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THE CONSEQUENCES OF CONTAMINATION OF TOXIC CARCENOGENIC ELEMENTS IN DRINKING WATER AND DIGESTIVE POLLUTION IN ENVIRONMENT IS A CASE OF CANCER

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Abstract: The contamination of drinking water in Azad Kashmir and Pakistan and environmental pollution by gases like CO2, CO3, SO2, NO2, NO3, CO, , O3 and inhalation by human is a big problem in the area under consideration . The distribution system of waste in hospitals, and contaminated water in cities, homes and chemicals in agriculture are not properly designed. The Environmental pollution is also a big risk in the area for human. A detailed research study was conducted in urban and rural areas which are affected by water borne diseases like cancer. Water samples were collected and tested for chemical toxic elements and environmental data was collected from environmental polluted areas where chemical industries, mining industries are active. Some data was collected from research papers published in reputed Journals. The chemical

contaminants found in drinking water in Azad Kashmir and Pakistan contain carcinogenic hazardous elements. Ground and surface drinking water contain Pb, Cr, As, Cd, Hg, Cu, Zn, Mn, B, F, Ni, Se, Na, SO4, PO4. Turbidity was > 6 NTU, These elements are highly toxic and are one of the most hazardous carcinogenic constituents of water. Some of them are nutrients. Excess of these elements cause cancer and target kidney, lungs, heart, prostate, and create neurological complications. Cd mainly damage kidney. CU is highly toxic and people get from drinking water and damage liver and kidney. Zn cause stomach nausea, skin irritation, cramps, vomiting and anemia. The toxic effects of Ni include dry cough, bone, nose and lung cancer, cyanosis, rapid respiration shortness of breath, chest tightness, chest pain and nausea. Cr is found in [FeCr2O4] and [PbCrO4] become Cr2O3. It is highly toxic metal in drinking water. It cause diarrhea, vomiting, congestion, kidney and liver cancer. The Pb in excess create anemia, cancer, kidney diseases nervous system damage, mental retardation. The As in body in excess cause skin cancer lungs and bladder cancer, kidney cancer.

Vascular diseases, diabetes, weight loss, and neurological disorder. The concentration of Hg in body results in damage to kidney reproductive system, immune hematologic cardio vascular system and brain damage, later on it become cancer. 50% of all diseases and 60% of all deaths are due to unsafe water. 95% of peoples are drinking contaminated water. 80-90% of deaths caused by water- borne diseases like diarrhea. The excess of K in the body causes hypertension, kidney diseases, heart and muscle weakness, asthma, rapid heart beat. The excess of Na in the body result in brain and kidney damage, hypertension, Nausea, head ache cardiovascular diseases. The increase of Fe in blood cause weakening cardiovascular tissue, fail central nervous system, kidney and liver cancer and blood problems and diarrhea to death. So the contaminated water create multi directional water borne diseases, cancer and death.

