STUDY OF HEAVY WEIGHT METALS (As, Cd, Co, Cu, Mn, Ni, Pb & Zn,) IN DRINKING WATER OF NASIRABAD DISTRICT IN AREA OF BALOCHISTAN (A CASE STUDY)

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ABSTRACT: *This study was conducted to examine the amount of heavy weight metals (As, Cd, Co, Cu, Mn, Ni, Zn and Pb) in drinking water (DW) in Nasirabad areas. The study looks at the possible healthiness hazard produced by the heavy metals intake by native populations breathing around Nasirabad. The purpose of this study is to achieve the information of heavy metals (As, Cd, Co, Cu, Mn, Ni, Zn and Pb) in drinking water of Nasirabad to consider the contamination of toxic heavy metals in the environment.*

Keywords; Pollution of Heavy Metals, Toxicity, Atomic Absorption Spectroscopy.

INTRODUCTION

Balochistan is a huge reservoir of mineral resources, yet unexplored. For this reason it has been a bone of contention among its neibours, harboring political instability in this part of the world. It is the largest province of the country claiming 43% of Pakistan's total area. Despite its mineral wealth remains unattended as one of the most underdeveloped areas of Pakistan. Exploitation of these resources can prove to be an economic hub of Pakistan. Though late, the Government of Pakistan has launched a number of development programs in collaboration with other countries. Worth mentioning are, i) significant contribution of US $ 1,100 million to deep-water marketable and naval harbor in Gwadar on the Arabian Sea is worth mentioning. ii) Republic of China on the other hand, funded over $ 200 million to the building of Gwadar's initial phase. China is deeply involved in the shape of China-Pakistan Corridor Economic (CPEC) projects.

Shortage of water resources is another setback with this province. Water is largely used for industrialized processes, agriculture and human consumption in Pakistan. Then the consumption rate for each purpose used is presented in table-1.

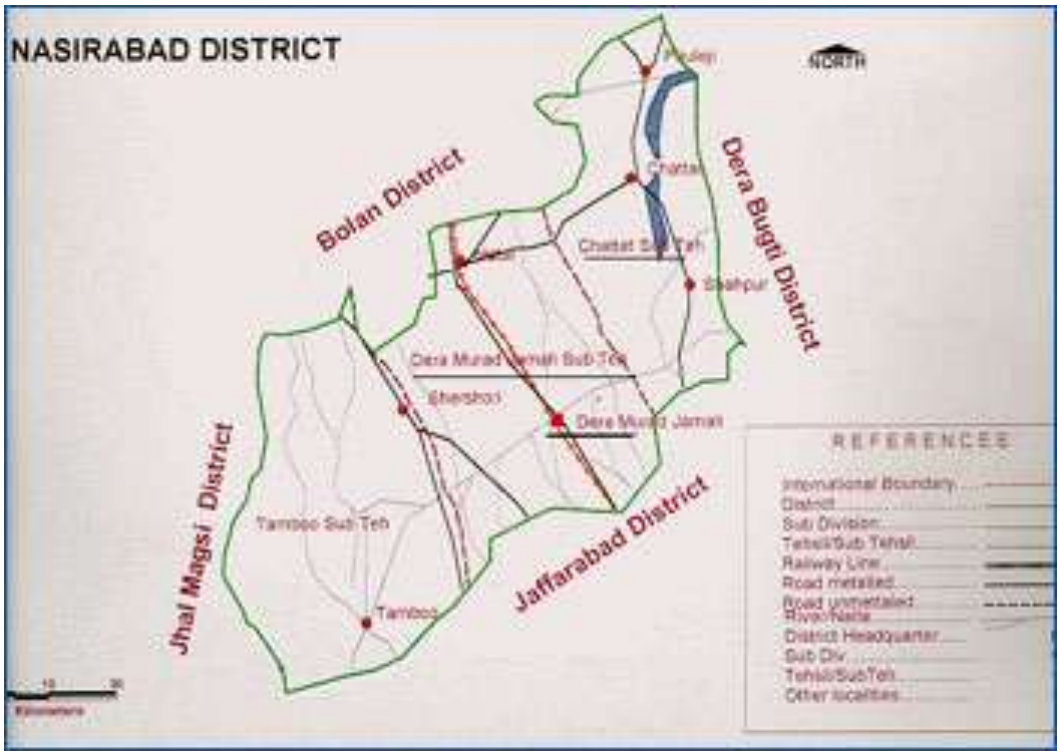

Figure-1. The general geological map of exploration site, Nasirabad.

