



Investigation of epidemiologic toxicities caused by Paraquat herbicide and comparing factors influencing these patients' causality in Kermanshah Imam Khomeini Hospital (2002-2013)

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ABSTRACT

Herbicide toxicities are considered as an important issue in public health programs of developing countries. This investigation aims at studying epidemiologic toxicities caused by Paraquat herbicide and comparing factors influencing these patients' causality in Kermanshah Imam Khomeini Hospital. In a descriptive-survey study, 9 patients poisoned by Paraquat herbicide were considered statistically. They visited Kermanshah Imam Khomeini Hospital during 2002-2013. Needed information obtained from patients' medical files. SPSS21 software was used for data analysis. From 9 patients who were involved in this study, 5 of them died. 8 patients were male and just 1 of them was female. 66.7% of patients were single and 33.3% of them were married. 8 patients were poisoned intentionally. 77.8% of these patients were dialyzed. 5 of them had eaten more than 30cc. there was a significant relation between consumption amount and toxicity consequences ($p=0.014$). Results obtained from this study indicated that most of toxicities were intentional. These results recommend paying attention to risky factors and toxicity consequences among population.

Key words: Toxicity, Herbicide, Paraquat, Causality

INTRODUCTION

Toxicities caused by herbicides and other chemical materials used by farmers is one of the main problems of health system all over the world. 2 million toxicities resulting in hospitalization and 20000 deaths caused by agricultural poisons are reported, annually, in world (Eddleston, 2000). Paraquat, has been used as a non-selective herbicide in the form of liquid concentrate or Aerosol in farming since 1962, resulting in lipid peroxidase generation (Wesseling et al., 1997). It destroys cell wall and causes tissue death in green plants through oxidative procedures (Heylings et al., 2007a). This herbicide involves just 0.34% of

all toxicities caused by agricultural poisons but has higher causalities of almost 60%. Most toxicities were happened due to accidental consumption, but presently most toxicities are occurring intentionally (Wesseling et al., 1997). After absorption, this substance accumulates in all important organs of body due to higher amount of distribution. After combining with macro molecules, it imposes serious injures to different organs through formation of superoxide highly poisoning radicals (Sittipunt, 2005, Krieger, 2001). Paraquat is one of mostly used poisons in suicides, especially in developing countries, since it is easily available, cheap with lower fatal doze. This substance can enter body through having contact, inhalation and eating (Sittipunt, 2005). Through skin and lung absorption, usually toxicity dose not occur systematically, but its entrance through mouth can cause systematic toxicity and in addition to gastrointestinal injury, it involves other organs, too (IZADI et al., 2003). Severe toxicity is identified through several organs inadequacy, which mainly injures lung, kidney and liver. Lung is the main organ involved in this procedure, due to having pressure and higher density of oxygen in it. Moreover chronic tubules occurs during 24 hours, since Paraquat has renal excretion (Heylings et al., 2007b, Dinis-Oliveira et al., 2008). Symptoms, side effects and prognoses are completely related to amount of poison entered to body in toxicities caused by Paraquat. For example, vomiting and severe diarrhea without liver and lung side effects and improvement is observed in slight and lower severe toxicities (Paraquat between 1.5 to 2 gr), this is while in normal to severe type (between 6-3gr), sever vomiting soon after poison consumption, diarrhea, stomachache, ulcerative in mouth and throat during several hours and renal, pulmonary and liver failure is occurs in 1-4 days and coughing, hemoptysis, plural effusion and symptoms of renal fibrosis can be seen in 1-2 weeks later in patients, and most of them die 2-3 weeks later due to renal fibrosis. In severe and Fulminant cases in which portion amount is more than 6 grams, in addition to vomiting, diarrhea, stomachache, renal, liver and lung failure, ulcerative wounds in gastrointestinal, pancreatitis, myocarditis, coma and paroxysm and death can be seen due to cardinal shock and failure in several organs during 1-4 days (Sittipunt, 2005). Considering rampant and higher causalities caused by Paraquat toxicity in developing countries, it seems that this substance, also, involves considerable part of toxicities resulting in death in Iran. But studies carried out in this regard inside country dose not seem sufficient. Hence considering significance of study, we investigated causality amounts and factors influencing it in patients poisoned with Paraquat during recent 10 years, in a descriptive-survey study, through referring to hospitalized patients in toxicities unite of Kermanshah Imam Khomeini hospital.

