

## Pakistan Journal of Society, Education and Language (PJSEL)

Journal Homepage: <https://pjsel.jehanf.com/index.php/journal>

ISSN

2521-8123 (Print)

2523-1227 (Online)

### 1998 Nuclear Tests in Ras Koh Hills Chaghi – Effects, Perceptions and Realities

Asadullah Raisani\*<sup>1</sup>, Abdul Rehman<sup>2</sup>

Original Article

1. Research Fellow at Balochistan Think Tank Network, Quetta.  
Email: asadu7471@gmail.com

2. Research Fellow at Balochistan Think Tank Network, Quetta.

#### Keywords

Chaghi, Dalbandin, Padag, Chehthar, Nuclear Tests Effects, Diseases, Psychological Effects, Abject Poverty.

#### Abstract

*Dating back to Pakistan's five underground nuclear tests in May 1998, carried out as a deterrent response to India's tests, this study critically examines the perceptions and realities surrounding their alleged adverse effects on the local population. It also evaluates the claims made by locals and politicians regarding increased illnesses and negative impacts in the region since those tests. The historical context of nuclear weapons development, from the Manhattan Project to the global proliferation of such arms, sets the stage for understanding the contested narratives. Due to the lack of documented evidence and medical records from the testing site's vicinity, the research employs a mixed-method approach involving closed-ended questionnaires, open-ended interviews, and discussions. The study reveals challenges in gathering accurate data due to high levels of unawareness, especially among the unemployed and uneducated locals of Dalbandin and surrounding areas. The study basically relies on the on-ground investigations and concludes that the psychological impact of the tests is greater than the physical effects on the locals or the region. It also recommends a future course of action based on the findings.*

#### Introduction

Since 1945, a large number of nuclear devices have been tested around the world. Broadly speaking, the two schools of thought exist; one group believes that underground nuclear tests have no effects on ground and thus humans and the environment remain safe (Karplus, 1992). While the other group believes that nuclear testing is a source of dangerous diseases and is hazardous for the environment, never mind whether or not they are underground (Dyke, 2006). However, nuclear tests have never failed to stir up controversies and generally tend to give a right to everyone to comment.

Pakistan carried out underground five Nuclear Tests on 28 May, 1998 at Ras Koh, District Chaghi. This was to create deterrence after India had carried out four Nuclear Tests on 11 May, 1998. Thereafter, the Pakistan Atomic Energy Commission (PAEC) monitored over a long period of time, if

there were any adverse effects on ground. The sustained study reportedly had found out no adverse effects (Gul, 2023). However, some politicians, off and on went on making adverse statements implying an increase in sicknesses and other negative effects around the test site. Generally, such statements sprout in May- June every year, as if to commemorate the Nuclear Tests. Consequently, the research team decided to undertake detailed research to ascertain whether or not these allegations had some truth in them. This research is based on an evaluation of the ground realities, weighing the allegations made by the locals by conducting interviews of the people and officials living around the nuclear testing site in District Chaghi, ascertaining adverse effects if any, and testing perceptions versus realities on ground. This Research undertook detailed evaluation of the reported adverse effects, academically, as well as on ground and consulting medical specialists regarding sicknesses found prevalent in Dalbandin area.

### **Historical Overview of Nuclear Tests**

The age of nuclear weapons began with a letter from Albert Einstein to the American President Franklin D. Roosevelt (1933-45), to inform him of the tremendous amount of energy-release possible should the nucleus of a heavy atom be split, and that it could be used as a weapon. The letter led to the authorization of the Manhattan Project, a research program on nuclear enrichment of radioactive heavy atoms for military use. The US succeeded in making a nuclear weapon on July 16, 1945 when the first successful test of a nuclear weapon was conducted (US History, 2022). The two nuclear weapons made during the World War II, were dropped on Hiroshima and later, Nagasaki on 6 and 9 August 1945 respectively, inflicting unprecedented destruction. It resulted into almost immediate surrender of Japan. Seeing the massive devastation which the nuclear weapons were capable of unleashing, a race for acquiring nuclear weapons started soon after the WW II. The Soviet Union acquired nuclear weapons in 1949, which ended the nuclear monopoly of the US. Then the UK became a nuclear power in 1952, followed by France in 1960 and China in 1964. India tested its first nuclear device in 1974 which it called a peaceful nuclear explosion (PNE). (Business Standard, 2022) Following India's pursuit of nuclear weapons, Pakistan also secretly launched its program for nuclear enrichment. India tested four nuclear devices on 11 and 13 May 1998 (PIB, 2009). To counter India's threat Pakistan also tested its nuclear devices on 28 May 1998 (FAS, 2002). In addition to P-5 possessing nuclear weapons, India, Pakistan and North Korea are also now nuclear weapon states. Israel is also believed to possess nuclear weapons but has neither denied nor confirmed the possession of nuclear weapon capability.

Pakistan was mindful of Indian advantage in conventional weapons, which could only be countered through acquiring nuclear weapons just as it happened between the US and the Soviet Union (Warden, 2021). In the 20<sup>th</sup> century, a large number of nuclear tests were conducted, mainly by USSR, the US and France. From 1945-1992, both the US and the USSR conducted 85% of the total nuclear tests while only 14.5% of the tests were conducted by UK, France, and China collectively (Katz, 2008).

### **Basic Classifications of Nuclear Tests**

The nuclear tests are divided into three categories, airburst, underwater and underground. In underground testing, the radioactive materials remain confined to the underground. Should the detonation be near the surface, some radioactivity can escape but the probability is low (Charnysh, 2006). Whereas, in atmospheric nuclear testing, the radioactive materials are directly released into the atmosphere (EPA, 2022). According to a report, 25% of nuclear tests have been conducted in the atmosphere whereas 75% were conducted underwater/underground (Tkacik, 2010). It is also

reported that wherever nuclear tests are conducted, radioactive materials remain in the environment for a long period of time.

### **Implications of Nuclear Tests**

Environmentalists argue that nuclear weapons testing is one of the most destructive tests for human health and the environment. The excessive nuclear testing by the US, UK, France, China, and Russia have harmed not only human lives, but also the overall environment. (Fedchenko & Hellgren, 2007) The production sites and the dumping sites are considered the main sources of contamination of the environment and human health (Robbins et al., 1991).

### **Effects on The Environment**

It is believed that nuclear tests have adverse effects on the environment by releasing radioactive materials into the atmosphere. The atmospheric nuclear tests release one of the byproducts of elements, Tritium into the atmosphere which is hazardous for the environment and human health. (Fedchenko & Hellgren, 2007) According to a report (Tadros et al., 2014), nuclear tests release large amounts of radioactive materials into the environment including radioactive isotopes. The US performed approximately 800 tests in Nevada, some were on ground but most were underground, which released a large amount of radionuclide 131 into the atmosphere (UNSCEAR, 1993). Semipalatinsk region of Kazakhstan, where the Soviet Union conducted many on-ground tests, is reportedly highly contaminated with radioactive materials like 90Sr, 137Cs, 239, 240Pu, and 241Am (IAEA, 1998). In the Semipalatinsk region, radioactive materials were also found in the water (Yamamoto et al., 2010).