Table-1. Water Consumption

Purpose	Percentage (%)
Agriculture	69
Industry	23
Domestic uses	8

It is expected that only 80 % of the urban and 45 % of the rural population have access to drinking water in Pakistan, and relocation to the urban is setting pressure on city water resources and inadequate public health facilities. Contamination has directed to the spread of water linked toxicities, further 40 % of bedsteads in Pakistan hospitals are full by patients with water linked illnesses.

In Pakistan, water left overs are keys reserve for the comfort of its supported inhabitants. Water scarcity and aggregate opposition for manifold usages of water have unfavorably changed water quality, so water contamination has developed a somber problematic in Pakistan.The outcomes of numerous studies and readings point out that water contamination has amplified in the country. Toxic waste stages are upper, especially in large cities due to industrial set up. The outcomes of numerous studies and reviews conducted by various organizations have shown that water contamination has converted into a grim delinquent in the country. In this sense, improving water standard is unique and the extremely significant for resolving water shortages in the country counter measures.

The quality of nontoxic and worthy consumption of water is the foundation in place of noble anthropological healthiness. Water provides some elements, but when it is contaminated it can become a cause of unwanted, harmful to humanoid health and source illnesses like numerous types of cancer, poor reproductive results, cardiovascular diseasess and neurological diseases. Infants and younger people are further disposed to the lethal special effects of heavyweight metals, such as fast fetal organization of development of organisms, newborn and youngsters are much extra sensitive [1]. Juvenile contact to certain metals can cause wisdom problems, remembrance disorders, nerve harm, and behavioral problems such as aggression and hyperactivity [2]. On upper quantities, heavyweight metals can originate permanent destruction of the brain. Offspring may obtain upper quantities of nutrients than grown person, as they devour more physique bulk than grown person. The cause is the existence of hydrological plague of disturbing stages of arsenic heavy weight metals in groundwater in different world communities [3].

Heavy metals and arsenic as arsenic complexes are extremely lethal and destructive to anthropological fitness. Initiation in metallurgical wastes and leachates, glass productions and earthenware businesses, fertilizer production, pesticides and refining of oil and further organic manufacturing cause diverse hazards. Several of the arsenic biospheres are obviously found in the ground somewhere groundwater [4]. Antimony exposure is associated with heart damage, lungs and other body part. There is inadequate indication that long-lasting contact may effects on development and reproduction. Individuals may be unprotected to living polluted air of antimony, consumption of unclean water or ingestion of foodstuffs that comprise antimony. Pb is a heavyweight metal and lenient gray. Environmental Protection Agency (EPA) categorizes Pb as a likely humanoid cancer-causing agent. Contact to Pb comes after inhalation of polluted air, dirty with contact of contaminated Pb water. Lead Pollution of tap-water happens while water permits over the older pipes having soldered Pb or brass fittings containing Pb. Even though aluminum is not a heavyweight metal (density 2, 55-2, 80), representing about 8 percent of the Earth's external and is the 3rd greatest rich component. Once aluminum stores heavily in soft tissue like brain, which has the latent to severe neurological hostile effects.

Dialysis encephalopathy is a system of aluminum neurotoxicity categorized by dementia and spasms. Agreeing to the Environmental Protection Agency (EPA) the tolerable quantity of heavy weight metals like Sb (antimony) is 0.006 mg per litre of water, for Pb (lead) is 0.015 mg per litre, As (Arsenic) of 0.010 mg per litre and (Al) aluminum 0.05-0.2 mg per litre. Heavy weight metals frequently are associated with anthropological harming with Pb, Hg, As and Cd. Additional heav yweight metals, comprising Cu, Zn, and Cr, are in fact essential for the organism in minor quantities [6].

Water (H_2O) is the elixir of long life and is necessary in lieu of the existence of entire alive stuffs. Body fluid and lungs comprise 82% water and 90% singly [7]. Drinking water is an important aspect of health people, so it should be delightful and pleasantly pleasing at the outset, but at the delivery point for the user as well. In order to ensure health care and to prevent harm to people's health, we recommend using approved water sources. Thousands of people around the world, the unsafe waters of contaminated heavy metals are causing the death of the fetus and the disease [8].

