flaccid Paralysis
BPHS	Pasic Package of health services
BHC	Basic Health Center
CHC	Comprehensive Health Center
CDC	Center for Disease Control
CI	Confidence Interval
DH	District Hospital
EPHS	Essential package of Health services
EPI	Expanded Programs for Immunization
HP	Health Post
IFA	Information for Action Program
MoPH	Ministry of Public Health
MPH	Master of Public Health
OR	Odds Ratio
RR	Relative Risk
SC	Sub Center

USA United State of America
 WHO World Health Organization

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Introduction/background

Afghanistan health structure collapsed during internal fighting in last 3 decades, Provincial Hospitals and Health facilities were inactive due to insecurity and lack of budget and human recourse. Main focus of health authority during the internal fighting were on cities (Estimate 80%)compare to rural areas. Insecurity, Internal displacement, Refugees, Poverty / low income of people, Low literacy rate were the factors that resulted very poor development of Afghanistan in last 3 decades. Health services also effect by the above mentioned social determinant of health as well. Rural community didn't have access to health facilities easily. Only few health facilities at provincial / urban areas were activated during the crisis. Health services were provided by untrained staff, Local doctors and traditional healers at their Private clinics which is unsafe injection was one of the main concern and problem of health during internal conflict, the main cause of disability (paralysis) and abscesses.

As Robert (1999) mentioned that "It is dangerous to inject medicine than to give it by mouth especially in children. I have seen children reduced to being disability and incapability because of no professional health worker aimed the needle straight in to the sciatic nerve.

As Faisal (2004, P1) mentioned that that Pakistan has the same situation, many of children suffer at the hands of untrained people who set themselves as expert of injections, the poor in rural society have no access to quality health workers who live in the cities and the urban poor afraid of modern doctors and their expensive prescription, they rely on someone friendly and cheap who appears more knowledgeable than they are.

And for its management prospective; majority of patients who sustain injuries to the peripheral sensory nerves of the face and jaws experience a slow but gradual return of sensation that is functional and tolerable, if not the same as before the injuries. However, long-term effects of such injuries are aggravating for many patients, and a few patients experience significant suffering. In some of these patients, posttraumatic symptoms become pathological and are painful.

Hence, the predominant painful components are followed by:

1. Numbing anesthesia dolorosa pain.
2. Triggered neuralgia form pain.
3. Burning and aching causalgia form pain, and.
4. Phantom pain. and the cases with such above components are needs conservative management.

Furthermore, the poliomyelitis is an important vaccine-preventable infectious disease which affects mostly children and causes permanent paralysis in those who survive, resulting in a major economic burden to the families and individuals. In 2009 there were 1,606 cases of wild poliovirus (WPV), infections worldwide, 388 of which occurred in Nigeria. In addition, outbreaks of polio affected 19 previously polio-free African countries (Centers for Disease Control and Prevention 2010).

The disease is thus an important public health problem and a major priority for eradication globally by the World Health Organization (WHO). The strategies for the eradication of poliomyelitis are: ensuring high routine immunization coverage (greater than 80%) with at least 3 doses of oral poliovirus vaccine (OPV), supplementary immunization conducted as national poliomyelitis immunization days (NIDs), implementation of surveillance to identify any cases of Acute Flaccid Paralysis (AFP) for detecting new cases of the disease and mop-up vaccination campaigns once poliomyelitis is reduced to focal (WHO, 2000). The strategies for polio eradication thus depend largely on the availability of high quality AFP surveillance and immunization coverage data.

World Health Organization (WHO) in the health report on 1999 elaborate that at least 75% of these injections are unnecessary.

The injections mostly are administered by public, private doctors, nurses, health workers, local doctors, some traditional healers, addictive drug users and housekeepers.

In many countries injections have become the modern magic, people request them because doctors and other health workers often prescribe them. Meanwhile, Traumatic injection neuropathy (TIN) can occur because of unsafe intramuscular injection practices. TIN involving the sciatic and radial nerves presents as acute peripheral neuropathy with flaccid paralysis of the injected limb within 24 hours after injection and is associated with pain and hypothermia in the affected limbs. This complication is of particular concern in countries with high rates of unnecessary injections.