### **Effects on Human Health**

In the short history of the nuclear age, it is reported that the world has witnessed adverse effects of nuclear radiation on human health. Nuclear radiation is responsible for cancers, tumors, birth deformities and genetic disorders. However, finding out the implications of nuclear testing on human health is a rather difficult task. Nuclear weapons states are very conservative and strict when it comes to information regarding the harmful effects of nuclear weapons. In most cases, nuclear tests are conducted confidentially, the locations highly secured and results not shared.

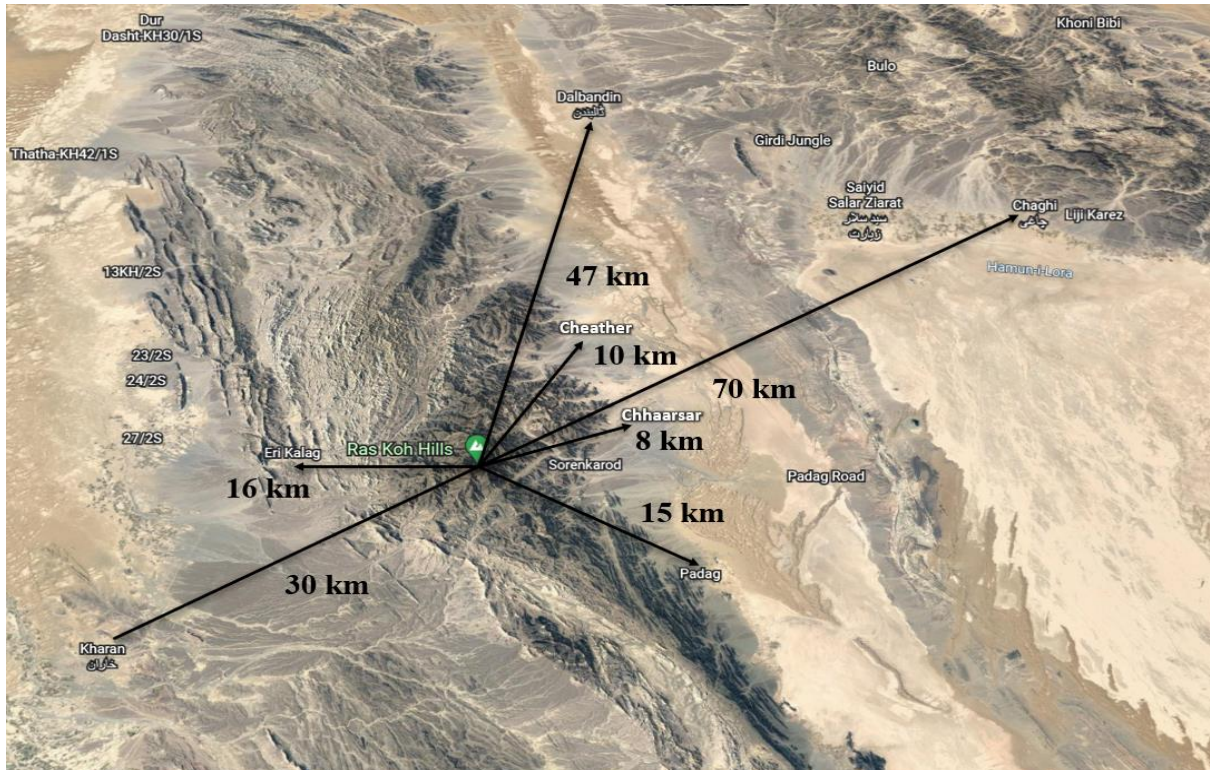
According to a report (Makhijani et al., 2006), nuclear radiation poses threat to human health in different modes such as genetic mutations, risk of cancers, cardiovascular and respiratory diseases. The ionizing nuclear materials can even bring about changes in DNA. The ionizing materials have different effects on different people. For example, women and children are more prone to the effects of nuclear radiation. Women are 52% more likely to get cancer than their male counterparts and 38% more likely to die of cancer than men (Makhijani et al., 2006).

### **Overview of The Nuclear Testing Site**

Pakistan conducted its nuclear tests in Ras Koh Hills. The word Ras Koh is derived from two Balochi words, 'Ras' means gateway, and 'Koh' means mountain, Ras Koh collectively means 'Gateway to the Mountains'. It is a range of hills that is mainly present in District Kharan, but is mistakenly considered to be in District Chaghi. Even the testing site is closer to Kharan than Chaghi.

The testing site, as reported by the locals, is surrounded by villages Padag, Chharsar, Chehther, and Eri Kalag in districts Chaghi and Kharan. Padag is located some 15km to the southeast of the site, Chharsar 8km south, Chehther some 10km northeast, and Eri Kalag some 16km west. Kharan is

located in southwest some 30km from the testing site, while Dalbandin and Chaghi are some 47km and 70km away from the site respectively, as shown in the Map 1. Therefore, it is more accurate to argue that it is a range of hills that forms a southwestern part of the Suleiman Range in the Chaghi as well as Kharan districts of Balochistan. The choice of this mountain or the range of these hills for nuclear tests makes sense as it is a range of bone-dry hills, where there are no chances of contamination of underground water. The population in that areas is also scanty, which makes the site even more suitable for such tests, should there be any unexpected fallout.



**Map 1:** Distances of certain areas from Pakistan`s nuclear testing site in Ras Koh Hills (Source: Google Earth)

### Methodology

Mixed method was used for the research paper related to the nuclear tests in Chaghi, Balochistan, qualitative as well as quantitative. One hundred closed-ended questionnaires were filled out by the residents of Chehther, Padag, and Dalbandin in District Chaghi.

Most of the questionnaires were distributed in Dalbandin as the literacy rate is comparatively better there than the small villages of Padag and Chehther. Still, unawareness among the people proved to be the greatest hurdle in ascertaining the facts. About 39 out of 100 respondents who were under the age of 30 were not even aware of the Nuclear Tests of 1998. However, those who were in their 50s or above, around 15 out of 100 respondents as shown in Figure 1, blamed the Nuclear Tests for every bad happening in the area.