INTRODUCTION

The chemical contamination of ground and surface water used for drinking purposes and environmental pollution is a question for management and researchers . The contamination of drinking water is from different sources [Khan et al, 2023] The toxic chemical elements in water are unacceptable which is used for drinking purposes. The analysis of 2000 water samples and visiting well known hospitals in urban and rural areas indicate that water is main cause of most of the diseases like cancer and other harmful diseases. This research was especially conducted for cancer a harmful disease in the area of study. From water analysis hazardous carcinogenic elements were found. At least 8 elements harmful to life were detected. The carcinogenic elements are Pb, Cr, Cd, As, Hg, CU, Zn, Ni. The excess of these hazardous elements in the human body are serious threat to the life [Khan et al 2023]. The Pb is [WHO, 2003-2022 is 0.01 mg/l], hazardous heavy metal. It is considered as water degradable element which is 8.9-9.7 in Azad Kashmir and > 8 in Pakistan in spring, lakes and stream water [Khan et al 2023, Junfeng et al 2014]. Excess of this easily accumulate in the human body. Drinking water is the main source of it. Although it can be enter in to the body through environment i. e air, smoke, and from food like vegetables and rice. It can enter the body through digestive system to lungs and carried by blood in whole body. Its excess in body cause cancer, renal kidney disease, anemia, and nervous system damage [Chin et al 1988]. The presence of Cr in water in excess is unwanted. It is highly toxic metal in drinking water. Cr naturally found in various oxidation states like Cr 2+3+6 with trivalent Cr [111], and hexavalent Cr [v1]. Cr [v1] is extremely toxic. It cause severe diarrhea vomiting, pulmonary congestion, liver and kidney damage, cancer to death [Mirvish et al 1992]. The Cd is toxic heavy metal found in rock deposits. It is considered as big pollutant of drinking water in Punjab, Sindh Baluchistan and KPK. [Khan et al 2023]. It always attack kidney [Morris et al 1992]. It remain in the body for long time. The CU contaminate environment , as well as It contaminate drinking water. The CU is highly toxic element. The excessive ingestion of CU increase blood pressure, and damage respiratory system. Kidney and liver are extremely effected and converted to cancer and to death [Salmon et al 1995, Khan et al 2023, Sonia et al 2018]. The Zn in excess cause stomach nausea, skin irritation, cramps, vomiting and anemia. Its concentration in water is < 1-4 mg/l in various wastes and released into environment from agricultural activities, ground water intrusion and collectively activation of these sources [Bahar et al 2017]. The Ni is a toxic metal mostly present in waste water. It effect the body cells, cause dry cough, bone, nose neck and lung cancer, synopsis, rapid respiration, shortness of breath, chest pain, nausea to death [Neha et al 2022, Khan et al, 2023, Alidad et al 2019]. The AS is highly toxic, present in drinking water and rocks cause skin cancer, lungs, bladder, kidney, liver cancer. Vascular system damage, diabetes, infant mortality, weight loss, neurological diseases [Anwar et al 2004]. Cancer is also due to use of tobacco, areca nut, chewable tobacco, Niswar [John et al 2003, WHO, 2001-

2023, Morris et al 1992], and mortality in all ages. Six million deaths occurred in 2000, 22 million live with this deadly disease [Anwar et al, 2004, Aroin et al 2009]. 15 million new cases were registered, 10 million deaths occurred in 2020. 19.3 million new cases were registered. 10 million deaths were reported worldwide in 2020 [Khan et al, 2023, Anwar et al, 2004].

The need of water Only in Faisalabad is 64. 7 million gallon /d for drinking. This water is coming from different sources, some of them are leachate, contaminated and others are agricultural chemical and pesticide contaminated [Anwar et al, 2004]. Three million gallon water come from soil is also contaminated by chemical elements. Current water supply is 80% [Anwar et al 2004, khan et al 2023]. Five million children deaths occurred due to contaminated drinking water In Pakistan 60% of diseases and 40 % of all deaths are due to unsafe water [Khan, et al, 2023]. In rural areas 25 % people get safe water and 75% people drink highly contaminated water. In Urban areas 99% people drink contaminated water [Khan et al 2023]. This contaminated water contain toxic carcinogenic metals which cause cancer. Expected cancer risk in 2040, is reported as 28.4 million people globally get cancer [Anwar et al, 2004, World Report, 2021-22, EPA, 2022, WHO 2003-2022]. In the year 2020 19.3 million peoples get cancer. New cancer cases registered: 18.1 million. Deaths 10 million [EPA, 2022, WHO, 2003-2022, Anwar et al, 2004].

It was reported that the causes of Breast cancer are chemical contaminants: 2.26 million women get breast cancer. The people with Lungs cancer: 2.21 million. Stomach cancer: 1.089 million. Liver cancer: 0.96 million. Colon cancer: 1.94 million is due to contaminated unsafe water and environmental pollution by various sources [World report, 2022, WHO, 2002-2022, PDAC, NCI, Park et al, 2020].