The World Health Organization (WHO) estimates that of the 12 billion injections administered worldwide annually, 50% are unsafe and 75% are unnecessary. In Pakistan, injections are overprescribed and are often given without regard to the patient's chief complaint. The rate of injection prescriptions in the country is estimated to be from 6.5 to 15 injections per person per year, with children under 5 years old receiving as many as 21 injections annually.

A recent national survey indicated that a high proportion of these injections are unnecessary and given in an unsafe manner. While some data exists regarding the medical complications of these injections, no estimate has been published regarding the disease burden caused directly by injection trauma. In Pakistan, all acute flaccid paralytic conditions are reported to the acute flaccid paralysis (AFP) surveillance system of the poliomyelitis eradication initiative. The AFP surveillance system has achieved or exceeded global targets for quality and sensitivity since 2000. This study was a review of AFP surveillance data to identify the incidence of TIN in Pakistan and to describe the basic epidemiology of the disease.

Since 2002, establishing new transitional government, Ministry of public health developed new policies and strategies and providing health services through Basic Package of health services (BPHS-2003) and Essential Package of Hospital services (EPHS-2005), which BPHS are focusing mainly on rural areas and EPHS are focusing on urban areas. In system of Basic Package of health services (BPHS) different type of health facilities were included, District Hospital (DH) which is covering 100000-300000, Comprehensive Health centers (CHC) covering 30000-60000, Basic Health centers (BHCs) covering 10000-15000, Sub health centers (Sub HC) covering 5000-10000 and health Post (HP) covering 1500-1000 Population. EPHS are focusing mainly on cities and providing the health services by provincial, regional and national hospitals. Capacity building programs are going on since 2002 onward for medical doctors, nurses, medic and paramedics, Community health workers and etc..., particularly on safe delivery, vaccination, safe injection and other field of health service delivery.

In Afghanistan, both buttock regions of the body are the common sites for intra muscular injection. This site cannot be safe for children particularly newborn, infant and children less than <5 ages, even it is not safe for adult if not expert.

The main reason which we want to conduct the research, still there is no any other significant study on traumatic neuritis and impact of health services to reduce the incidence of Traumatic Sciatic neuritis in Afghanistan since 20010.

Literature review

Extensive review of many journals, books and magazines for traumatic neuritis, is an issue of great concern especially for the developing world. Traumatic Neuritis in sciatica nerve is common compare to other nerve in the body, and Traumatic neuritis due to intramuscular injection is well known when injection in gluteal region. Both sensory and motor will loss the limb that they supply during trauma (Injection).

As Robert (1999) mentioned that "It is dangerous to inject medicine than to give it by mouth especially in children. I have seen children reduced to being cripples because an ill-trained professional health worker aimed the needle straight in to the sciatic nerve.

As Faisal (2004) mentioned that that Pakistan has the same situation, many of children suffer at the hands of untrained people who set themselves as expert of injections. The poor in rural society have no access to quality health workers who live in the cities and the urban poor afraid of modern doctors and their expensive prescription, they rely on someone friendly and cheap who appears more knowledgeable than they are.

These formal and informal health care workers routinely prescribe injections to patients. Many of them are unnecessary.

As WHO in the health report on 1999 elaborate that at least 75% of these injections are unnecessary. 90-100 % patients receive an injection while visiting a health worker, approximately 12 billion injections per year are given worldwide.

As in different journal mentioned that during surgery the chance of Sciatic nerve injury is present. As James and William (1998) mentioned that; sciatic nerve injury occurs between 0.5% and 2.0% of the time during total hip arthroplasty in USA. Other Author in USA certified this issue and mentioned that; sciatic nerve palsy is a complication of total hip arthroplasty with an incidence of 0.2% to 2.8% of the time, or with an incidence of 1.7% to 7.6% following revision.

As Faisal (2004) find out in the Pakistan (Neighbor country in South of Afghanistan) in Article; Incidence of traumatic injection neuropathy among children in Pakistan that 456 cases out of 5627 Acute Flaccid paralysis cases are Traumatic neuritis. And most of these cases are on younger children. As estimated the annual incidence of traumatic injection neuropathy rate in Pakistan is 7.1 per 1 000 000 in Children under 3 years old.

