

## **Editorial:**

# **ESTABLISHING MEDICAL JOURNALISM: NEED OF THE HOUR FOR PAKISTAN**

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Scope of medical journalism extends from being an authentic source to get information about new modalities, drugs, experimental trials, vaccines, surgical procedures and management guidelines in health care professionals to the general public.<sup>1</sup>History of medical journalism dates back to 18<sup>th</sup> century when for the first time proceedings of meetings of doctors were published leading to the development of general medical journals. With emergence of evidence based medicine, increase demand of medical journals has been felt worldwide to disseminate scientific information.<sup>2</sup> Further advancement in scientific knowledge of health care professionals led to establishment of specific medical journals in specific fields of medicine.<sup>3</sup>

Globally thousands of medical journals are published annually.<sup>4</sup>To have a greater impact of their findings, researchers want to publish their data in internationally recognized journals having greater citations.<sup>5</sup>With globalization, increasing use of social media, improved access of internet facilities and creation of health bloggers have tremendously increased the importance of information transfer in the form of original articles, systemic reviews, meta-analysis and case series. Internationally it is being evaluated that medical journals have published papers with poor scientific knowledge, ghost authors, conflict of interest and influenced with pharmaceutical industry.<sup>3</sup> High annual subscription fees can make access of journals difficult.

Jonathan et al. published an article with the objective to assess that what were the reasons that some countries publish more articles in renowned and high ranking journals than others and it was found that national research funding and proficiency in English make distinguished contributions in publications of original articles in medical journals.<sup>7</sup>

Publication is the most crucial part of scientific process which is affected by study design, sample size, sampling techniques and use of appropriate statistical analysis.<sup>8</sup> Research with highest impact factor is published in Denmark, Sweden, Switzerland and Netherland. Asian countries have low publication rates as compared to developed nations.<sup>7</sup>Some of the high ranking journals specify some place for contribution from developing countries too.<sup>9</sup>To further support the process of publication, International Committee of Medical Journal Editors (ICMJE) have devised uniform guidelines to be followed by all manuscripts before submissions.<sup>10</sup>

In 2006, 51 medical journals were registered with Pak Medi Net, Pakistan's first online database of Pakistani medical journals.<sup>11</sup>Currently this number reaches to 80 different medical journals. Higher Education commission in Pakistan gives W category to only three journals. Rest of the journals either belongs to Y or Z category. Majority of these journals are not even indexed with Higher Education Commission of Pakistan.<sup>12</sup> There are issues with timely publications of these journals and selection of quality papers too. Fabrication of results and plagiarism are other issues that point fingers towards integrity of medical journals.<sup>13</sup>

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The need of the hour is to develop new medical journals which follow all the scientific and ethical guidelines before publication of manuscripts. It is further to emphasize that we need to publish and contribute towards scientific knowledge. We have to imprint our presence by contributing in medical journalism. We need to show the authenticity of our work based on sound clinical and academic grounds. Journal of Akhtar Saeed Medical & Dental College is a small contribution towards development of medical journalism in Pakistan with the intention to publish quality papers following international guidelines. As part of the team, contributing towards development of this journal, I wish that this journal proves its worth in years to come.

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## Original Article

# TETANUS TOXOID VACCINATION COVERAGE AND REASONS FOR NON-VACCINATION AMONG MARRIED WOMEN IN REPRODUCTIVE AGE GROUP OF 15---49 YEARS

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### **ABSTRACT:**

**Back ground & Objective:** Tetanus toxoid (TT) vaccination in pregnancy is a widely used preventive strategy targeting neonatal and periparturient tetanus. The objective of this study was to assess the coverage rate of TT vaccination among married women in reproductive age group and reasons for non-vaccination.

**Methodology:** A descriptive cross sectional study was conducted at Akhtar Saeed Trust Teaching Hospital, Lahore from February to August, 2013. A sample of forty seven (47) married women of reproductive age, fulfilling inclusion criteria was selected by non-probability, convenience sampling. Data was collected on structured questionnaire and was analyzed on SPSS version 20. Chi. Square test was applied to assess association of different factors with non -vaccination status.