In Pakistan 1.9 million new cancer cases were recorded in 2020. The patients of breast cancer registered in 2018 were 200. The cancer patients of age 70 y were 8.3%, [Adimlla and WU 2019, Park et al 2020, Anwar et al 2004]. The Cancer cases were due to environmental pollution and Life style damage DNA. Causes: Fatigue, weight loss, skin changes, unusual bleeding, Persistent cough, Fever, lump, are common symptoms [Park et al 2020, Anwar et al 2004]. The highest release of Pb is 77% and 61% was in gastric juice[2h and lung fluid 56 h , PH 7.4], These results are highest , and the dependency of the concentration on the chemical composition and PH of the fluid in which the dissolution of PM is taking place in relation to assessing health risk [Adimlla and WU, 2019, OECD, 1991, WHO/ UNICEF 2019].

Table-1. Cancer cases from 2015-2021 reported in Hospitals of Pakistan, registered patients, by hospitals, deaths percent and causes of deaths

Patients registered in 2015-2021	Hospital	Head and Neck Cancer	Gynecological tumor	Breast	Esophagus	Lungs	Liver	Colorectal	Lymphoma
Total no of patients registered 16191 for cancer treatment	Nimra hospital Sindh	36-76	10-22	13-83	5-18	4-79	3-87	4-27	3-16
Urinary		Prostate		Mean age	50-41+_11-78 y in men				
3-11		1-53		50-41 +- 11.78					
Global Cancer incidenc	Burden expected in	Cell type chronic infections	Use of betel nut						

es	2040								
28.4 million	28.4 million	22% by the use of tobacco	22%						
Mineral dust appears in the form of oxides, Ca-Mg, Po4, in matrix of clays, and oxides of alkali and alkaline earth metals. These include Fe, CU, Mn AS, Pb from traffic, industrial CU, AS, Pb < 0.1 um [Park et al].	Total patient admitted 127979 At least 5 million deaths /y attributed to water borne diseases	Neoplasms of which 8443 were benign National statistics of Pakistan 2.5 billion peoples have no proper drainage system /sanitary UNICEF and WHO 2012, UNESCO 2003	And 119486 malignant reported during past 28 y National statistics of Pakistan n 2005 56 % excess to safe drinking water 45% in rural and has no excess to safe water	Male 46.9% Farooq Farooq et al 2008 40-60% safe water in urban area 20-40 % water borne diseases 1/3 are died Pak-SECA 2006	Female 53.1% 5-6 million tons of fertilizers and 70000 ton of pesticides are utilized in Pakistan ultimately contaminate river and lake water	Total neoplasm 127929 Atmospheric pollution, aerosol particles originate from natural and atmospheric sources size > d=1 um accumulation mode 0.1< d <1um ,oil, fly ash and coal dust d< 2.5 um, ultra-fine d< 0.1 um	Waterborne diseases Cholera Typhoid Shigellosis Amoebiasis Food poisoning Diarrhea Infectious diseases Leptospirosis	Drinking water - 973 805 805 450 139 2908 2405 89	Atmospheric dust, or gases released from its matrix such as gastrointestinal tract and thus available for intestinal absorption enter the blood stream or up take by biota at sea surface micro layer [SML]2.5 of CU, and AS released in saliva gastric juice and lung fluid compared to 26% saliva juice.

[Fasil Ali et al 2023, WHO, 2001-2022, ***]

Table-2 Global Cancer Statistics 2020

Cancer type	New cases	Death %	New cases	Deaths	
Gastrointestinal	3573928	18.5%	2228749	22.4	
Leukemia	474519	2.5	315194	3.1	
Melanoma of skin	1198073	6.2	63731	0.6	
Brain/Nervous	308102	1.0	998401.0	1.0	
Pulmonary cancer	2707406	14.7	2019937	20.3	

Genitourinary	4017064	21	1548189	15.6	
Liver cancer	1401450	7.3			
Mouth/oral Cavity cancer	431296	2.3			
Breast cancer	2261419	11.7			
Mesothelioma	30870	0.2			
Hodgkin Lymphoma HL	83087	0.4			
Mesothelioma	30870	0.2			
Kaposi sarcoma	34270	0.2			
Others	2564031				
Some of all	19292789hich are highly cancerous /carcinogenic				