Polio is an enteric virus and expresses three important antigens (type 1, 2 and 3) associated with paralysis. These antigens are used to classify the three serotypes and are also the targets for vaccine development. Poliomyelitis also referred to as "polio" is a highly contagious, acute viral disease (Murray, Lopez and Mathers 2004). The virus is transmitted from person to person through the feaco-oral route with occasional transmission via milk, sewage and drinking of contaminated water (Pavlov *et al.* 2005).

Though polio mainly affects children below 3 years old, it can also affect older children and adults. The disease progression was not clearly understood until 1870 that the lesions associated with poliomyelitis in the spinal cord were first described (Sutter, Kew and Cochi, 1988). More recent research on poliomyelitis as a disease has focused on transmission, morbidity, and the disease burden. One in every 200 affected children becomes paralyzed, followed by permanent disability (Bernier, 1984, WHO, 2005), resulting in huge economic burden for the family and the country. The high mortality rate and the disabilities attributable to polio infection have increased the economic burden especially at the household and community levels (Thompson *et al.* 2008) About 5%- 10% of affected children with paralytic poliomyelitis have a fatal outcome (Kenji Shibuye, Murray, 1984).

So far; there is no any data to show the incidence rate in Afghanistan, and most suitable age groups (Vulnerable groups) and the proportion of them in rural and urban areas in Afghanistan. The Only source which we are using for further study will be AFP surveillance data which are collecting through Surveillance network since 1997 in whole Afghanistan.

Clinical Manifestation of all types of traumatic neuritis:

Neuritis: A general term indicating inflammation of a peripheral or cranial nerve. Clinical manifestation may include pain, paresthesia, paresis or hypoesthesia.

Optic Neuritis: Inflammation of the optic nerve, commonly associated conditions include autoimmune disorders such as multiple sclerosis, infections, and granulomatous diseases. Clinical features include retro-orbital pain that is aggravated by eye movement, loss of color vision, and contrast sensitivity that may progress to severe visual loss, an afferent pupillary defect (Marcus-Gunn pupil), and in some instances optic disc hyperemia and swelling. Inflammation may occur in the portion of the nerve within the globe (neuro papillitis or anterior optic neuritis) or the portion behind the globe (retro bulbar neuritis or posterior optic neuritis).

Brachial Plexus Neuritis: A syndrome associated with inflammation of the brachial plexus. Clinical features include severe pain in the shoulder region which may be accompanied by muscle weakness and loss of sensation in the upper extremity. This condition may be associated with virus diseases; immunization; surgery and heroin users; and other conditions. The term brachial neuralgia generally refers to pain associated with brachial plexus injury.

Neuritis, Autoimmune, Experimental: An experimental animal model for the demyelinating disease of Guillane barre syndrome. In the most frequently used protocol, animals are injected with a peripheral nerve tissue protein homogenate. After approximately 2 weeks the animals develop a neuropathy secondary to a T cell-mediated autoimmune response directed towards the MYELIN P2 PROTEIN in peripheral nerves. Pathologic findings include a perivascular accumulation of macrophages and T lymphocytes in the peripheral nervous system, similar to that seen in the Guillaine-Barre syndrome.

Vestibular Neuritis: Idiopathic inflammation of the VESTIBULAR NERVE, characterized clinically by the acute or subacute onset of VERTIGO; NAUSEA; and imbalance. The COCHLEAR NERVE is typically spared and HEARING LOSS and TINNITUS do not usually occur. Symptoms usually resolve over a period of days to weeks.

Sciatic Neuropathy: Disease or damage involving the SCIATIC NERVE, which divides into the PERONEAL NERVE and TIBIAL NERVE. Clinical manifestations may include SCIATICA or pain

localized to the hip, PARESIS or PARALYSIS of posterior thigh muscles and muscles innervated by the peroneal and tibial nerves, and sensory loss involving the lateral and posterior thigh, posterior and lateral leg, and sole of the foot. The sciatic nerve may be affected by trauma; ISCHEMIA; COLLAGEN DISEASES; and other conditions.

Vestibulocochlear Nerve Diseases: Pathological processes of the VESTIBULOCOCHLEAR NERVE, including the branches of COCHLEAR NERVE and VESTIBULAR NERVE. Common examples are VESTIBULAR NEURITIS, cochlear **neuritis**, and ACOUSTIC NEUROMA. Clinical signs are varying degree of HEARING LOSS; VERTIGO; and TINNITUS.