Although water from the contaminated heavy toxic metals wells is poisonous, but people have no choice but to keep drinking water from these wells and to be a victim of diseases, including skin cancer and many other fatal diseases such as reduction of growth and development, cancer, organ damage, nerve damage, and in extreme cases, death. Exposure to certain metals, such as mercury and lead, can also cause autoimmunity in which the immune system attacks a person's cells. This can lead to common diseases such as rheumatoid arthritis and kidney disease, circulatory system and nervous system. Infants and younger people are more prone to the toxic effects of heavy metals, such as fast fetal body development systems, infants and children are much more sensitive [9].

Poor rural communities in developing countries use their own initiatives to acquire drinking water from surface water sources (rivers, dams, etc.) or underground springs, such as tubular wells, hand pumps, etc. Using sources of groundwater, surface holes are dug, where water is obtained by using ropes-connected buckets. A hole in the ground is dug in order to remove the ground floor [10]. Tubular wells are those that penetrate aquifers where water is not limited by a waterproof layer overhead. The level at

which the soil is saturated is the ground water. These wells are particularly sensitive to seasonal variations and may decrease during periods of drought. Particular of the arsenic world is certainly found in the ground wherever groundwater approaches the water [4].

Environmental scientists are currently concentrating on surface and underground Heavy Metal (HM) contamination. Rock erosion and anthropic actions are well thought-out of the main usual or non-natural bases of HM water resource growth [11]. Excess heavy metals, whether vital or non-vital, are injurious to the living constituents of an ecological unit. The expulsion of deadly engineering wastes into water bulks is dangerous for marine life and finally to anthropological healthiness [12]. The sweetie sector syrup produced for the manufacturing of distillate fermentation % ethanol. For the production of a single tin of 13-15 tons of consumed washing, they are settled from the distillery [13]. The production of distillery molasses of ethanol production is about 13 million cubic meters, while 156-195,000,000 m of spent washing per year is discharged from the distillery sector around the world [14]. HM like Zinc, Cobalt and Copper are vigorous to the regular function of entire beings together with body growing, although unnecessary amounts of metals, Cadmium, lead, Manganese and chromium are terminal venomous to humans and marine creatures [15]. A stable amount of Chromium is essential for flat bulk roles; its highest amount can communicate poisonousness to kidney, liver and malignancy cause [16].

Co is similarly compulsory for normal bodily utilities and integral metal B12 [17]. Nevertheless, the intake of excess diet and water Cobalt may cause problems because the right-hand side coronary blood vessel is source for too much creation of white blood cell and polycythemia [18] Manganese is vital for breathing creatures, trace element and enzyme promoter in the body, Manganese and Copper cause mainly destructive to intelligence and nervous system disorders, such as Alzheimer's men's disease and magnetism [19]. While drinking water is abundant Mn also affects the brain function of 10-year-old children. Also the intake of Ni-Ni and chloride sulphate can cause fatal health complications, including incurable cardiac arrest, respiratory cancer, pulmonary fibrosis, problems with the excretory system and skin allergies [20]. Lead (Pb) is similarly an exceptionally toxic and cancer-causing metal and can produce long-term healthiness jeopardies such as pain, bad temper, anemia, nausea, loss of hunger, seizures, brain destruction, blood pressure, liver and lung stomach and kidney-cancer. Zinc produces a lesser amount of harmfulness to humans and is vital for ordinary physique utilities, similar further HMs, their extra amount in body promotes healthiness harms such as weakness, neutropenia, and vertigo while shortage slows down the restorative development of Wounds, reduction of flexibility of respirational tissues, depression, anorexia, amoebaises and dermatitis [21]. Cd is a noxious metal like lead (Pb). It produces testicular damage and is machinery for kidney filtration and can grounds red blood cell destruction. Cd contacts produces long-term and life-threatening fitness difficulties, such as bone destruction, Itai Itai (ahi-ahi) and malignance for men [22].

This work examines the past washing effect stored in evaporation basins in groundwater and intended used for anthropological intake. The excellence of underground water in the surrounding area of the vaporization basins with respect to the water vaporization basins and associated with the criteria for intake water to assess the potential adulteration of underground water and the special effects on humanoid well being.