WHO, 2001-2022,

METHOD OFSTUDY

Methods used in study of chemical elements in water using: *****

1-PH - was measured by using PH-Meter [field measurement]

2- Atomic absorption was used for the determination of chemical elements

3- Ion Chromatography was used for SO4, NO2, Cl

4- CO2 was detected by Spectrophotometry

Clinical research involves the application of treatments in patients. Clinical research was conducted clinical trials , study a particular patient group , including their behavior, use material from human such as blood, tissue samples, to learn about disease, how the healthy body works and response to treatment adopted from Quin et al 2023. Then the population in different areas was studied for cancer patients. The all cancer hospitals were visited to study cancer registered patients, and unregistered patients traced from villages, hospitals. Most of the patients do not know about cancer. They drink chemically and biologically contaminated water. Animals and village people in urban areas of Sindh and Punjab, drink water from one place. Chemically contaminated water they drink they get cancer because the chemical elements like Pb, Zn, AS, Se, Hg, Cd, and carcinogenic elements present in water[Khan et al 2023, EPA1998, Bahar et al,2013, WHO, 2001, Quin et al 2023].

For this to detect chemical elements water was analyzed for the above elements to know the cause of cancer in Pakistan. The cancer hospitals were visited for knowing the number of patients registered. International reports were also studied for the total number of patients admitted / year and the deaths /year. It was noted that number of patients admitted are less than unregistered patients. The research was concentrated on patients and the chemical elements that cause cancer and the diet they eat, the

environmental pollution, the gases in air, ingestion of gases by human /day were calculated [shahid et al 20 18, khan et al 2023, Anwar et al 2004].

Inhaling particle matters [PM] in fine d< 2.5 um, ultrafine d< 0.1 um size range in human health and links to cardiovascular diseases, lung cancer, brain function damage and mortality [Park et al 2018] analyzed differential toxicity PM 2.5 from various combustion and mono combustion sources of differential toxicity of PM 2.5 drive toxicity scores. The steps followed in post inhalation, digestion and deposition. The higst release of Pb 77%-61% was in gastric juice and [lungs fluid 56 h, PH 7.4]. These results highlight concentration on the chemical composition and PH of the fluid in which the dissolution of PM is taking place. Three major gaps identified by [Bahar et al, 2013] , EPA, 1998, WHO, 2001-2023, QIN et al 2023]: are as : 1. Effect of atmospheric aging processes over time, heat simulate long range transport 14 days abbreviated to 14. 2. Onward on the dissolution TE from natural and combustion sources in bodily fluid [saliva and lungs gastric 10 min -1 h]. 3. Lack of results from using reality available and fully solid material which are representative of atmosphere aerosol particles from natural sources. {Arizona Test Dust, AZTD]. Exposure to lungs fluid , exposure time, applying micro wave extraction method vs a simplified heart block digestion and incorporating high matrix introduction {HMI] over Agilent 7580 [Qin et al, 2023, Anwar et al 2004, EPA, 1998, WHO,2003]. Patient selection and collection process between 2012-2022. Patients with cancer were involved in this study and enrolled in hospital. All patients were enrolled in hospitals and cancer was detected in patients. Their family history was maintained. The disease place, the cancer stage, and sex were recorded [PMA, EPA, WHO, 2003]. The patient range in oncology, clinics, pathology demography and family history was recorded. Data were recorded electronically; health record was maintained, from cancer registry. Data from database was collected and divided as pathogenic pathogenic unknown [VUS] variants reported according to known genomic variation solicit nomenclature guideline PGVs in any ACMG SF gene, including heterozygous carriers of an autosomal receive cancer predisposition syndrome. All was discussed in a group of researchers[khan et al 2023].

Table-3. Showing cancer genes, cancer caused by elements , frequency and diseases.