Brachial Plexus Neuropathies: Diseases of the cervical (and first thoracic) roots, nerve trunks, cords, and peripheral nerve components of the BRACHIAL PLEXUS. Clinical manifestations include regional pain, PARESTHESIA; MUSCLE WEAKNESS, and decreased sensation (HYPESTHESIA) in the upper extremity. These disorders may be associated with trauma (including BIRTH INJURIES); THORACIC OUTLET SYNDROME; NEOPLASMS; NEURITIS; RADIOTHERAPY; and other conditions.

Femoral Neuropathy: Disease involving the femoral nerve. The femoral nerve may be injured by ISCHEMIA (e.g., in association with DIABETIC NEUROPATHIES), nerve compression, trauma, COLLAGEN DISEASES, and other disease processes. Clinical features include MUSCLE WEAKNESS or PARALYSIS of hip flexion and knee extension, ATROPHY of the QUADRICEPS MUSCLE, reduced or absent patellar reflex, and impaired sensation over the anterior and medial thigh.

Ulnar Neuropathies: Disease involving the ULNAR NERVE from its origin in the BRACHIAL PLEXUS to its termination in the hand. Clinical manifestations may include PARESIS or PARALYSIS of wrist flexion, finger flexion, thumb adduction, finger abduction, and finger adduction. Sensation over the medial palm, fifth finger, and ulnar aspect of the ring finger may also be impaired. Common sites of injury include the AXILLA, cubital tunnel at the ELBOW, and Guyon's canal at the wrist.

Myelin P2 Protein: A positively charged protein found in peripheral nervous system MYELIN. Sensitive immunological techniques have demonstrated that P2 is expressed in small amounts of central nervous system myelin sheaths of some species. It is an antigen for experimental allergic neuritis (NEURITIS, EXPERIMENTAL ALLERGIC), the peripheral nervous system counterpart of experimental allergic encephalomyelitis.

Facial Nerve Diseases: Diseases of the facial nerve or nuclei. Pontine disorders may affect the facial nuclei or nerve fascicle. The nerve may be involved intracranial, along its course through the petrous portion of the temporal bone, or along its extra cranial course. Clinical manifestations include facial muscle weakness, loss of taste from the anterior tongue, hyperacusis, and decreased lacrimation.

Nervous System Autoimmune Disease, Experimental: Experimental animal models for human autoimmune disease of the nervous system. They include GUILLAIN-BARRE SYNDROME.

Multiple Sclerosis, Relapsing-Remitting: The most common clinical variant of MULTIPLE SCLEROSIS, characterized by recurrent acute exacerbations of neurologic dysfunction followed by partial or complete recovery. Common clinical manifestations include loss of visual (see OPTIC NEURITIS), motor, sensory, or bladder function. Acute episodes of demyelination may occur at any site in the central nervous system, and commonly involve the optic nerves, spinal cord, brain stem, and cerebellum.

Guillain-Barre Syndrome: An acute inflammatory autoimmune neuritis caused by T cell- mediated cellular immune response directed towards peripheral myelin. Demyelination occurs in peripheral nerves and nerve roots. The process is often preceded by a viral or bacterial infection, surgery, immunization, lymphoma, or exposure to toxins. Common clinical manifestations include progressive weakness, loss of

sensation, and loss of deep tendon reflexes. Weakness of respiratory muscles and autonomic dysfunction may occur.

Mercury Poisoning, Nervous System: Neurologic disorders associated with exposure to inorganic and organic forms of MERCURY. Acute intoxication may be associated with gastrointestinal disturbances, mental status changes, and PARAPARESIS. Chronic exposure to inorganic mercury usually occurs in industrial workers, and manifests as mental confusion, prominent behavioral changes (including psychosis), DYSKINESIAS, and NEURITIS. Alkyl mercury poisoning may occur through ingestion of contaminated seafood or grain, and its characteristic features include POLYNEUROPATHY; ATAXIA; vision loss; NYSTAGMUS, PATHOLOGIC; and DEAFNESS.

Absinthe: An extract of absinthium and other bitter herbs, containing 60% alcohol. Prolonged ingestion causes nervousness, convulsions, truisms, amblyopia, optic neuritis, and mental deterioration.