District Health Office (DHO) Dalbandin, Agriculture Department Dalbandin Office, and Basic Health Units working under People's Primary Healthcare Initiative (PPHI) in Padag and Chehther were also parts of the field visit to know official stances and perceptions of the effects of nuclear tests in Dalbandin and surrounding areas. The lone college of Dalbandin was also visited to learn the views of educated young men. Most of the questionnaire was filled out in the Bazar and *dhabas* (roadside cafes) of Dalbandin. Dalbandin is a small

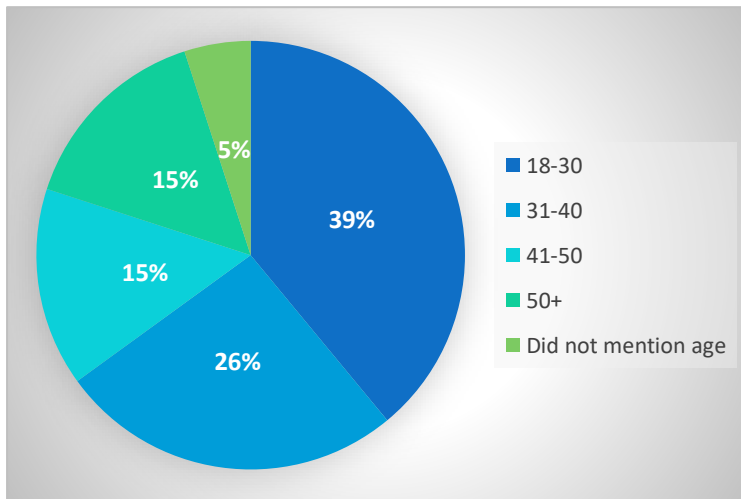


Figure 1: Age groups of the respondents.

town some 350km from Quetta, very backward and has a conservative society where female participation in public is almost none. Therefore, the researchers could not get any questionnaire filled by females to know their perceptions regarding the adverse effects of the nuclear tests carried out in 1998.

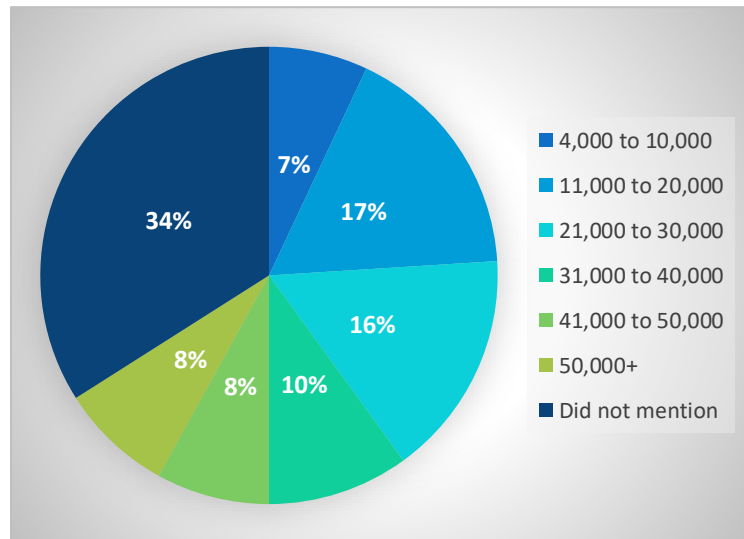
After acquiring the health data from the target area, a tertiary hospital in Quetta was visited to interview medical specialists. The commonly found sicknesses/diseases in Padag, Chehther, and Dalbandin were discussed with them to ascertain whether or not these were due to nuclear radiation. The type of diseases and frequency of occurrence were not found to be related to any old or decaying radiation. These sicknesses / diseases and the small number of prevalence were considered to be common, generally in rural areas where hygiene is not taken care of and water is scare.

A radiologist at Bolan Medical College Hospital was also contacted for an interview but he declined to cooperate calling this subject, "too sensitive". A Lahore-based Baloch journalist who had written opinion pieces on the subject did not respond to queries either. Online literature was a modest, but significant source of data. However, no proper study could be found online on the topic. Those who are critics of the tests as well as those who defended them have not mentioned credible sources to support their arguments. Also, they have written opinion pieces rather than proper research papers on the topic. Therefore, the analysis and conclusions of this paper depend on the results of the fieldwork and discussions with different medical specialists, experts and officials.

**Critique, Common Perceptions, And Counter / Official Narratives**

**Critics` Narratives**

On 28<sup>th</sup> May every year when *Youm-e-Takbir* is commemorated in Pakistan, a few non-resident Pakistanis and a handful of Indian analysts in particular call it 'a black day' for the people of district Chaghi (Singh, 2016). They claim that these tests have caused and spread skin diseases and cancer in the region. According to these people, these tests were carried out in a haste without realizing ground realities, ultimately resulting in the "destruction of generations". Even on the 15<sup>th</sup> anniversary of these

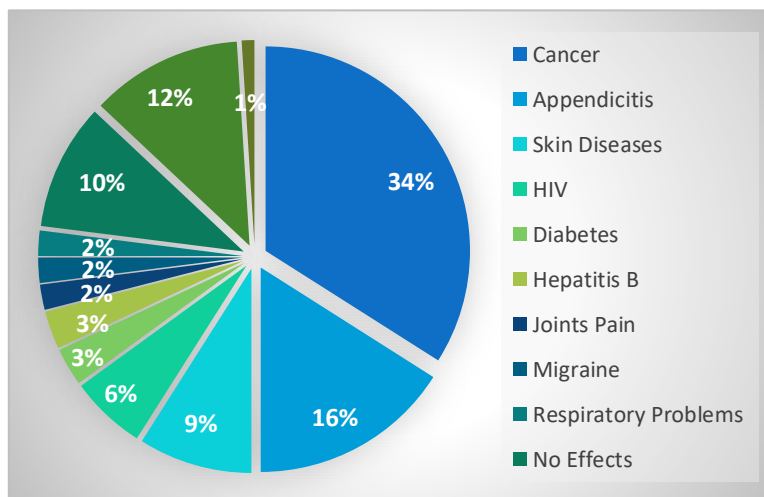


**Figure 2: Monthly incomes of the respondents.**

tests, on 28<sup>th</sup> May 2013, strikes were observed in a few places in Southern Balochistan like Gwadar, Kech, Panjgur, Kharan and Hub. Interestingly, the people of Chaghi and Dalbandin were not part of it (Tribune, 2013).

These critics also criticize that Nawaz Sharif, the then Prime Minister Pakistan had promised to invest in education, health, roads, and infrastructure of the province (Bolan Voice, 2021). Two and a half decades later, these promises are yet to be fulfilled as the locals of Dalbandin and Chaghi still lack basic facilities of clean drinking water, electricity, hospitals, academic institutions, and above all, employment. Many respondents in Ras Koh and surrounding areas were more concerned about employment opportunities than anything. The periodic closure of the borders by the FC also stops their vocation of smuggling and their livelihoods. Poverty is a serious issue in the area, as most of the respondents said that they can barely earn between Rs.11-20,000 per month as shown in Figure 2. (Field Visit to Padag, Chethar and Dalbandin, 2022)

Critics also believe that the people of Chaghi were against these tests. They attribute the