Cancer causing elements					
Ar	Ni	Asbestos	Rn	Benzene	Benzidine
Br	1,3 Butadiene	Cd	Coal Tar	Coke Silica	Erionite
Ethyleneoxide	Cr6 compound	Indoor emission	Combustion of coal	Tobacco smoke	Organic acid
Pb	Air pollution	Wood dust	Viinel chloride	Tricholoroethylene	Thorium
Disease Colon/rectum OVERY fallopian tube Uterus Pancreas	PGV Proportion 5/124 [4.0%] 2/85 [14%] 4/70 [5.7%] 6/53 [11.3%]	Cancer gene Neck cancer 2012-2020 203 patients were enrolled including crossover in arm 1, ORR was 21.2%, DDCR 65.6%, ORR 0% for arm 2 42.9% , arm3 , 0%, arm4 , 15.6%, arm5,	Small intestine[1/29] Breast 3/16 [18.8] Skin 1/15 [6.7] Breast cancer 50000.	Cancer genes identified MSH2[1] BRCA1[4] BRCA2[6] TP53 BRCA1[1] TPNALYSIS53 MSH6[2]	2012-2023 Cancer increased from 32%-44% 1835 with 5 year survival rate, ranging 4-8%-47% 43000 new cases were reported. Worldwide cancer cases 730000

National Library of Medicine NLM scientific literature . J Res med. Sec. 2016-21[Adel Ghorani et al, Khan er al 2023, WHO 2023].

RESULTS:

The water analyses showed the presence of water borne diseases. The chemical elements which are highly cancerous have been identified from water samples and patients history form urban and rural areas. The hospital reports add a significant figure in this study. Clinical studies showed that chemical elements like Pb, AS, Ar, Cd, Hg, CU, Zn, Mn, are highly toxic. The chemical data was compared with WHO standards for health. The WHO limits for Pb in human body should not be > 0.01mg/l. The intake of Pb by human is from different sources like environmental pollution [Pb 2.5 mg/kg/person/day, vegetables 5.8 %, water 80 % and other sources like chemical elements from pesticide, agriculture, industrial waste water, hospital infectious wastes which cause cancer. The amount of elements increase in body from different sources. The environment water used for drinking, vegetables, gastric juice, ingestion from air etc [WHO, 2000-2023]

Table-3 Toxic elements deposited in body from different contamination sources cause cancer.

Required	Pb	B	Cr	Cd	Hg	CU
	0.01	0.3	0.05		0.001	2.0
Present in water		8.9	10.8	3.0	4.0	5.5
	>8.9	9.0	3.2	4.6	6.2	7.8
➢	>6.5	4.6	4.5	6.9	5.3	9.7
	9.8	3.6	6.2	5.5	6.8	7.6
Gases pollution in environment and ingestion		SO2 2.5	NO2 3.4	SO4 6.2	CO 6.9	O3 6.8
Drinking water ingestion		2L/day/ person	Fish 49.5 /day/person	Fruit/rice 367g/day/person	Metal 1.5/- 0.085/0.38 mg/kg/day	USEPA
What body can accept		Turbidity 70%	E-coli 94	Lolony counts /1 ml 88	As, Pb,Cd	

The Nutrients in the body like Cd < 0.03 mg/l, Hg< 0.001, Pb < 0.01, As < 0/01, Cr6 < 0.05, CN< 0.07, [WHO, 2000-2023], NO3-NO2 50 mg/l, Tri -halomethane, NIL, Zn < 3mg/l, CU < 1mg/l, Cl < 250 mg/l, CaNO3 54-462 mg/kg, NaNO3 32-154 mg/kg for adult. The above toxic elements > than the required from all sources, deposit in the body and cause cancer when exceed the limit. 90% peoples face this problem in villages and 60% in rural areas. In each house in Punjab, Sindh, Balochistan and Khyber pakhtoon kha at least one person is caught by cancer. Every year the percentage of cancer patients increases by 20-30% which is a serious threat to life of the people. The cancer ratio is 1:4 [Khan et al 2023].