METHODS AND MATERIALS

Present study was carried out in descriptive-survey method in 2013. studied statistical population involves patients intoxicated by herbicide poisons visited Kermanshah Imam Khomeini Hospital during 2002 to 2013. Considering estimations about studied sample size, and in order to prevent reduce in study power, all patients were studied. Among these patients, of course, those whose information was not registered in profile were eliminated from study. Needed information obtained from patients' medical profile in the form of scholar checklist. Variables including age, gender, season, type of toxicity, acid metabolic, toxicity side effects, were measured. We used SPSS20 software to data analysis. using descriptive statistics and exact Fisher test.

RESULTS

In this study which was carried out in the form of enumeration, 9 cases with Paraquat toxicity visited Imam Khomeini Hospital during considered interval. From these patients, 8 were male and just 1 them was female. Age limitation of patients was between 17 to 38 with average of 24.44 ± 6.9 . 8 of these patients (i.e. 88.9%) used poison intentionally. 7 of these patients were dialyzed after visiting hospital. Consumption method of all these patients was oral. Toxicity diagnosis time of 33% was more than 6

hours after entering hospital. Summer with 6 cases had highest frequency among year seasons. 5 of these patients (55.6%) had consumed more than 30cc Paraquat poison. Mouth ulcer was observed among 44.4% of these cases. Finally most of toxicities(55.6%) resulted in death. Other results obtained from this study have been presented in table1 in detail.

Table 1: Frequency of cases in based of the variables for patients with paraquat poisoning

Variable	Sub-group	Frequently(percent)
Season	Spring	1(11.1)
	Summer	6(66.7)
	Autumn	1(11.1)
	Winter	1(11.1)
Age	≤20	3(33.3)
	21-30	5(55.6)
	≥31	1(11.1)
gender	Male	8(88.9)
	Female	1(11.1)
Type of toxicity	Intentional	8(88.9)
	random	1(11.1)
consumption amount	≤30cc	4(44.4)
	>30cc	5(55.6)
mouth ulcer	Positive	5(55.6)
	negative	4(44.4)

As it can be observed in table 2, among studied variables , consumption amount, superficial symptoms (mouth ulcer) and pulmonary side effects were significantly high in toxicities resulting to death. Moreover this test was not accountable for contact variable.

Table 2: Frequency of cases based on variables and the results Fisher exact test for patients with paraquat poisoning

Variable	Sub-group	Frequently(percent)	p-value
Type contact	Oral	9(100)	-
	Skin	-	
	smell	-	
Type of toxicity	Intentional	8(88.9)	0.444
	random	1(11.1)	
consumption amount	≤30cc	4(44.4)	0.014
	>30cc	5(55.6)	
mouth ulcer	Positive	5(55.6)	0.048
	negative	4(44.4)	
Time diagnostic	≤6	4(44.4)	0.629
	>6	3(33.3)	

	unknown	2(22.2)	
Side effect lung	Positive	5(55.6)	0.048
	negative	4(44.4)	
Side effect kidney	Positive	3(33.3)	0.119
	negative	6(66.7)	
Side effect liver	Positive	2(22.2)	0.267
	negative	7(77.7)	
hysteria	Positive	2(22.2)	0.267
	negative	7(77.7)	
Dialyze	Positive	7(77.7)	0.167
	negative	2(22.2)	

CONCLUSION AND DISCUSSION

From 9 studied patients, most of them were male and from age point of view, almost all of them were young. Results obtained from this study indicated that causality rate among patients consuming more than 30cc of Paraquat herbicide was higher than others. Toxicity fatal index in a study which was about product toxicity and toxicity intensity was reported higher than other poisons due to intentional intoxication with Paraquat (IZADI et al., 2003). Higher rate of (55.6%) of causality obtained from this study confirms this issue. Variables of age, gender, type of toxicity were studied in this investigation. Among considerable results we can mention frequency of poison consumption during summer which might be due to availability of this poison for agricultural consumptions during summer. Most of toxicities were intentional, and this confirms results reported by other studies (Agarwal et al., 2006, Nagami et al., 2007, Seok et al., 2009). Among studied variables, consumption amount, superficial symptoms (mouth ulcer) and pulmonary side effects were more significantly in toxicities resulting in death. This is in accordance with other similar studies findings (Sabzghabae et al., 2010). Some results obtained in this study do not confirm reported findings of other similar studies. This indicates present study limitations. Findings of this study indicated that having access to poison is threatening factor for family members and it needs more care. Appropriate therapeutic measurements can have an effect on reducing these patients causality.

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