Neuro myelitis Optica: A syndrome characterized by acute OPTIC NEURITIS; MYELITIS, TRANSVERSE; demyelinating and/or necrotizing lesions in the OPTIC NERVES and SPINAL CORD; and presence of specific autoantibodies to AQUAPORIN 4.

Methodology

Study design: Secondary data review was done for the year 2017

Study methods: Secondary data from those collected data through AFP (Acute Flaccid Paralysis) surveillance and health management information system were reviewed;

Study setting: Data was collected from available surveillance and HMIS department of Ministry of Public Health (MOPH), and related department officers if needed;

Study subjects: Secondary data were reviewed for the year 2017

Study teams: Principle Investigator (PI) will analyze, interpret all surveillance and HMIS data with proper managing the data and controlling the quality of the whole process.

Data collection: Surveillance and HMIS data for year 2017 were collected and interpreted.

Study duration: The data were reviewed within six months' period starting from Feb 2018 and ending in July 2018.

Activities/Months	M1	M2	M3	M4	M5	M6
Develop and submit draft outline proposal	X					
Revise and submit the final outline proposal	X					
Application for ethical approval	X					
Submission of questionnaire		X				
Ethical approval		X				
Data collection and initial analysis			X	X		

Draft methodology and result chapters					X	
Draft discussion chapter					X	
Final draft						X
Final submission						X

Plan of Analysis

Principle Investigator (PI) was carry out the analysis manually taking the following steps:

1. Deep analysis was done through all the surveillance and HMIS data repeatedly about the content of each specific part of traumatic neuritis.
2. Information were organized to the available surveillance and HMIS data.
3. Themes were identified and labeled.
4. Each theme was searched for identification of the specific and most frequently intramuscular traumatic neuritis by ages, sex, location based on structured format to all those cases reported by primary, secondary and tertiary health facilities.

Ethical Considerations

The study was carried out after seeking ethical approval from Ethics Panel of Maulana Azad University.

Since the study intended to deal with secondary data, which were collected from health facilities through-out health management information system monthly integrated activity report from each individual health facilities.

We were ensured that the HMIS monthly integrated reports were provided proper information in to the study. For the confidentially observation, all information was kept in a safe place so that no one except the Principal Investigator can access to it.

Data Management and Quality Control

Principle Investigator (PI) was contact with health management information system /Surveillance departments of Ministry of Public Health and requesting them for providing/extracting all related

data of traumatic neuritis from both HMIS/Surveillance databases based on provide checklist to them.

Principle Investigator (PI) was main in charge of compiling the data collected by the departments and filing them. check all transcriptions of the extracted data and translate them from local language to English.

Limitations of the study

This study cannot measure the qualification of injectors, type of drugs, duration of residual paralysis.

Results and Discussions

The result of this research will be used for improvement of knowledge of health workers in rural or urban areas, and more focus on the existing gaps on safe injection, and venerable groups. It will be presented through a peer-reviewed article and workshop at national level.

Table (1): Distribution of traumatic neuritis among rural and urban areas

Areas	Yes	No	Total
Rural	17	330	374
Urban	3	73	76
Grand total	20	403	423*

*3 records were blank for (rural /urban)

Table (2): Distribution of Traumatic Neuritis among AFP cases by Location in 2011 in Afghanistan

Areas	Traumatic Neuritis		Other Case		Relative Risk
	#	(%)	#	(%)	#
Urban	17	4.9	330	95.1	1.24
Rural	3	3.9	73	96.1	0.81

Looking to the above table; prevalence of Traumatic neuritis those are living in rural areas 1.24 times more versus those who do not. It may be due to lack of expert injectors and lack of knowledge among rural community regarding the safe injection and will be the may concern of these high prevalence of traumatic neuritis in rural areas compare to urban areas. Meanwhile 4-5 (4.9 %) of Traumatic neuritis cases among children with Acute Flaccid paralysis are located in rural areas. It means that 4-5 children are paralyzed due to unsafe injection among those are getting paralysis. It is indicating the concern and magnitude of the traumatic cases in rural areas and can be prevented compare to other cause of paralysis.