**Figure 3: Respondents` response to the question, "What effect have you observed on the district`s population?"**

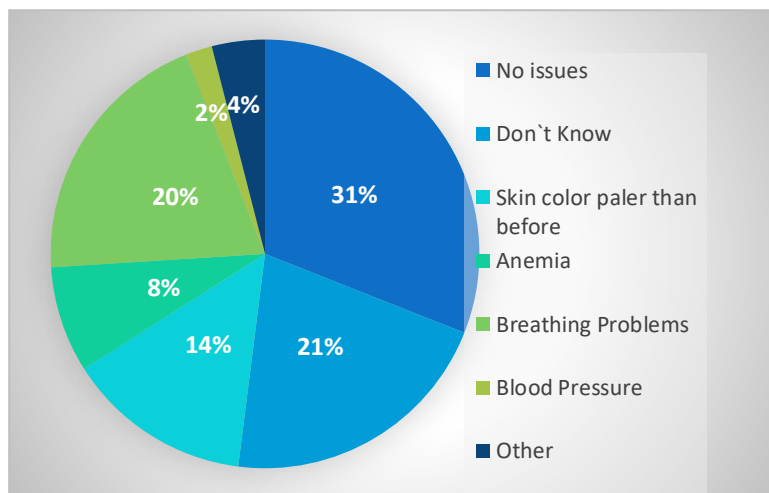
hijacking of a PIA plane by three Baloch hijackers just four days prior to the tests, who were hanged in 2015 (Dawn, 2015). But it does not sound true as the tests were carried out with extreme secrecy. Even the top civil officials were not informed about these tests until the tests actually took place. There was no way a few Baloch could plan to hijack a plane so quickly (Gul, 2023).

It is also critiqued that many residents were displaced and dislocated before carrying out those tests and were not facilitated (Baloch, 2017). The same grievance was shared by a literate respondent in Dalbandin, who was angry with the government. He claimed that people around the testing site were forced to migrate and they had no other option, but to leave most of their belongings when these tests were carried out. He also claimed that they were not compensated either. "Even if

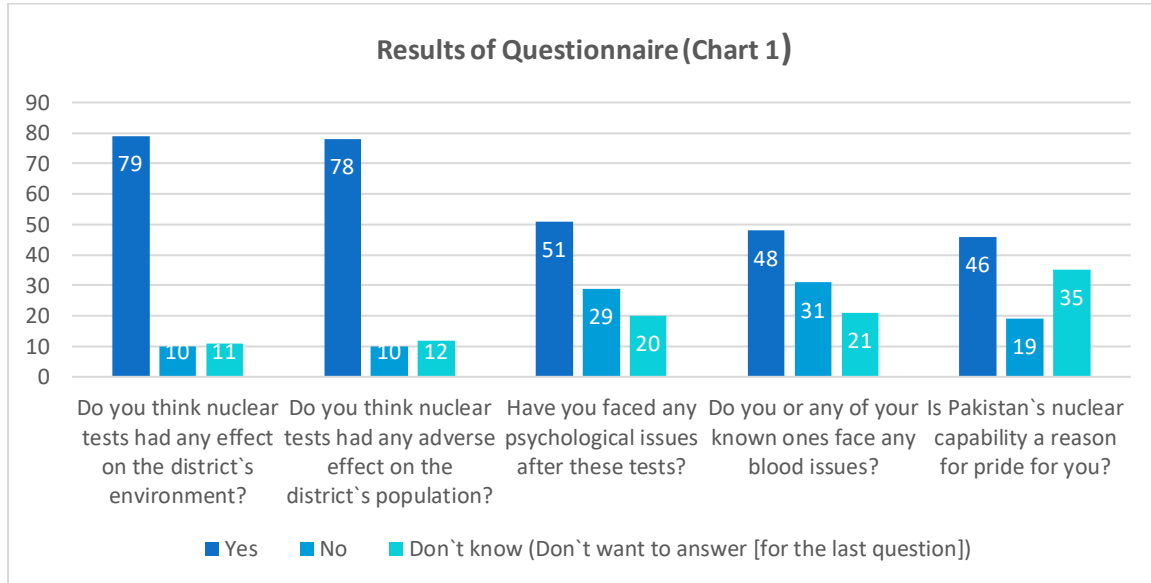
today any of them crosses that line where there is a deployment, they [the villagers] are investigated." (*Field Visit to Padag, Chehther and Dalbandin*, November 2022).

The 15 respondents in Padag who filled out the questionnaires complained of respiratory problems, Hepatitis B, Appendicitis, Diabetes, Blood Pressure, and Cancer. However, some of the overall respondents as 34/100 claimed the spread of Cancer and 16/100 claimed spread of Appendicitis as shown in Figure 3. A few of them argued that the water table has also gone down due to the tests. "Before it was at 40 meters, now it is below 170 meters," they said. (*Field Visit to Padag, Chehther and Dalbandin*, 2022) However, these claims are not backed by authentic sources discussed in official narratives. It is also alleged that the cases of lung, liver, blood cancer, skin diseases, typhoid, infectious hepatitis, affected nervous system, blood pressure, eyes, throats, and abnormal newborn babies are all effects of those nuclear tests (Baloch, 2017). However, no newborn with such defects was indicated or shown. No complain of typhoid, affected nervous system and eyes were made by the respondents as well as District Health Office, Dalbandin officials.

Almost every person who filled out the questionnaire quoted examples of either their family or their neighbors and relatives who are or have been patients of the mentioned diseases. Many had been operated on for Appendicitis and had faced these issues specifically the residents of Chehther which is some 8km from the testing site. The critics of the tests had a common claim of the spread of the mentioned diseases as well as cancer as 34 out of 100 respondents claimed outbreak and spread of cancerous diseases since these tests (Figure 3).



**Figure 4: Respondents` response to the question, "What health-related blood issues have spread in the district since the tests?"**



Anti-Punjab sentiments are also high among the critics of the tests as one respondent in Dalbandin claimed, "Why don't they carry out such tests in Punjab? Because they (people of Punjab) might have declined, and [as usual] they [the ruling elite] have Balochistan as a scapegoat." He refused to write his name on the questionnaire. One of the respondents even said, "For a [cricket] test match they have Karachi and Lahore, but for nuclear tests they have Balochistan." (*Field Visit to Padag, Chehther and Dalbandin, 2022*) These were emotional outbursts which are expected in these underprivileged backward areas.

An official in the DHO, Dalbandin, who was a critic of these tests and had disagreed with almost everything his colleagues argued, said that our questions in the questionnaire are flawed, "Instead of asking what diseases have spread since those tests, you should have asked, what diseases are spared?" He also claimed that a person had done similar research long ago in a personal capacity who was later harassed and then he could never hear of him presenting his research on different platforms, nor did he publish his work. When the name of the researcher was inquired, he was unable to recall his name, which makes his claim doubtful.

#### Common Perceptions of the Residents of Dalbandin and Surrounding Areas

Officials of BHU that function under PPHI in Padag as well as Chehther, the nearest sites after Chhaarsar to the site, as per the locals, where nuclear tests were carried out, had a common complaint that there are no proper vaccines for many diseases. While lack of competent doctors and professionals is another issue in Dalbandin and surrounding areas, they argued. A common perception in Padag was that every bad or unpleasant happening in the area is due to those tests, let it be related to the environment or health of the local population, as all the 15 respondents in Padag were critics of the tests except an official in BHU. In contrast, people under 30 (39/100 respondents) many of whom, 14/39, were students (Figure 5) had very little idea about any nuclear tests in Ras Koh Hills or their adverse effects. A few of them even wondered if and when such tests were carried out at all in District Chaghi. They were more concerned about employment and job opportunities. Some 20 respondents in Dalbandin claimed that people of Chehther, Padag, and Chharsar are most

affected by the fallouts of the tests. But no specifics were presented. Most of such statements were based on hearsay.