**Results:** The socio-demographic profile of 47 respondents showed that 17 (36.2%) were illiterate. Large family size of more than 4 family members was showed by 42(89.4%). Results showed that 23(49%) respondents had income of less than Rs.3000/capita/month. Out of total 47respondents, 26 (55.3%) were aware of the name of disease tetanus. Knowledge about availability of vaccine for prevention of disease was present in 25(53.2%). Out of 47 participants, 21 (44.7%) women had the correct knowledge that the disease is transmitted mostly through unhygienic delivery practices. Regarding vaccination status only 29(61.7%) had 2 injections of T.T during their antenatal checkups. However, 18 females (38.3%) never had any tetanus toxoid dose. No significant difference was observed in Tetanus toxoid coverage and education of the respondent ( $p = 0.35$ ), number of antenatal visits ( $p = 0.35$ ), place of delivery ( $p = 0.82$ ) and distance to health facility ( $p = 0.12$ ).

**Conclusion:** The study reveals that tetanus toxoid coverage is very low in illiterate population.

**Key Words:** Tetanus, Vaccination, Coverage

## **INTRODUCTION**

Tetanus is a vaccine preventable, noncontiguous infectious disease. It is an acute disease manifested by motor and autonomic nervous system instability, caused by exotoxin produced by anaerobic bacteria *Clostridium Tetani*.<sup>1</sup>The target year for global elimination of maternal and neonatal tetanus was 2015 by World Health Organization (WHO).<sup>2</sup>

Maternal and neonatal tetanus occur mostly where deliveries and cord cutting are performed under unhygienic circumstances. High prevalence is found in the regions of Asia and Africa.

Neonatal tetanus is fatal in the absence of medical care. If mothers have been vaccinated against tetanus the infants acquire passive immunity and thus protected. Neonatal tetanus occurs through infection of the unhealed umbilical stump particularly when stump is cut with a non-sterile instrument. In 2013 alone, 49,000 newborns died due to tetanus which is about one newborn dead every 10 minutes.<sup>3</sup> WHO estimates that in 2015 almost 34,019 newborns died from neonatal tetanus. This

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alarming number can be minimized or completely abolished by 100% vaccination coverage of females of reproductive age which is a very cost effective intervention for tetanus elimination. Once the disease is contracted, the fatality rate can be as high as 100% without hospital care and between 10% to 60% with hospital care.<sup>1</sup> Thousands of lives at stake can be saved by simple administration of I/m injection of tetanus toxoid (2 injections of tetanus toxoid to antenatal mothers 4 weeks apart). Similarly 3injections for females in reproductive age group of 15 to 49 years can save them for 5 years. A study entitled “coverage of tetanus toxoid vaccination during pregnancy among women of rural areas in district Gujarat,” (Pakistan) concluded that “deployment of health workers in rural areas following a strict monitoring mechanism can significantly increase the coverage of tetanus toxoid vaccination. The increased coverage of immunization will subsequently decrease the rate of maternal and neonatal deaths”.<sup>4</sup>

Pakistan is one among high burden countries, which accounted for 45% of global neonatal tetanus deaths, which is about 22,000 deaths per year with most of the deaths remaining unreported.<sup>5</sup>

During2002, worldwide tetanus deaths recorded were around 213,000 of which neonatal tetanus was estimated to be about 180,000 and maternal tetanus about 15000 – 30,000.<sup>6</sup>World Health Organization (WHO) estimates that in 2010, 58,000 newborns died from NT.<sup>7</sup>Number of total deaths was reported 49,000 in 2013.<sup>8,9</sup>

In the United States, from 2000 to 2007 averages of 31 cases were reported per year. Nearly all of the cases in the United States occur in unimmunized individuals or individuals who have allowed their inoculations to lapse.<sup>10</sup>

In Pakistan every year, over 4 million women become pregnant, out of these 0.7 million (15%) of all pregnant women are

likely to experience obstetric and medical complications.<sup>11,12</sup>

Complete coverage of reproductive-aged women by tetanus toxoid is the most cost-effective way to eliminate this often neglected cause of maternal death.<sup>13</sup> Globally the past two decades have seen significant reduction in the number of deaths due to tetanus, however Pakistan still remains a high burden country and this problem can easily be overcome by vaccination of reproductive age mothers and newborn children.