EXPERIMENTAL

The study area is part of the Nasirabad district. For the collection of the sample, 1.5 liters of plastic rods were pre-washed. The sampling system used over 2015 to 2016 three folds and an typical (n = 3) was created. The factors of Cd, Co, Cu, Mn, Ni, Zn, Pb and As elements were inspected by regular analysis procedures [23] ("APHA 1995"). For the purposes of Cd, Co, Cu, Fe, Mn, Ni, Zn and Pb metals, used washing tasters were watered down 1: 100 with purified water, even though for flow of water and underground water additional (1.25 Ml) of HNO_3 and heated in a water-bath around 17 ml and filtered. Lastly the bulk was used at 25 ml with purified water. Entirely the substances used were of systematic rank, appropriate salts of the individual metals in 100.0 ml to formulate mother liquor quantities of 1000 ppm were dissolved, further dilution was carried out with deionized water. Cd, Co, Cu, As, Mn, Ni, Zn and Pb were find out by atomic flame atomic absorption spectrophotometer (A.A.S.) with typical heat flame Perkin Elmer A Expert 800 (Perkin Elmer, Singapore) Conditions recommended by the manufacturer. Five standard solutions (1.0, 2.0, 3.0, 4.0 and 6 ppm, respectively) of every single metal were castoff to standardize the device. The typical solution (2 to 3 ppm) was observed afterward 5 tasters to test instrument quality, if the comparative fault was% greater than 5 percent, the device was re-standardized act as standard.

RESULTS AND DISCUSSION

Effects on human and environmental health of heavyweight metals rest on the kinesis of every metal via the ecological partitions and through which metals find man and the atmosphere. The heavy metal contamination position in Pakistan is a major disaster and is revealed in the number of readings and this study is housed in Table-2 and Figure 1. The subsequent passage shows the state of contamination of heavy metals in various sources such as Water, soil, sediments, particles and vegetables.

Table-2.Heavy metals level (ppm) in drinking water of Nasirabad District.

S.NO	Name of Site	Cd	Co	Cu	Mn	Ni	Pb	Zn	As
1	Water Supply	0.01	0.03	0.3	0.1	0.21	2.25	0.21	1.08
2	Abroabad	0.12	0.04	0.4	2.2	0.24	6.35	0.39	2.5
3	Jacko Mahala	0.13	0.035	0.5	2.3	0.23	6.34	0.4	2.6
4	Goot	0.11	0.031	0.3	2.4	0.22	6.4	0.69	2.3
5	Goot Pathafi	0.2	0.02	0.3	2.45	2.69	7.13	2.3	1.9

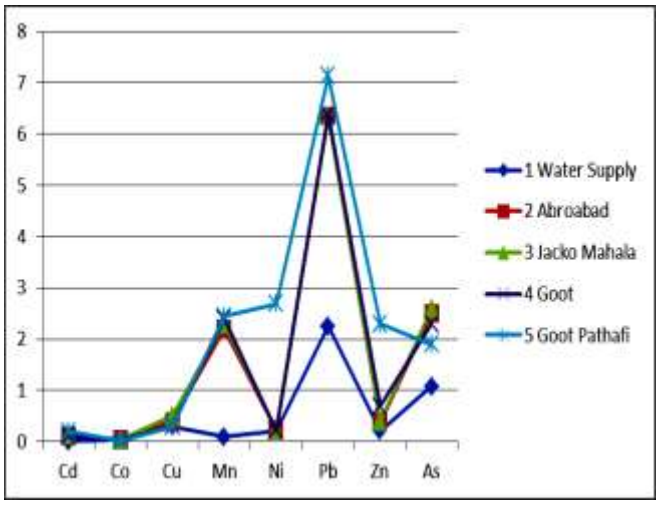

Figure-1. Heavy metals level (ppm) in drinking water of Nasirabad District.