Dr. Saboor Baloch (not his actual name), who has served in different parts of Balochistan and currently serving in Dalbandin, claimed that the cases of Hepatitis B and C are more common in Kech and Dasht as compared to Dalbandin. Also, Hepatitis is most common in Kodi Zikriani in Balochistan standing at 17 percent. (Sheikh et al., 2011) However, Hepatitis has no link with nuclear radiation (Ilyas et al., 2022; Baloch, 2021). It is transmitted through contact with blood or other body fluids, using unsafe injections and exposure to sharp instruments. (WHO, 2022) Therefore, the health officials recommended to test the water as no solid claim can be made without such tests on whether water really got contaminated in Dalbandin or surrounding areas or not (Baloch, 2021).

Another official argued that a short time ago, water tests were carried out to check the standard of water in Dalbandin. The Total Dissolved Solids (TDS), the total concentration of dissolved substances in water comprising inorganic salts and a small amount of organic matter, of the water was between 1500-1800 parts per million (ppm) or milligrams per liter of water (mg/L), whereas the set standard is far below this, between 50-1000 ppm. Therefore, issues related to the stomach in Dalbandin and surrounding areas are understood to be normal due to the existence of salts and impurities in water and have therefore, no connection with the nuclear tests conducted in Chaghi (Baloch, 2021).

10 out of 100 respondents claimed that the effects of these tests were severe for the first four to five years. They complained that these surveys and research should have been done long before, not now. One respondent argued that the place immediately closer to the testing site, Chhaarsar was affected the most, as well as Chehther. He argued that they used to hear about massive livestock deaths. Dr. Waseem (not his real name), surgeon doctor in a tertiary hospital in Quetta affirmed that radiation can cause livestock deaths. (Ilyas et al., December 2022) However,

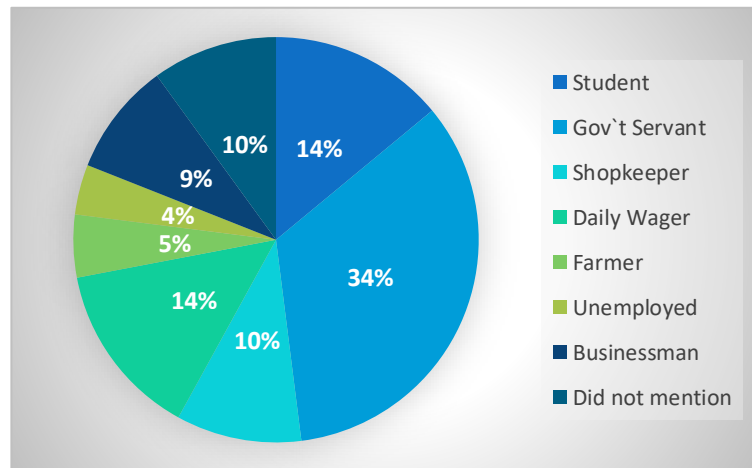


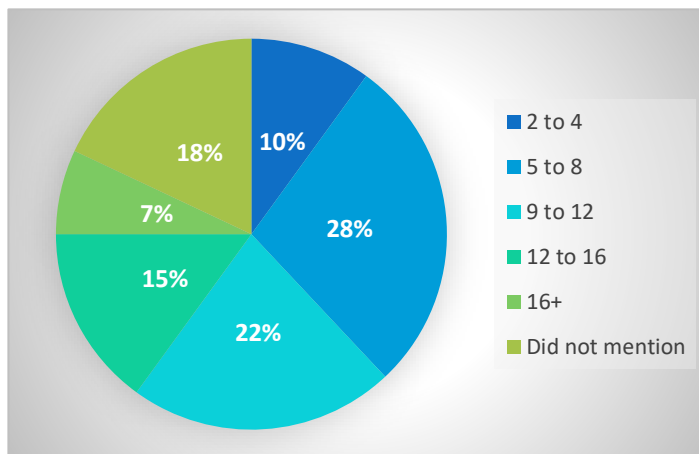
Figure 5: Occupations of the respondents.

such solid claim was not backed by any official record, and the research team did not receive any information of such claims from any other respondent except that one respondent.

In short, the people of Dalbandin and surrounding areas were more concerned about employment opportunities. They had a mindset based on hearsay and emotional outbursts while responding to questions, without quoting specifics. 34 respondents, who had government jobs, out rightly rejected the possibility of adverse fallouts of the tests.

**Counter Narrative**

A large number of professionals and experts were found unwilling to talk or comment on the possible effects of the nuclear tests. It thus became difficult to get an authentic official narrative. However, the researchers still managed to get response on telephone interview, from a renowned Pakistani nuclear scientist who had served in different capacities. He had been part of the process of nuclear tests of May 1998 in Chaghi and had also served as a top official in Pakistan Atomic Energy Commission (PAEC). He explained that any state that intends to carry out a nuclear test on its soil, goes through multiple precautionary measures and Pakistan is not unique in this regard. It took the necessary time to decide on a perfect site for such tests and the hard and bone-dry range hills of Suleiman



**Figure 6: Number of family members of the respondents.**

Range in District Kharan were found to be the most suitable ones for the purpose. The water table around that site at the time of the tests was already very low, therefore it is hard to believe that the water got contaminated after those nuclear tests (Parvez, 2022).

Besides, top-class nuclear scientists of the country were present at the time of nuclear tests in the Chaghi district when these tests were carried out. After a few days the then Prime Minister also visited the site. This should be enough to prove that the atmospheric pollution must have been of no consequence. Otherwise, the top officials would not have been exposed to risks (Parvez, 2022). The population in the surrounding areas was moved beyond a safe radius to make sure that they remained safe in case of any unexpected fallouts.

He further argued that if the authorities had found serious fallouts, they would have done something to prevent any emerging catastrophe as blamed by critics of the tests. The studies support the argument that underground tests are far less risky than atmospheric ones (Parvez, 2022).

Furthermore, officials of the DHO, particularly Dr. Saboor Baloch argued that the claims of Appendicitis, Thalassemia, or Anemia are not directly linked with nuclear radiation. (S. Baloch, 2021) Dr. Waseem (name withheld) also said that diseases like Appendicitis, Hepatitis, and Thalassemia have no direct connection with nuclear radiation. These diseases are not only found in the District Chaghi and surrounding areas but also in other areas of the country. However, as per the website of Agha Khan University Hospital, Appendicitis is the inflammation of appendix and tumor can be a possible reason for such inflammation. Whereas the type of tumor is not certain (AKU, 2022). Dr. Hassan (name withheld) a Pathologist in a tertiary hospital in Quetta, also argued that the mentioned diseases have nothing to do with radiation. However, skin diseases and respiratory problems can be caused by radiation (Ilyas et al., 2022). Therefore, it will be a flawed approach to blame nuclear radiations for the increase in the cases of Appendicitis in Dalbandin and the surrounding areas.