## **METHODS**

A descriptive cross sectional study was conducted at a 300 bedded private sector, teaching hospital (ASTTH) of EME sector district, Lahore.

The study was conducted in Gynae & Obstetrics department of hospital from February, 2013 to August, 2013. The study included 47 married females of reproductive age, (15 to 49 years) in third trimester of pregnancy fulfilling the inclusion criteria through non probability, convenient sampling method. Consent was taken from the participants. The information was collected through pre-tested structured questionnaire. Response rate was 100%. Obstetric history of females regarding their current and previous pregnancies was explored. Tetanus toxoid immunizations as well as reasons for non-immunization were asked. All the data was entered and analyzed on SPSS VS 20. Fisher Exact test and Chi square test were used to find the significance of results.

## **RESULTS**

Total 47 respondents were interviewed who had experienced 132 reproductive events. The Socio demographic profiles showed 17 females (36.2%) were illiterate, 12 (25.5%) were primary pass and very small proportion was educated more than grade five. There were 10.6% women who never had children

before this pregnancy and were labeled as primigravida. There were 48.9% of women who had less than three children. Out of 47 females, 42(89.4%) were having families greater than 4 family members and 23(49%) respondents were having income of less than Rs.2500 per month. (Table 1)

**Table 1:** Socio-demographic Profile

Variables	Frequency (n)	Percent (%)
Awareness about Tetanus disease		
Yes	26	55.3
No	21	44.7
Awareness about Tetanus Neonatorum		
Yes	21	44.7
No	26	55.3
Awareness about Genetic Transmission		
Yes	22	46.8
No	25	53.2
Awareness about Transmission through unhygienic delivery practice		
Yes	21	44.7
No	26	55.3
Awareness about disease Prevention by vaccine		
Yes	25	53.2
No	22	46.8
Awareness about Presence of vaccine		
Yes	25	53.2
No	22	46.8

Out of the total 47 participants, 26 mothers (55.3%) were aware of the disease tetanus and 47.7% were aware of disease tetanus neonatorum. Twenty two participants (46.8%) shared lack of knowledge about disease transmission by responding that this disease is transmitted from mother to newborn. Out of 47, 21 (44.7%) correctly identified the mode of transmission of disease by pointing out transmission through unhygienic delivery practices. Among them 25 respondents (53.2%) had the knowledge of vaccine preventable nature of this disease and only 25 (53.2%) knew about the availability of vaccine for prevention of tetanus in Pakistan. (Table 2)

Regarding Immunization history, 29 (61.7%) of the participants were vaccinated with tetanus toxoid in the current pregnancy.

Only 18 (38.3%) had full schedule covered with five doses of TT vaccine. A Vast majority was vaccinated in private clinics followed by vaccination in Basic health unit. (Table 3)

**Table 2:** Knowledge about disease & availability of vaccine

Variables	Frequency (n)	Percent (%)
Educational Status		
Illiterate	17	36.2
Primary	12	25.5
Matric	6	12.8
Graduation	7	14.9
Post grad	5	10.5
Number of Children		
No Children	5	10.6
<3	23	48.9
>3	19	40.4
Total Family Member		
<4	5	10.6
>4	42	89.4
Total monthly Income		
<2500	23	48.9
2500 – 5000	16	34
>5000	8	17

**Table 3:** Immunization Status

Variables	Frequency (n)	Percent (%)
Immunized against tetanus toxoid		
Yes	29	61.7
No	18	38.3
Completed course of 5 injection		
Yes	18	38.3
No	29	61.7
If yes from where		
BHU	11	23.4
RHC	1	2.1
District Hospital	8	17
Private Clinic	27	57.4

These 47 women have experienced 132 pregnancies in total. In these 132 pregnancies, 34.1% never had a single antenatal visit. There were 26.5% who had less than 3 antenatal visits during their

course of delivery. There were 54 deliveries (40.9%) conducted at home. Tetanus toxoid vaccine coverage in these pregnancies was reported to be 67.4% only and majority of them got this vaccination in last trimester. (Table 4)