From the data in table-2 it was observed that the concentration of Cd in range of .01-.2 ppm. Cadmium (Cd) is a major cause of concern for toxicity and exposure can cause acute and chronic fitness sound effects in active beings. Cadmium is obviously found in the earth-crust and sea water [24]. Earth's richness of Cadmium is on usual range of 0.1 to 0.2 mg per Kg, while in marine waters it is between <05and 110.0 ng per litre on regular range [24]. Cadmium and its complexes are cancer-causing for human beings and are categorized as Group 1 by the Global Cancer Research Agency, as the Cd and its complexes produces lung tumor, and have observed optimistic relations for kidney and prostate cancer. Cd poisoning can also lead to lung damage, kidney-destruction, skeletal-injuries and Itai Itai- [25] sicknesses. In intake water the bearable amount established by World Health Organization is 3 microgram per litre Cd [21]. Pakistan, the upper amount of Cd in intake water can come from drains, marble, steel and aluminum, and mines and metals [17]. Cd observed in groundwater samples taken at several sites in Pakistan concentration was between 1 and 210 µg / litre [22]. The maximum value of 210 µg / litre was reported in Hayatabad Manufacturing Land, tube wells, Khyber Pashtonkhawa province (KPK) through an regular of 20 µg / litre [25]. Correspondingly, the Cadmium amount in superficial water tasters displays a huge dissimilarity across the motherland and among the exposure limit below 200µg / litre (Figure-2) [25] in addition, in the superficial water taster (Of the Kalar Kahar lake, Chakwal) Cadmium stayed unnoticed in March to April, nevertheless, it disclosed regular variations in the further months of the year (ie 10-50) µg / litre [25]. quantity of Cd in superficial water tasters together from several spots in the region of Khyber Pashtun Khawa was between 2 and 90µg / litre (mean 2 µg / L), being the maximum informed by draining Kaplan. , Maler Canal in Karachi (Sindh) displayed dissimilarity stuck between 2 and 70 µg / l Cd (mean 40 µg / L) in the similar learning [17].

Several studies show the capillary distribution of Cd in wastewater samples from different areas of Pakistan. The uppermost quantity of 5.35 mg / litre Cadmium in the waste waters described in Korongi, Karachi [26] surpassed the allowable boundary of 100 µg / litre fixed by National Environmental Quality Standard (NEQS) Pakistan for industrialized waste water. In addition, Reflux in the north and east of Lahore in Punjab region, Cd quantity in reflux was similarly beyond the safety border established by NEQS and ranged from 180 to 370 µg / litre [27]. In alternative reading of the effectiveness of wetlands for the removal of heavyweight metals from industrialized unwanted water Gadoon Ammazai Industrialized Estate, Swabi KPK indicated a deviation of the Cd in the sort of 190-620 µg per litre [28]. It is noted that there is a huge variant in the level of Cd from the selected spots ranging from 20 to 184000 µg per kg of regular soil for polluted mud with excavating or additional deeds [29] in the next reading of Sargodha region, the uppermost amount of Cd in the topsoil were 0.00674 g per kilogram and upper grounded Cd standards recommended the probable danger that Cd enter the upper foodstuff sequence as replicated in the Cd gamma buildup Food from 0.00114 g to 0.0042 g per kg [30]. On the floor of the region of Islamabad, Pakistan-capital, and road dust beside the highway from capital, we found amount of Cd 0.0058 to 0.0061 and 0.0045 to 0.0068 g per kg, correspondingly; these upper values are in many municipalities round the biosphere, analogous to the cities of Karachi and Lahore [31].

Considering the effects of the Cd on health, which proposed a reference value of 0.005 µg per m^3 in the air [32]. Heavy metals in the atmosphere normally contemporary as part of fine constituent part called particulate matter (PM10 or PM2.5). The International Agency for Research (IARC) working group recently classified external and atmospheric airborne particles as cancer-causing to human-being (IARC Group 1) [33]. Most studies indicate that the concentration of Pakistan Cd in air is fewer than 0.005 µg per m^3 (on average) colloidal particles. Nevertheless, a survey displays the average yearly Lahore Cd amount of 0.069 µg per m^3 in PM2.5 [34].