Neuro- physiotherapist complications, the eyes irritation, skin diseases, and long term chronic diseases such as cancer. According to [Thom and Ott 1974] numeric value of pollutants in air is 0-500 PSI. [Pollutants Standard Index and PM [particulate Matter] has been evaluated [Thom et al 1974]. The gases present in the air are SO4, SO2, NO2, CO, O3 [Johnson et al 1974]. The air quality index is above 300 the highest level PM 2.5-PM10 Um. The SO2 is colorless highly reactive gas which is considered as an important air pollutant emitted from fossil fuel consumption, [Johnson et al 1974], natural volcanic activities, and industrial processes. SO2 is very harmful for plant, life, animals, and human health, peoples with longs diseases, respiratory, irritation and dysfunction cardiovascular diseases absorb in upper airways [Johnson et al 1974, Adel Ghorani et al 2021]. The SO2 penetrate in lungs is > mouth breathing compared to nose breathing. According to EPA annual standard of SO2 is 0.03 mg/l reduce oxygen in water to death. Acid rain marine life, animal and plants damage to eyes, skin, and respiratory tracts.

The NO2 increase respiratory infections, emitted from mortar engine, traffic related air pollutant. Deep lungs irritants induce pulmonary edema less toxic than O3. Exposure at 2-5mg/l affect T-lymphocytes particularly CD-8+ cells and metal killer cells. Coughing and wheezing are common. 0.2-0.6 mg/l is harmful. Eyes nose, throat, irritations, headache, dyspnea, chest pain, diaphoresis and fever are common. Pb a heavy metal in air is toxic results both indoor and outdoor sources. P b accumulate in body , in blood, bone and soft tissues not readily excreted affect kidney, liver, nervous system, and other organs. Concentrations of 90% of Pb particles in air that are inhaled are small enough to inhale. Mental retardation, learning disability, impairment, memory, hyper activity, and antisocial behavior are common[WHO, 2000-2023].

ANALYSIS

Chemical and environmental pollution indicate that people inhale chemical elements from atmosphere. The gases like nitrogen, SO2, NO3, CO2 , CO and chemical toxic elements like Pb , Ar, As, CU, Hg, F, Cl, Fe, H2SO4, PO4 by ingestion and inhalation from different sources deposit in human body. Mining rocks and soils, drinking water, vegetables and working in industries like batteries, oil factories [EPA, 2022, WHO, 2003-2022], pesticides, and dust. Fossil fule, gutka, gastric juice are all health risk. Air pollution is significant and is threat to public health. The world population breathing 99% unfair air. > 6.7 million deaths associated with air pollution [EPA, WHO,2022]. 8.1 trillion the global cost of health damages associated to air pollution [WHO 2002-2022] Smoke tobacco , exposure to air pollution can lead to cancer, and cause respiratory cardiovascular diseases. At least 7 million deaths per year are caused by air pollution [EPA, WHO, 2003-2022]. Air pollution is threating to cancer. The lung cancer. According to world bank 8.1 trillion USD equivalent to 6.1 % of global GDP spent on health damages associated with air pollution WHO, 2003, EPA, 2022]. According to EMSO 2022 Presidential symposium prof. Charles Swanton of the Francis circk Institute presented that the same particles that contribute to climate change are impacting human health via an important cancer causing lung cancer. Lancet Comission on pollution and health established that all form of pollution cause 43% of lung cancer deaths [WHO, 2003-2022], Air pollution alone cause 29% of all lung cancer deaths [EPA, WHO, EMSO 2022].

The case study in Sindh, KPK, Punjab and Azad Kashmir showed that in Urban areas the cancer symptoms are less than the Rural areas [Khan, et al 2023, Anwar, et al 2004]. In Sindh the peoples do not aware with cancer. About 40% people get cancer symptoms any way. The hospitals history showed 30% patients enrolled have cancer symptoms in cities. In villages 20% were positive cases. The cases may be more in far areas where no facility is available. In cities only registered patients are counted, those unregistered were contacted and analyzed their samples in laboratory get positive signs. In urban areas there is no hospital facility to check the patient in place. As investigated the blood samples can not be collected. The MIR or CT Scan is not available in rural areas. Only few hospitals have these facilities. It was found clearly that the peoples drink contaminated water. The animals and residents use same water in urban areas. Rural water supply is also give contaminated drinking water to users [WHO, EPA, Khan et al, 2023].