Table (3): Distribution of Traumatic Neuritis among AFP cases by region in 2011 in Afghanistan

Areas	Traumatic Neuritis		Other Case		Relative Risk
	#	(%)	#	(%)	#
Badakhshan	0	0.0	11	100	0.00
Central	0	0.0	69	100	0.00
Eastern	0	0.0	39	100	0.00
Northeastern	3	5.8	49	94.2	1.22

North	3	4.3	67	95.7	0.91
Southeastern	1	4.2	23	95.8	0.88
South	6	6.7	84	93.3	1.41
West	7	10.3	61	89.7	2.18
Afghanistan	20	4.7	403	95.3	1.00

Table (4): Distribution of Traumatic Sciatic Neuritis among AFP cases by Sex in 2011 in Afghanistan

Sex	Traumatic Neuritis		Other Case		Relative Risk
	#	(%)	#	(%)	#
Male	12	5.0	228	95.0	1.14
Female	8	4.4	175	95.6	0.87
Male-to-female Ratio	1.50		1.30		

Table (5): Distribution of Traumatic Sciatic Neuritis among AFP cases by Age Groups in 2011 in Afghanistan

Age Groups	Traumatic Neuritis		Other Case		Relative Risk
	#	(%)	#	(%)	#
<1 Years	5	11.9	37	88.1	2.52
1-4 Years *	14	5.6	234	94.4	1.19
5-14 Years	1	0.8	132	99.2	0.16

Discussion

As in the table (2) indicated that the prevalence of Traumatic neuritis those are living in rural areas 1.24 times more versus those who do not. It may be due to lack of expert injectors and lack of knowledge among rural community regarding the safe injection and will be the may concern of these high prevalence of traumatic neuritis in rural areas compare to urban areas. Meanwhile 4-5 (4.9 %) of Traumatic neuritis cases among children with Acute Flaccid paralysis are located in rural areas. It means that 4-5 children are paralyzed due to unsafe injection among those are getting paralysis. It is indicating the concern and magnitude of the traumatic cases in rural areas and can be prevented compare to other cause of paralysis.

In Table (3) the Northeastern region, south and west part of Afghanistan have >1 Relative risk of traumatic neuritis. In addition, Western & southern regions have the high % of traumatic Neuritis (> 6 %)

compare to national level and it need more study to know what will be the main reason of that. Badakhshan, Central (Including Bamyan) and Eastern regions haven't any traumatic neuritis cases in this sampling. It may be chance it not picked or may have very good safe injection system.

Health officials assuming that Afghanistan community have more interest on health of boys compare to girls. In this analysis is also indicating that relative risk of traumatic neuritis 1.14 times among boys compare to girl's children (see table 4). In addition, male to female ratio is 1.5 (12/8) in traumatic neuritis which is supporting the idea of health officials that Afghan community are more focusing on health of boys compare to girls and they exposing more to injection as well compare to girls and it is not confirmed by this study but it can be a hypothesis for further study, but we can conclude based on analysis of sex that boys are more in risk compare to girls.

In other hand, the most vulnerable groups for traumatic neuritis are children < 1 year and followed by 1-4 years' age. The relative risk among under one is 2.52 and 11.9 % is the prevalence of traumatic neuritis among other cause of AFP (See table 5). Safe site for injection of children is mid part of anterior surface of leg which is not considering for teen age children in Afghanistan. Mostly children are injecting on buttock site which is dangerous and risk of traumatic injection neuritis is high and this site is very common in Afghanistan. Sciatic nerve is very close to site of injection in children < 3 years' age, and this study proving this idea.

As I conclude based on the Map (1), more or less traumatic neuritis and unsafe injection is a general health issue in all part of Afghanistan particularly in Herat, Faryab, Kunduz, Helmand and Kandahar provinces.

Overall; Injection-related traumatic neuropathy often results in life-long disability. As we progress towards eradication of poliomyelitis, causes of AFP other than polio is becoming more apparent and TIN has now emerged as the third most common cause of acute flaccid paralysis in Afghanistan in children under the age of 15 years after Guillain–Barré syndrome and infantile hemiplegia. The problem is particularly severe in children under the age of 1 year who suffer from a higher complication rate from injection methods inappropriate for this age group. The observation that fever was often reported to have occurred before the injection agrees with the fact that, even in this age group, most injections in Afghanistan are given for therapeutic purposes rather than for vaccination. However, routine immunizations have been observed being given in the gluteus of infants that also pose a potential risk as well.