DHO officials also argued that Appendicitis is more common in Gwadar than in Dalbandin and surrounding areas. Dr. Saboor Baloch even claimed that being a doctor he is ashamed to share that there are very less, equal to no professionals in Dalbandin and for earning a small amount of money, they diagnose almost everyone with a problem in the stomach as Appendicitis and recommend them a surgical operation (Baloch, 2021). Dr. Waseem confirmed the stance stating that appendix surgery is the most conducted surgery worldwide. "However, respiratory problems might be caused by radiation, but dust and dry weather are indeed, more common causes of such problems in Balochistan and other areas of the country," he added (Ilyas et al., 2022).

As far as Anemia is concerned, Dr. Saboor Baloch argued that 38-40 percent of females in Dalbandin are Anemic as people are unaware of family planning. Almost everyone here keeps having children until any serious issue occurs with the mother or she reaches the age where she cannot give birth anymore (Baloch, 2021). Dr. Waseem affirmed this view. He argued that malnutrition, in this area is a basic reason for Anemia, particularly in females (Ilyas et al., 2022).

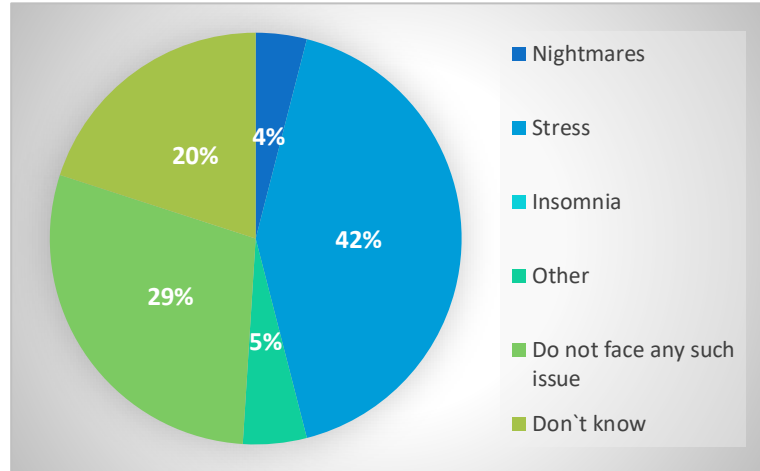
Reliable sources second the claim. According to the World Health Organization (WHO), some 40 percent of pregnant women are Anemic in the world (WHO, 2022). A few common symptoms of Anemia among women are hair loss, pale skin, depression and difficulty in swallowing, symptoms that people of Dalbandin confuse with the effects of nuclear radiation. (Medical News Today, 2013) As per a national nutrition survey carried out by the Ministry of National Services Regulation and Coordination (MoNHSR&C) Government of Pakistan in 2018, Anemia affects 41.7 percent to 77 percent of work-related Asthma in Pakistan. It also causes Anemia and breathing problems among newborn babies, whose mothers are anemic (Ali et al., 2020).

Dr. Saboor Baloch further shared an account that in Dalbandin a person had 13 children and his wife was pregnant for the 14<sup>th</sup> time. "*Now if this lady will not be anemic then who else will be?*" "The most of the females are victims of malnutrition in Dalbandin on account of poverty", he commented (Baloch, 2021). However, Dr. Waseem, Dr. Hassan, and Dr. Ilyas argued that worm infection is the most common cause of Anemia as water quality in Balochistan is below the set standard making such causes more likely (Ilyas et al., 2022). Poor hygienic conditions and practices are other major reasons.

When asked about any possibilities of abnormal births, DHO officials affirmed that rare cases of such births are witnessed as delivery cases are mostly handled by midwives in Dalbandin who are not even properly trained. Most of them are either lady dispensers or medical technicians. They also argued that females often die or fall victim to any disease due to ill-trained methods and unhygienic procedures. They nevertheless acknowledged that the radiation might also have had a role to play, but only in the early years after the tests, if at all (Baloch, 2022). However, not only in Dalbandin but all over the country, cousin marriages are another major cause of defective births.

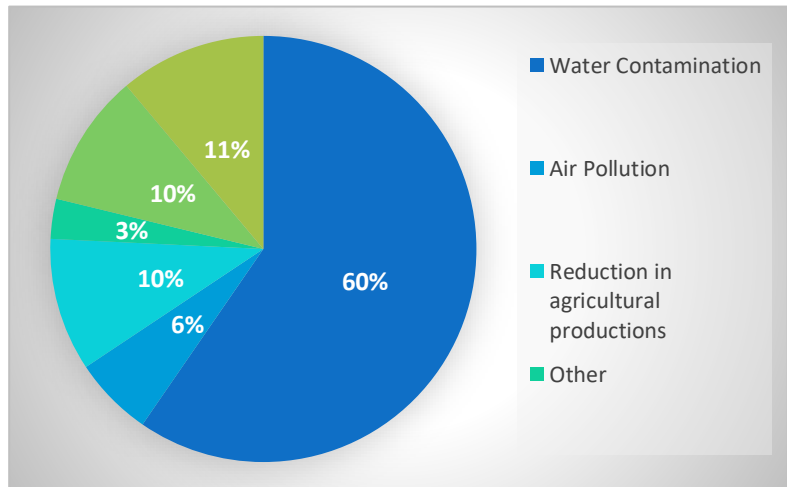
One official at DHO claimed that the site where these tests were carried out is nearer to the people of Kharan than Dalbandin. It has been shown in the map. If the nuclear tests had serious effects, the people of Kharan would have been the first to claim that. "But when we go around Ras Koh Hills in Kharan for picnics, we find them fitter than us," he claimed.

Regarding the lowering of the water table, many respondents, 29/100, particularly literate ones, argued that it is not convincing that those tests had lowered the water table as water tables have gone down throughout the province either due to massive installation of tube wells or regular spells of drought (Naz et al., 2020). Dalbandin has massively suffered from these drought spells, particularly of the 1990s (Islamic Relief, 2019). Therefore, the lowering of the water table is hard to be linked with the tests. Besides, this belt has traditionally been highly water deficient. Between Noshki and Dalbandin, a stretch of about 200 km and then Dalbandin to Nokundi again about 200km, there is no water at all and consequently no human habitation (Gul, 2023), confirmed by a local of Nokundi who helped the research Team get the questionnaires filled in Dalbandin and surrounding areas.



**Figure 7: Respondents' response to the question, "What kind of psychological issues have you faced?"**

When asked about the peak years for Appendicitis, some 4 respondents argued that during the years 2013-14 the cases of Appendicitis were at their peak while 12, said that they "do not recall peak years", (*Field Visit to Padag, Chehther and Dalbandin, 2022*) whereas the Nuclear Tests were carried out in 1998. Therefore, it is hard to believe that nuclear radiation is the cause behind such cases.