**Table 4:** Factors affecting vaccination status

Factors affecting vaccination		Frequency	Percentage %
Antenatal Visits	No Visit	45	34.1%
	<3	35	26.5 %
	>3	52	39.4 %
Home Delivery	Yes	54	40.9 %
	No	78	59.1 %
T.T. Vaccination	Yes	89	67.4 %
	No	43	32.6 %
At Which Trimester	No response	48	36.4 %
	Second Trimester	2	1.5 %
	Third Trimester	82	62.1 %

Reasons for poor coverage were assessed in these 132 experiences and the results showed that 99 times (75%) women were not aware of this vaccine. Fear of abortion and fear of side effects was not mentioned by any of the respondent. Only 2.3% of the respondents pointed out distant facility as a barrier for vaccination. (Table 5)

**Table 5:** Reasons for poor coverage with Tetanus Toxoid vaccination

Variables		TT vaccine		P-value
		Yes	No	
Education of respondent	Yes	20	10	0.35
	No	9	8	
> 3 Ante Natal visits	Yes	44	8	0.38
	No	27	8	
Home Delivery	Yes	37	52	0.82
	No	17	26	
Distant facility	Yes	0	3	0.12
	No	89	40	

To find out the relationship of vaccination status with Tetanus toxoid and other socio-demographic profiles, chi square test of significance was applied. It was observed that Tetanus toxoid coverage and education of the respondent showed that literates are 1.26 times more in vaccination practices than illiterate ( $p=0.35$ ). Similarly women who have experienced more than 3 antenatal visits they have 1.10 times more vaccination coverage practice ( $p = 0.35$ ) and (R.R. = 1.10). However there is no significant difference between home delivery and vaccination practice. ( $p = 0.82$ ) and (R.R. = 1.0). Far away health facility or distance has no impact on vaccination practices ( $p = 0.12$ ) (Table 6)

**Table 6:** Factors affecting vaccination status

Reasons		Frequency (n)	Percentage (%)
Aware of vaccination	Yes	33	25 %
	No	99	75 %
Fear of Abortion	Yes	-	-
	No	132	100 %
Fear of Side Effect	Yes	-	-
	No	132	100 %
Distant Facility	Yes	3	2.3 %
	No	129	97.7 %
Non Availability	Yes	-	-
	No	132	100 %
No Permission	Yes	-	-
	No	132	100 %
Non Affordable	Yes	-	-
	No	132	100 %

## DISCUSSION

Maternal and neonatal tetanus is a silent killer. The target year for global elimination of Maternal & Neonatal Tetanus (MNT) was 2015. Pakistan is one of the five countries accounting for 90 % global neonatal tetanus deaths.<sup>3</sup>

This study in Akhtar Saeed Trust Teaching Hospital was conducted to assess the vaccination coverage and reasons for non-vaccination in spite of free availability of

vaccine in public sector health facilities. In total 47 respondents who had experienced 132 reproductive events vaccination awareness was 25% only. In this scientific era of advanced technology, unawareness in 75% of antenatal mothers was very alarming. Only 2.3% stated that far away health facility was the reasons of non-vaccination rest was unaware of vaccination. In this study 49% of respondents were living below the poverty line and increasing burden of poverty leads to improper medical care seeking behavior and less vaccination coverage. In a similar study published in Ayub Medical College journal in March 2010, "out of total 304 females of reproductive age 38.4% were unaware about tetanus vaccination".<sup>6</sup> similarly an urban study of Jinnah Hospital, Lahore showed, "out of random sample of 362 reproductive age females, who had delivered, during the previous 3 months, 87% remembered they had 2 doses of TT injections. The main reasons for low coverage were lack of awareness about the importance of vaccination and misconception about it that it was the contraceptive."<sup>10</sup>In another study carried out to find the vaccination coverage of mothers during pregnancy with tetanus toxoid and infants after birth, it was concluded that the socio economic conditions and educational level of parents is significantly associated to mothers vaccination coverage which is contrary to the results found in this study.<sup>1</sup>In a study of 8,474 births in rural north India, 258 resulted in neonatal deaths. This study concludes that newborn survival could be achieved through increased coverage of antenatal T.T vaccination.<sup>13</sup> There is a constant need for creating awareness and motivation among females about significance of T.T vaccination as in a study the % of receiving two doses of vaccination in Pakistan was 56% in 2002. 57% in 2003 and 45% in 2004.<sup>14</sup>Maternal & neonatal tetanus killed 34,000 new borne in 2015 alone .<sup>15</sup>In a study

the data demonstrate that a limited-dose regimen of maternal tetanus toxoid (one injection) provides significant and extended protection against the risk of neonatal tetanus death.<sup>22,23</sup>