Conclusions and recommendation

Based on this study, it is concluded that prevalence of traumatic neuritis among those living in rural areas is high compare those who do not. The most vulnerable groups for traumatic neuritis was <1 year and followed by 1-4 years' age groups in Afghanistan in 2011. The risk of traumatic neuritis is more among boys compare to girls especially in Herat, Faryab, Kunduz, Helmand and Kandahar provinces.

- To improve the capacity building of rural health staff particularly community health workers and nurses for safe injection

- Intramuscular injection for infant (or less than 3 years' children) on the region of buttocks should be avoided and safe site of injection for children should be included in the Afghanistan national health policy.
- More focus on the region those have inadequate and untrained health staff on capacity building particularly on safe injection
- Increase the awareness of the community for changing behavior to reduce the demand of injectable drugs through national wide programs
- Safe injection messages through possible communication channels
- Unnecessary injection should be avoided and oral therapy should be promoted
- It is recommended that rational and judicious use of injections should be recommended and unsafe injection should be avoided or discarded on the buttocks.

In addition; as a main issue in this study how to overcome and reduce the traumatic neuritis cases due to injection or some other cases particularly; need to thought for the elimination of wild polio virus which has active circulation in Afghanistan and its neighbor country Pakistan by focusing on how to strengthens the AFP surveillance data and its use to determine which areas have transmission of the virus which causes poliomyelitis and together with the final laboratory results of virus isolation, identification and characterization allows the determination type of the polio vaccines (oral polio types 1, 2, 3, bivalent or trivalent vaccine) to use in response to stopping the spread of the virus in the population. In addition, by identifying the virus responsible for an AFP case, the origin of the virus can also be determined, in relation to viruses isolated from other regions or parts of a country or region, enabling response to be monitored in such areas as well.

By serving as a measure of the success of the polio eradication programme, AFP data is also used for resource mobilization in support of the Polio Eradication Initiative (PEI). For example, the GAVI Alliance has based its funding of immunization activities in developing countries on accurate, timely and easily verifiable immunization data, including AFP surveillance data (Lim Stein, Charrow and Murray, 2008). In some cases, absence or inaccurate immunization data has led to the suspension of GAVI Alliance funding which in turn has adversely affected the PEI. Thus as routine immunization coverage improves the number of cases of disease decreases and surveillance is required to identify any cases occurring in those not immunized and to target them with supplementary immunization so as to eradicate or eliminate or control the disease eventually.

This is critical for polio which has been targeted for eradication requiring that transmission is completely stopped.

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Annexures

Annex 1: Copy of Paper Published / consent for publication

Not yet published

Annex 2: Consent Form and Research Subject Information Sheet

1:

Department of Public Health, Maulana Azad University, Jodhpur

Thesis Form (MPH 2016-18)

Thesis in MPH course comprise of research done on a particular subject of public health importance. Through thesis, students get opportunity to apply public health concepts and enhance research knowledge and skills.

Semester III and Semester IV are dedicated for thesis work in MPH course. To complete the thesis, the student must submit thesis proposal at the end of semester III and final thesis at the end of semester IV

Name:	Dr. Sayed Ashoqullah Sadaat
Address:	Apartment # 61, Block B7, Shahr Aara Project, Kolola Pushta 4 th districts, Kabul, Afghanistan
Emergency contact number:	+93(0) 799020750
Email id:	dr.asadaat@gmail.com
Topic of Thesis:	Proportion of Traumatic Neuritis in Rural and Urban Areas of Afghanistan
Name and Place of Study Site (Please provide full address):	Data will be collected from available surveillance data; questionnaire will be used as instruments for data collection from HIMS/Surveillance department of Ministry of Public Health with close follow up with 34 provinces of Afghanistan if needed;
Name of thesis site supervisor:	Dr. Pir Mohammad Paya
Designation and qualification of site supervisor	MPH, MD, MA (USA) Deputy Chief of Party, USAID-IHSAN Project FHI 360 Kabul, Afghanistan
Contact Phone No. and Email ID of site supervisor	+ 93 (0) 799156137 pirmohammad_paya@yahoo.com

Student's Signature

Date:

Sign of thesis site supervisor

Sign of Head, Department of Public Health

Date:

Place:

Annex 3: Consent Form and Research Subject Information Sheet

2:

Consent Letter from Site Supervisor (MPH 2016-18)

Date: October, 2017

To,
The Head
Department of Public Health
Maulana Azad University
Jodhpur, Rajasthan

Sub: Consent Letter to be a site supervisor for project/ thesis of Dr. Sayed Ashoquallah Sadaat

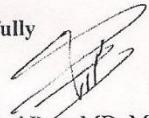
Dear Madam,

This is in reference to the above mentioned subject. In this regard I wish to inform you that I am willing to accept Dr. Sayed Ashoquallah Sadaat as my student for guiding his project/thesis work leading to the MPH degree from Maulana Azad University, Jodhpur. I will guide him for the entire duration of his project/thesis work and will supervise him throughout the process.