**Figure 8: Respondents' response to the question, "What environmental effects have you observed the most?"**

The Researchers also confirmed from a blood bank in Dalbandin Bazar about increased cases of Thalassemia. A person who was working there who was in his early twenties, argued that a month ago or so, most people had Malaria, confirmed by BHUs in Padag as well as Chehther, but these days Thalassemia is more prevalent. (*Field Visit to Padag, Chehther and Dalbandin, 2022*)

Regarding cancerous diseases, Dr. Waseem, a surgeon doctor, Dr. Tanvir, a medical specialist, and Dr. Hassan, a Pathologist said that radiations can cause certain types of cancer like the thyroid, bladder, lungs, blood, and skin. Whereas joints pain, Appendicitis, Hepatitis B, C, and Thalassemia have nothing to do with nuclear radiation (Ilyas et al., November 2022).

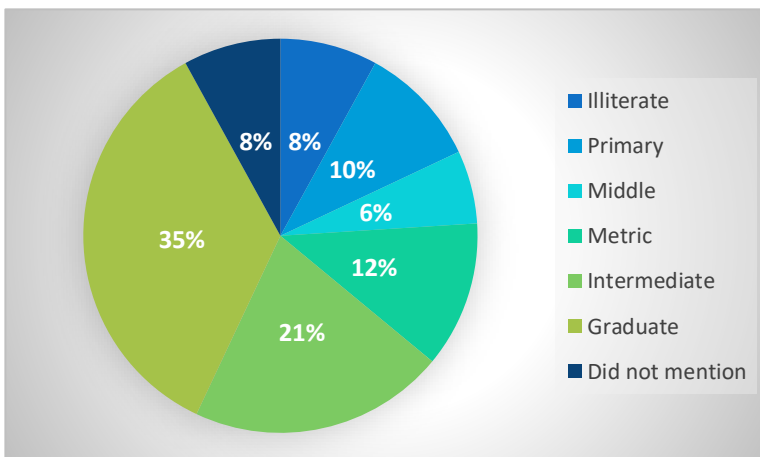
Regarding psychological issues after the Nuclear Tests, a considerable number of the respondents, 29/100 said that they have not faced any psychological issues, 42/100 claimed they “feel stressed” and 20/100 said that they do not know whether they are facing any or not as shown in Figure 7. (*Field Visit to Padag, Chehther and Dalbandin, 2022*)

Officials related to agriculture declined to cooperate arguing that they had been issued a notice in 2006 that they would neither share such sensitive data nor will give any official narrative in this regard. They did not provide any records that could be used to compare whether agricultural production has decreased after the Nuclear Tests in May 1998. However, 60/100 respondents claimed of water contamination due to those tests and 10 claimed reduction in agricultural productions as shown in Figure 8. However, these claims cannot be relied upon in the absence of any scientific study.

### Conclusion

It is not fair to claim that the nuclear tests had adverse effects on the population of Dalbandin and surrounding areas. The Nuclear Tests were carried out more than two decades ago in 1998. Therefore, it becomes hard to trace the effects as there are no medical or environmental records or official data of the small villages around the testing site. In the absence of documented records, no claim of adverse effect on human health or the environment in these areas can be made. Closed-ended questionnaires, open-ended interviews, and discussions with the locals and officials have proved to be a great clue to trace the realities though, still not sufficient to argue those tests had any adverse effect on the population.

Since most of the locals are unemployed and uneducated, as despite many efforts the research team could hardly get only 35 questionnaires filled by graduates (Figure 9), it makes it further harder to get accurate data from them. As most respondents had no proper idea of the tests. They were more concerned about basic human facilities and job opportunities. Many of them had great panic regarding the fallouts of the tests and their perceptions were shaped by those fears, panic and hearsay. They were of the view that any unpleasant happening since those tests have a link with the nuclear tests of May 1998. For instance, many respondents claimed the spread of Appendicitis and Hepatitis B in



the areas adjacent to the testing sites, as already discussed in details, the diseases which have hardly anything if nothing to do with nuclear radiation. Their unawareness proved to be a major hurdle in attempts to reach the facts as they are.

Moreover, the psychological effects of the tests are greater than any physical effects. Except for the new generation, as most of the respondents under 30 years of age had little or no idea of these tests. The residents of Dalbandin and surrounding areas are anxious about the possible effects of the tests.

In short, the panic of fallouts or effects of the tests is far greater than the real effects among the locals of Padag, Chehther, and Dalbandin.

### **Recommendations**

This research study took several months. It followed a social sciences approach towards differentiating between the myths and realities surrounding the fears and apprehensions pertaining to the outcome of the nuclear tests. Based on this study's findings, the following recommendations are made:

1. Based on the findings of such scientific studies, the government and relevant institutions (such as PAEC) should ensure that there are awareness campaigns that inform public opinion on such sensitive matters that ultimately affect Pakistan's national image. Incorporation of such studies in the schools and college curriculum; seminars at university levels; media and television talk shows may be arranged to educate the masses.

2. Awareness campaigns in the areas in the vicinity of Nuclear Tests sites and Nuclear Energy Plants should be part of the national course of action, to counter negative propaganda.

3. Medical facilities may be upgraded in Dalbandin and at least a well-equipped modern facility should be made in Dalbandin, so that the people of the area should not be compelled to rush to Quetta for their treatment. A few locals of the areas should be trained to serve there with at least one or two male and female specialists appointed in the facility. Their duty should be to create awareness for every patient whether or not his/her disease has any link with nuclear radiation.

4. It is understandable that appointing specialist medical doctors in such far-flung areas is a difficult task. However, provincial Health authorities may ensure that free medical camps are periodically arranged. Such medical camps with specialist doctors from different departments of medicine and surgery can offer free medicines for minor diseases, and free treatment for chronic diseases like cancer, heart diseases, and breathing problems.

5. This measure will surely help them live a better life and bring change in their negative approach against the government and end imaginary allegations against the government and state institutions. The patients with tumors who may blame the nuclear radiation for their conditions should be properly checked. Whether or not their tumor has any connection with the effects of nuclear radiation, the government should ensure their treatment in the Center for Nuclear Medicine & Radiotherapy (CENAR), known as CENAR Cancer Hospital, Quetta, without any cost.

6. Improved infrastructure, better education and employment opportunities with a specific quota to uplift the population of these areas may be considered. Provision of other basic facilities, such as clean drinking water can improve the living standards of the locals. Provision of such basic needs would empower the population in the long run and will also create a positive environment for them to grow and make progress.

7. The government may make sustained attempts to understand the psyche of the locals of the place. They are very poor. Most of them depend on smuggling for their livelihood, called *border-trade*. Periodic closure of borders with Iran and Afghanistan enhances their poverty and frustration. If they are provided with regular employment opportunities, they will be more satisfied and that will ultimately benefit the country.

## References

AKU. (2022). *Diseases and Conditions*.