Cobalt metal is mainly used in the preparation of magnetic alloys, wear resistance, high resistance. Cobalt and aluminized cobalt (II) (CoAl2O4, cobalt blue) cobalt compounds give a deep distinctive blue glass, ceramics, inks, paintings and paints. Cobalt is naturally present as a stable, cobalt-59 isotope. Cobalt-60 is a commercially important radioisotope, and used as a radioactive tracer for the production of high-energy gamma rays. Cobalt is the active coenzyme called cobalamins, the most common of which is vitamin B12. As such, it is an essential mineral to feed all animals. Inorganic cobalt is an active nutrient for bacteria, algae and fungi while in the data the range 0.2-0.35 ppm of Co was observed

The amount of Cu was observed in range 0.3-0.5 from the data shown in table-2. Cu is a crucial constituent and continuously exists in the diet and liver of animals, those are most contributing to contact to Cu diet [35]. Cu acts as reducing agent in superoxide-dismutase, cytochrome-oxidase, lysine-oxidase, dopamine-hydroxylase, and various other diatomic oxygen reducing oxidants. It is conveyed to the body for ceruloplasmic protein [36]. The suggested diet in the diet (ADR) for grown person is 900 µg per day. The average Cu diet in the United States is about 1000 to 1600 µg per day and the maximum admissible grade of adult intake is 0.01 g per day [35]. In Pakistan, superficial and groundwater adulteration with Copper amount not carriage noteworthy difficulties since maximum readings shows Copper quantity inside the satisfactory limits of WHO / NSDWQ Pakistan 2000 µg per litre [21]. Merely single reading shows that concentration of Cu melted in groundwater varies from <0.1to 2800 µg per litre [15]. Pothi Bond AJ & K municipal water (well) presented the uppermost quantity of 2800 µg per litre of Copper, whereas total other readings of Cu quantity in intake water were surrounded by assurance edges [15].

The amount of Manganese was observed in range .1-2,45 ppm as shown in table-2. Manganese phosphatization is used as a treatment to prevent oxidation and corrosion in steel. Depending on its oxidation state, manganese ions have different colors and are industrially used as pigments. Alkaline and alkaline metal permanganates are powerful oxidants. MnO_2 is castoff as cathodic material in alkaline and carbon-zinc batteries.

In natural science, Mn (II) ions acts as promoters for a diversity of biological catalysts with numerous roles [37]. Mn enzymes are mainly vital in the decontamination of free superoxide ions in living beings to be treated with free oxygen. Mn also works in oxygen emitting in photosynthetic complex plants. The constituent is a bit mineral necessary for totally living beings known, nevertheless it is a neuropoison. In superior quantities, and seemingly with larger breath efficiency, can source intoxication disorder in animals, sometimes nervous injury is permanent.

The concentration of Nickel was observed in the data in range from .2 - 2.69 ppm as shown in table-2. Ni (Nickel) is extensively dispersed in natural-surroundings and is found in wildlife, floras and earth; The Ni quantity in the earth is in the variety of about 4-80 ppm [5]. Huge quantity of Nickel is left into the troposphere from both usual and man-made activities, including fossil fuels, industrial production (extraction, fusion and filtering), usage and removal of Ni and alloy compounds and residual ignition [5] . Not any anthropological contact outcomes from ingestion of diet contaminated with Ni, aqua, breathing and immersion [38]. Agreeing to the Global Agency for Investigation on Malignancy Screening, Nickel complexes are cancer-causing for homo sapiens and are categorized as mixtures of Group 1 metals. Nickel and complexes cause cavities and nasal and lung sinuses. The maximum permissible nitrogen concentration established by World Health Organization in intake water is 70 µg per litre [21], while nationwide values for intake water value in Pakistan (NSDWQ-Pak) proposed a guide rate of 20 µg per litre [21]. Ni quantity be different from < 1 µg to 3.660 mg per litre in groundwater < 1 µg to 1.52 mg per litre superficial water in the country [16]. This has been detected that, in utmost circumstances, under-groundwater is adulterated by Nickel further than the grade of pollution established by N.S.D.W.Q Pakistan or World Health Organization.

The concentration of Pb in the data was noted 2.25-7.13 ppm as shown in table-2. Exposure to Pb in youngsters and grown person can produce a number of healthiness harms, with little sound-effects on digestion and convulsive intellect, unconsciousness, kidney destruction and passing away [39]. According to the International Agency for Cancer Research, Pb inorganic compounds are likely to be cancer-causing to human-being (Group II-A), while carbon-based Pb complexes are not classified as carcinogenic to human being (Group III) [40]. Pb is in little quantity in the earth-crust mainly as PbS (Galena), nevertheless the extensive presence of Pb in the atmosphere is mainly the result of anthropological-activity. Lead move in the atmosphere on certain phase after extraction to last usage, and pollutes harvests, earth, water, nutriment, air and powder-dust [40].As a result, discarded aquatic waterways contain upper Pb contented which makes them more dangerous aimed at earth, plants and further beings, plus human being.