Thanking you

Yours faithfully

Signature



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Annex 4: List of Tables

Table (1): Distribution of traumatic neuritis among rural and urban areas

Areas	Yes	No	Total
Rural	17	330	374
Urban	3	73	76
Grand total	20	403	423*

*3 records were blank for (rural /urban)

Table (2): Distribution of Traumatic Neuritis among AFP cases by Location in 2011 in Afghanistan

Areas	Traumatic Neuritis		Other Case		Relative Risk
	#	(%)	#	(%)	#
Urban	17	4.9	330	95.1	1.24
Rural	3	3.9	73	96.1	0.81

Table (3): Distribution of Traumatic Neuritis among AFP cases by region in 2011 in Afghanistan

Areas	Traumatic Neuritis		Other Case		Relative Risk
	#	(%)	#	(%)	#
Badakhshan	0	0.0	11	100	0.00
Central	0	0.0	69	100	0.00
Eastern	0	0.0	39	100	0.00
Northeastern	3	5.8	49	94.2	1.22
North	3	4.3	67	95.7	0.91
Southeastern	1	4.2	23	95.8	0.88
South	6	6.7	84	93.3	1.41
West	7	10.3	61	89.7	2.18
Afghanistan	20	4.7	403	95.3	1.00

Table (4): Distribution of Traumatic Sciatic Neuritis among AFP cases by Sex in 2011 in Afghanistan

Sex	Traumatic Neuritis		Other Case		Relative Risk
	#	(%)	#	(%)	#
Male	12	5.0	228	95.0	1.14
Female	8	4.4	175	95.6	0.87

Male-to-female Ratio	1.50		1.30		
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Table (5): Distribution of Traumatic Sciatic Neuritis among AFP cases by Age Groups in 2011 in Afghanistan

Age Groups	Traumatic Neuritis		Other Case		Relative Risk
	#	(%)	#	(%)	#
<1 Years	5	11.9	37	88.1	2.52
1-4 Years *	14	5.6	234	94.4	1.19
5-14 Years	1	0.8	132	99.2	0.16

Annex 5: Separate Questionnaire which has been used

1. Enhance Privacy Identification #: (_ / _ / _)
2. Date of Onset: (_ / _ / _)
3. Date of birth: (_ / _ / _) Age in months: (_)
4. Sex: Male () Female: ()
5. Location of residency place:

5.1: Region:

Northeastern: () South Eastern: () North: () South : () Center:
() Eastern: () West: ()

5.2. Province: Name: (.....) Code: ()

5.3. District: Name: (.....) Code: ()

5.4. Village: Name: (.....) Code: ()

5.5. Types' of Village: Rural: () Urban: ()

6. History of injection: Yes: () No: ()

If yes, fill the following question, If no move to Question # (7)

6.1: Site of Injection: Buttock: () Leg: () Arm : ()

6.2. Swelling History of Injection Site: Yes: () No: ()

7. Patient Hospitalized: Yes: () No: ()

8. Residual of paralysis: Yes: () No: ()

9. Provisional Diagnosis by visited investigator:

- Guilin Bare syndrome: ()
- Traumatic /Injection Neuritis: ()
- Poliomyelitis: ()
- Transvers myelitis ()
- Central Nervous System Infection ()
- Other ()

.....
Data collector name: () Date: / /

Annex 6: Review schedule table

Activities/Months	M1	M2	M3	M4	M5	M6
Develop and submit draft outline proposal	X					
Revise and submit the final outline proposal	X					
Application for ethical approval	X					
Submission of questionnaire		X				
Ethical approval		X				
Data collection and initial analysis			X	X		
Draft methodology and result chapters					X	
Draft discussion chapter					X	
Final draft						X
Final submission						X