Table-4.Cancer causes from air pollution, new cases registered, World-wide deaths and sources of contamination.

Air pollution caused cancer	Lung cancer	Deaths world wide 2020	New cases	PM2.5 is 2.5 micrometers in diameter	Vehicle exhaust, , smoke, from stove fossil fule
PM2,5 associated with lung cancer group-1[IARC] 2020	Air pollution key factor in lung cancer	1.8 million deaths	Over 2 million		Damage respiratory system
According to [IARC] more a person exposed to air pollution PM2.5 higher lung cancer	Tobacco smoke cause of lung cancer	Prof. Charles Swanton Francis Crick Institute and cancer research UK			
Detection technique Low dose CT scans and	Arsenic is the main cancer	Potential danger s of	Flouride 14 mg/day but	Selenium and Uranium in	Changes peripheral

potential for blood basedEGFRprofiling	element in water. Cr6 and Cr3 cause cellular metabolism and DNA damage	PM2.5	there is an evidence of bone effect above 6 mg/day	drinking water cause cancer give loss of hair, weakened nails, and skin	nerves,
According to Prof. Tony Mok Chairman Li Shu Fan clinical oncology University of Hong Kong said treating lung cancer with strides battleagainst air pollution continue	WHO 99% of the world population breathes unhealthy air 2022	Vulnerability of drinking water WHO guideline 10 mg/l available data 5,10, 15 ug/l Ar	Uranium give rise to kidney toxin increase in fractional	Calcium excretion increased macroglobulin urea, cause cancer	Iron and Mn water is unsafe in presence of Mn.
Lead sources metal plating	And finishing operation	Waste from battery industries, soil wastes	Exhaust from automobiles, additives in gasoline and pigments	Factory chimneys, smelting, pesticides,	Flora et al 2012

[WHO, 2001-2023, EPA, Whittle J et al 1991, Chen CL et al , IARC 2020, Charles et al 2020]

DISCUSSION:

The chemical and environmental contamination has its serious consequences on human health, surface water, vegetables, foods, indoor and outdoor diseases [Flora et al 2008, HUGHES et al 1988, Singh et al 2007] indicated that Ar is most important toxic heavy metal prominently carcinogenic available in the form of oxides, sulfides, or as salt of iron, sodium, calcium and copper. Drinking water is contaminated by use of arsenical pesticides, natural mineral deposits or improper disposal of arsenic and chemicals. Pb is the second highly toxic carcinogenic and cancerous element in nature. It cause environmental contamination . With air it can converted to complex compounds[Sharma and Dubey 2005] It comes from industrial processes, contaminate food, drinking water, and domestic sources. It damage liquid membrane, damage to chlorophyll, photosynthesis processes growth of plants. [Najeeb et al 2014]. It is a big cause of cancer

The Hg is another metallic element highly toxic adversely affect the environment. Major sources of pollution are anthropogenic activities such as agriculture, municipal waste water, discharges, pesticides, industrial waste water[Chen et al 2012]. Hg exist as metal element in organic salts, and organic compounds having different toxicity. These are present in water resources such as lakes, rivers, and oceans taken by microorganisms get transformed in to methyl mercury causing disturbance to aquatic live. Later these aquatic animals used by human can cause toxic poisoning diseases. It is neurotoxic, [Patrick, 2002]. Total amount of Hg emission in environment is 2200 metric tons annually [Ferrara et al 2000]. The brain is target organ for Hg. Attack membrane and interrupt intracellular calcium homeostasis [Patric, 2002]. It can cause bronchitis, asthma, and respiratory problems.