The concentration of the Zinc was noted in range of .21-2.3 ppm as shown in table-2. Zn is a necessary micro-nutrient and catalyzes enzymatic action adds to polypeptides organization, and standardizes genetic factor appearance [37]. Even though the significances of the shortage of Zn is being accepted in lieu of several annum, however it can be lethal when grants surpass functional requirements [41]. Opposing properties related per prolonged supplemental consumption of Zinc and gastrointestinal effects consist of acute headache, impaired immune function, reduced lipo-protein and dietary fat grades, reduced Cu grade, and zinc-iron relations. RNA for adults of Zn is 8 to 11 mg / day, while the maximum admissible grade of intake is 0.04 g per day for adults, based on the reduction of superoxide dismutase value of copper-zinc red erythrocytes [36]].

The concentration of Arsenic (As) was observed in the data in range of 1.08-2.6 ppm as shown in table-2.. As is a deadly metal and rests an important anthropological fitness problem because their (inorganic) compounds are cancer-causing to homo sapiens and are categorized as group IA, while carbon-based complexes such as mono- and dimethylcarbons are perhaps cancer-causing for l 'And are categorized as Group IIB by the World-wide Agency for further Investigation on Malignancy [24]. As contact produces a marked increase in

the development of numeral of tumours, particularly melanoma and Hepatocellular carcinoma, lung carcinoma, Urothelial carcinoma possibly renal cell carcinoma and colorectal cancer are the cybernetes of metabolic system [42]. For the duration of the nineties, the natural presence of what has been found wide-ranging in under-groundwater in the United States, Argentine, Republic of China, Hungarian (Hungary), Viet-Nam and the Ganga plaintiff [43]. The temporary indicative rate of the WHO for the concentration of As in intake water is 10 mg / l; Likewise, several regulatory authorities or countries such as the United States or the EU have set benchmarks owing to the developing anxiety for this toxic cancer-causing agent and ensure increased consciousness of As's hazards in intake water. Likewise, in various regions of Pakistan, we are faced with serious community healthiness difficulties as existing in neighbor nations and in the United States [44]. The concentration of arsenic remained in elevation in superficial and underground waters in our country, predominantly in two regions, in particular, Sindh and Punjab. Punjab and Sindh assets (3 percent to 16 percent) with a grade of contamination above 50.1 gms per litre, however 20 percent to 36 percent of the Sindh and Punjab water resources presented are adulterated with As beyond 10.0 gms per litre [45].

Council of Pakistan and Water Research Resources (CPRWR) and UNICEF have conducted the assessment of intake water value since 1999, following the Pakistan crisis and other neighbors [16]. So, the presence of groundwater contaminated by 11-200.5 gms per litre is being accepted in numerous zones of the country, particularly Punjab [16]. In 2001, he conducted a nationwide analysis of As intake water reservoir in 35 out of 104 districts of the country [46].

CONCLUSION

Contaminated aqua is similarly a chief problematic for publics in Balochistan. Inhabitants of these regions believed the public health and drainage-scheme is inadequate because they are suffering from many problems. Everyone is a holder of the participation since we are residents of this unique homeland. Therefore, each person would be individually accountable for maintaining the environment over collaboration and vigorous contribution in the release of the atmosphere. In summary, the concentration of all the elements in water samples was significantly different between the sites and the level of all metals (except Zn and Ni) remaining higher in surface water samples and low in the underground water sample. It can be concluded that the artificial reservoir (dam, lake and pond) significantly affects the water quality in the Nasirabad district.

RECOMMENDATIONS

- There had better not be unbroken watching of intake water and the atmosphere all over the motherland, equally in pastoral and metropolitan areas.
- The industrialized waste water discarding must be firmly controlled and each sector had better be enforced to adjust waste-water handling procedures.
- Wastewater collection and treatment facilities should be installed in large urban wastewater treatment cities.
- Local authorities should have means for monitoring and purifying drinking water.

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