## CONCLUSION

All the relevant literature and this study revealed underutilization of vaccination services with tetanus toxoid in pregnant women. Lack of knowledge was the main significant factor in non-immunization practices.

## RECOMMENDATIONS

The motivated antenatal mothers for tetanus toxoid vaccination as well as reproductive age females (15-49 yrs.) for tetanus vaccination is a goal yet to be achieved. It is strongly recommended to create awareness among women of reproductive age group and particularly pregnant women to have Tetanus toxoid vaccine to prevent maternal and neonatal tetanus both.

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## Original Article

# “EPIDEMIOLOGY OF FIREARM WEAPONS INJURIES AT DISTRICT HEAD QUARTER TEACHING HOSPITAL, GUJRANWALA”

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### ABSTRACT

**Objective:** Firearm weapons injuries are an important component of the medico legal examination. The current study was planned to know the epidemiology of firearm weapons injuries, to update the junior Medicolegal Examiners about the appropriate recognition, interpretation and investigation of firearm weapons injuries.

**Material and method:** The present study comprised of fifty seven cases of firearm weapons injuries presented in Trauma Centre of D.H.Q/Teaching Hospital, Gujranwala, during the year 2012 including 50 Males (80.72 %) and 07 Females (12.28 %). Their medico legal record was reviewed retrospectively; Demographic profile, including age and sex distribution was recorded. Firearm weapons injuries were described according to distance, manner of infliction of injury and area of distribution.

**Results:** The age ranged from 1 to above 60 years. The maximum number 22 (38.6%) were of age between 21-30 years (Table 1) out of 57 cases, 50 (87.72%) were male and 07 (12.28%) were female (Table 2). Cases of far distance fire were 47 (82.46%), near distance fire were 6 (10.52%) and loose contact fire were 4 (7.02%) (Table 3). Regarding manner, 55 (96.49%) were homicidal and 2 (3.51%) were by friendly hand (Table 4). Urban cases were 45 (78.95%) and rural were 12 (21.05%) (Table 5).

**Conclusion:** Most of firearm weapons injury cases at District Head Quarter Teaching Hospital Gujranwala are of distant fire and are homicidal. Most cases are from urban areas.

**Key words:** Weapons, Injuries, Minor

## INTRODUCTION

A firearm is a device to propel a projectile by the expansive force of gases generated as a result of combustion of powder in a closed space.<sup>1</sup> A firearm weapons injury is defined as a penetrating injury from a weapon that uses a powder charge, these are pistols, revolvers, handguns and shot guns.<sup>2</sup>

There has been an increase in the medicolegal cases due to firearm weapon, while blunt and sharp edged weapon injuries have decreased to a considerable extent.<sup>3,4</sup> One major cause for this increase is easy availability of firearm weapon in our country. Easy handling causing grave damage by keeping oneself away from the enemy target has made the firearm weapons most favorable choice to the people involved in enmity, target killing and terrorism.<sup>5,6</sup> Most intentional injuries occur in family disputes over land.<sup>7-9</sup> The presence of a gun in a house is associated with a fivefold increase in the risk of suicide and three fold increased risk of homicide. Abuse of firearms<sup>10,11</sup> and resulting injuries result in major cost of life and health. The resources spent for medicolegal cases<sup>12</sup> and law enforcement must be considered a major public health and safety concern.<sup>13, 14</sup>

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## MATERIAL AND METHODS

This Study was conducted at trauma Centre, Department of Forensic Medicine, DHQ Teaching Hospital, Gujranwala. The study of firearm cases during the year 2012 was conducted. The cases were of all ages, sex, including minor and severe injuries. The data were evaluated from medicolegal certificates. The variables were age, sex, distance of fire, manner of infliction and area of distribution, urban / rural.