The Cd is the toxic heavy metal . It is a byproduct of Zinc production which humus and animals may get exposed in the environment. Hg absorbed by human and accumulate in the body for whole life. Human inhail this from surroundings and environment [Chin et al 1988, Junfeg et al, John et al 2003]. It effect on cells. Cd concentration in liver is 3000 fold when it binds to cyst enrich protein such as metal lothione in complex causes hepatotoxicity and circulate to kidney and accumulated in the renal tissue causing nephrotoxicity, can lead to deficiency of iron [Castag netto et al 2002]

Table5. Contamination of drinking water by toxic metals , environment and Toxic effects of Ar, Pb, Hg, Cd, Cr,

Ar	Pb	Hg	Cd	Cr	F
Ar in the form of arseniteand arsenate are > hazardous to health. They are highly carcinogenic and can cause cancer of lungs, liver, bladder, and skin	Highly toxic, poisoning, damage nervous system, gastrointestinaltract Mark owitz 2000]poisoning drinking water, according to EPA Carcinogene, deposited in form of insoluble phosphate, in bones, hypertension, abnormal pain, renal disfunction, arthritis, Heavy metals An, As, Bi, Cd, Ci, Cr, Co, CU, Ga, Go, Fe, Pb, Mn, Ni, Pt, Sv, Zn, UR, hazardous to human health. Damage kidney , liver, brain, lungs, blood composition, neurological degenerating process, imitate diseases, such as sclerosis, Parkinson's , diseases, Alzheimer,s diseases, muscular dystrophy, cause cancer.[Mosby et al 1999	The Hg is toxic, in the environment, poisoning, acrodynia, damage brain, kidney, present in food, beverages, < 1 to 50 Ug/kg, Present inmarine food, fatty fish, lead to shyness, damage lungsdiarrhea, nausea, skin rashes, increase heart rate, and blood pressure. Cause depression, memory problems, tremors, hair loss, WHO LIMIT 2004 IS in drinking water 0.002mg/l, and 0.001 mg/l. Absorption 70-85%, vapor absorbed, 95-100% intestinal tract	Highly toxic to kidneyaccumulate in the proximal tubular, cells in higher concentration, , cause bone mineralization, to bone damage, renal dysfunction, cause teoporosis, severe damage to lungs, stomach irritation, vomiting, diarrhea. Deposited in kidney, fragile bones, [Bernard , 2008]. Water soluble, morphopathological changes in kidney, smokers are more affected , tobacco is main source of Cd, 50% absorbed in lungs, [Flora et al 2008]. [Henson and Chedrese, 2004]	Cr is a toxic hazardous metal Cr3 and Cr6 [Rodriguez et al 2009] Cr3 is insoluble in waterCr6 is highly soluble in water. [Duan et al2010]. Cause chlorosis, necrosis, in pla nts, damage to DNA, human carcinogene [IARC 2001] , cause of cancer, resides in organic matter in form of soil and aquatic environment in the form of oxides and hydroxides, and sulfates, Cervantes et al, 2001, used in industries, pollute streams, penetrating the cell membranethrough isoelectric anionssuch as SO4, HPO4. Highly cancerous	The concentration of Cr in deep ocean is 335x106, mg/l, in fresh water it remains 5Ug/l, in ground water it concentration is 20 mg/l in dissolved state, [EPA 1993], penetrate in cell of heart, damage tissues, damage liver and brain, attack DNA, cellular damage, Mirvish et al, TaoxG et al, Morris et al, Moseley et al, Saloman et al, Alidad, et al

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CONCLUSIONS

The peoples in rural areas are not aware of safe drinking water and its consequences. About 60% of both Rural and Urban population facing cancer risk. More than 30% do not aware of water borne diseases . The 15% of people in rural areas avail the opportunity of hospitals but treatment is so costly, only few people can get this facility. About 15 % of them are unknown to cancer disease and they are living in very critical condition.

In the Rural areas the lives are better than Ur ban areas, they can avail hospital facilities, some of them can afford costly medical facilities, but others 50% just go to private clinics. Only 5% get good facilities those getting free of cost treatment. In the country and outside the country. 95% people are just living with chronic diseases, infections, cancer, hepatitis, and disabilities.

No facility for poors but only for Government employees or high officials. In Sindh, Tharparker, Nagarparker, Jamshoro, Dadu, and Thatta and many other areas Even peoples are not aware of medicine So how they will know about cancer or infections. Examination of the people for cancer is difficult Most of the diseases are water borne. But there is no facility for safe water.

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