Ali, S. A., Abbasi, Z., Shahid, B., Moin, G., Hambidge, K. M., Krebs, N. F., Westcott, J. E., McClure, E. M., Goldenberg, R. L., & Saleem, S. (2020). Prevalence and determinants of anemia among women of reproductive age in Thatta Pakistan: Findings from a cross-sectional study. *PLoS One*, 15(9). <https://doi.org/10.1371/JOURNAL.PONE.0239320>

Baloch, S. (2021). *Interview with DHO officials, Dalbandin*.

Baloch, S. M. (2017, May 29). *The Fallout From Pakistan's Nuclear Tests*. The Diplomat. <https://thediplomat.com/2017/05/the-fallout-from-pakistans-nuclear-tests/>

Bolan Voice. (2021). *28th May: Nuclear Tests in Chaghi*. Bolan Voice. <https://bolanvoice.wordpress.com/2012/05/16/28th-may-nuclear-tests-in-chaghi/>

Business Standard. (2022, May 18). *Pokhran I: The event that ushered the nuclear era for Indian defence*. [https://www.business-standard.com/article/current-affairs/pokhran-i-the-event-that-ushered-the-nuclear-era-for-indian-defence-122051800245\\_1.html](https://www.business-standard.com/article/current-affairs/pokhran-i-the-event-that-ushered-the-nuclear-era-for-indian-defence-122051800245_1.html)

Charnysh, V. (2006). A Brief History of Nuclear Proliferation. *Mechanical Engineering*, 128(11), 40–44.

Dawn. (2015, February 6). *PIA Fokker hijackers sent to gallows after 17 years*. Dawn. <https://www.dawn.com/news/1184728>

Dyke, J. M. (2006). Liability and Compensation for Harm Caused by Nuclear Activities. *Denver Journal of International Law and Policy*, 35.

EPA. (2022). *Radioactive Fallout From Nuclear Weapons Testing*. United States Environmental Protection Agency. <https://www.epa.gov/radtown/radioactive-fallout-nuclear-weapons-testing>

FAS. (2002). *A Brief History of Pakistan's Nuclear Program*. Federation of American Scientists. <https://nuke.fas.org/guide/pakistan/nuke/>

Fedchenko, V., & Hellgren, R. F. (2007). *Nuclear arms control and non-proliferation*.

*Field Visit to Padag, Chehther and Dalbandin*. (November 2022).

Gul, A. A. (2023). *Interview*.

IAEA. (1998). *Radiological Conditions at the Semipalatinsk Test Site, Kazakhstan: Preliminary Assessment and Recommendations for Further Study*.

Ilyas, Dr., Waseem, Dr., & Hassan, Dr. (2022). *Interview with tertiary Hospital Officials*.

Islamic Relief. (2019). *Drought Assessment Report Chaghai, Noshki, Kharan, Washuk and Quetta*.

- Karplus, W. J. (1992). Nuclear Radiation. *The Heavens Are Falling*, 165–178.  
[https://doi.org/10.1007/978-1-4899-6024-5\\_7](https://doi.org/10.1007/978-1-4899-6024-5_7)
- Katz, J. I. (2008). Lessons Learned from Nonproliferation Successes and Failures. *Comparative Strategy*, 27(5), 426–430. <https://doi.org/10.1080/01495930802358398>
- Makhijani, A., Smith, B., & Thorne, M. (2006). *Science for the Vulnerable: Setting Radiation and Multiple Exposure Standards*.
- Medical News Today. (2013, January 1). *Iron-deficiency anemia*. Medical News Today; Humana Press Inc. [https://doi.org/10.1007/978-1-62703-047-2\\_10](https://doi.org/10.1007/978-1-62703-047-2_10)
- Naz, F., Dars, G. H., Ansari, K., Jamro, S., & Krakauer, N. Y. (2020). Drought trends in Balochistan. *Water*, 12(2). <https://doi.org/10.3390/W12020470>
- Pakistan Bureau of Statistics. (2021). *Population and Household Detail from Block to District Level*.
- Nuclear Scientist (December 2022). *Interview*.
- PIB. (2009). *Press Statement by Dr. Anil Kakodkar and Dr. R. Chidambaram on Pokhran-II tests*. Press Information Bureau, Government of India. <https://pib.gov.in/newsite/PrintRelease.aspx?relid=52814>
- Robbins, A., Makhijan, A., & Yih, K. (1991). The Health and Environmental Effects of Nuclear Weapons Testing In, On and Above the Earth. In Ze. Zed Books.
- Sheikh, N. S., Sheikh, A. S., Sheikh, A. A., Yahya, S., Rafi-U-Shan, & Lateef, M. (2011). Sero-prevalence of Hepatitis B Virus Infection in Balochistan Province of Pakistan. *Saudi Journal of Gastroenterology: Official Journal of the Saudi Gastroenterology Association*, 17(3), 180. <https://doi.org/10.4103/1319-3767.80380>
- Singh, M. P. (2016, August). *Inhuman impact of nuclear bomb tested by Pakistani army in Chagai*. India Today. <https://www.indiatoday.in/india/story/inhuman-impact-of-nuclear-bomb-tested-by-pakistani-army-in-chagai-335782-2016-08-17>
- Tadros, C. V., Hughes, C. E., Crawford, J., Hollins, S. E., & Chisari, R. (2014). Tritium in Australian precipitation: A 50 year record. *Journal of Hydrology*, 513, 262–273. <https://doi.org/10.1016/J.JHYDROL.2014.03.031>
- Tkacik, M. (2010). Pakistan's Nuclear Weapons Program and Implications for US National Security. *International Relations*, 24(2), 175–217. <https://doi.org/10.1177/0047117809366202>
- Tribune. (2013, May 29). *Fallout: Balochistan observes 'black day.'* Express Tribune. <https://tribune.com.pk/story/555885/fallout-balochistan-observes-black-day/>
- UNSCEAR. (1993). *Report to the general assembly (Annex B— Exposures from man-made sources of radiation)*.
- US History. (2022). *The Manhattan Project*. US History. <https://www.ushistory.org/us/51f.asp>

Warden, C. (2021). *Hiding in Plain Sight: India and Pakistan's Global Environmental Threat*. Center for Arms Control and Non-Proliferation. <https://armscontrolcenter.org/hiding-in-plain-sight-india-and-pakistans-global-environmental-threat/>

WHO. (2022a). *Anaemia*. World Health Organization. [https://www.who.int/health-topics/anaemia#tab=tab\\_1](https://www.who.int/health-topics/anaemia#tab=tab_1)

WHO. (2022b, June 24). *Hepatitis B*. World Health Organization. <https://www.who.int/news-room/fact-sheets/detail/hepatitis-b>

Yamamoto, M., Tomita, J., Sakaguchi, A., Ohtsuka, Y., Hoshi, M., & Apsalikov, K. N. (2010). Uranium isotopes in well water samples as drinking sources in some settlements around the Semipalatinsk Nuclear Test Site, Kazakhstan. *Journal of Radioanalytical and Nuclear Chemistry*, 284(2), 309–314. <https://doi.org/10.1007/S10967-010-0463-2>



License [Pakistan Journal of Society, Education and Language \(PJSEL\)](#). This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) 4.0 International.