## RESULTS

**Table-1:** Age wise distribution of Firearm cases presenting in DHQ Teaching Hospital Gujranwala (n=57).

Age Group	No	% age
0-10	03	5.26%
11-20	13	22.81%
21-30	22	38.60%
31-40	10	17.54%
41-50	05	8.77%
51-60	02	3.51%
61+	02	3.51%
<b>Total</b>	<b>57</b>	<b>100%</b>

**Table-2:** Gender wise distribution of firearm cases presenting in DHQ / Teaching Hospital Gujranwala (n=57)

Gender	No	% age
Male	50	87.72%
Female	07	12.28%
<b>Total</b>	<b>57</b>	<b>100%</b>

**Table-3:** Distance of fire (n=57)

Distance	No	% age
Far Distance	47	(82.46)%
Near Distance	06	(10.52)%
Loose Contact	04	(7.02)%
<b>Total</b>	<b>57</b>	<b>100%</b>

**Table-4:** Manner of infliction of injury (n=57)

Manner	Male		Female	
	No	% age	No	%age
Homicidal	48	84.21%	07	12.28%
Friendlyhand	02	3.51%	-	
Suicidal	-	-	-	-
<b>Total</b>	<b>50</b>	<b>87.72%</b>	<b>07</b>	<b>12.28%</b>

**Table-5:** Urban / rural area distribution (n=57)

Area	No	% age
Urban	45	66.67%
Rural	12	21.05%
<b>Total</b>	<b>57</b>	<b>87.72%</b>

## DISCUSSION

Firearm weapons (especially unlicensed) are easily available in the country. In this study, 87.72% victims of firearm injuries were males while 12.28% were females. This fact that the male victims are involved more commonly than female victims has been established in other studies as well<sup>15-17</sup>. This study depicts that the maximum number of victims belonged to 3<sup>rd</sup> decade of life (21-30 years). This age group individuals are physically strong, full of energy and adventure and challenge or provocation. The number of victims of firearm injuries in other decades of life is less.

Firearm injuries inflicted within arm's length in this study were 10 (near distance and loose contact), while the far distance (beyond arm's length) firearm cases was 47. Presence of burning effect, blackening and tattooing was the basis to decide that the injury was inflicted within arm's length. Absence of these findings was the criteria to decide that the injury was inflicted beyond arm's length. Firearm injuries beyond arm's length almost rule out the possibility of its being suicide, self inflicted. This study shows that most of the cases 45 (79%) belong to urban area while

12 (21%) belong to rural area. The emergency treatment in all the teaching hospitals is being provided by the Government. The emergency surgery has to be provided in many of such cases.

## LIMITATION

The limitations of the present study were a limited number of firearm cases in this center. There is need to collect statistics from all medicolegal centers for complete evaluation of the problem. This will enable us to suggest measures to minimize the victims of firearm injuries in our society.

## CONCLUSION

Most of firearm injury cases are of distant fire and are homicidal. Most cases are from urban areas. The preponderance of males as victims in such a high percentage inactive, energetic age group has added to this problem.

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## Original Article

# COMPARISON OF EFFECTS OF TWO VARIETIES OF ALLIUM SATIVUM (ALLIUM SATIVUM VAR CHINESE EXOTIC AND ALLIUM SATIVUM VAR LEHSUN GULABI) ON SERUM GLUTATHIONE PEROXIDASE IN ALBINO RATS

Sauda Usmani<sup>1</sup>, Hamid Javaid Qureshi<sup>2</sup>

### **ABSTRACT:**

**Objective:** Glutathione peroxidase (GPx) is a family of multiple isozymes that catalyze the reduction of H<sub>2</sub>O<sub>2</sub> or organic hydro peroxides to water or corresponding alcohols using reduced glutathione (GSH) as an electron donor. GPx competes with catalases for H<sub>2</sub>O<sub>2</sub> as a substrate to protect against mild oxidative stress. Different medicinal plants and their active ingredients possess the ability to prevent decrease in GPx in oxidative stress. The objective of this study was to compare the effects of two varieties of Allium sativum on an antioxidative biomarker, serum glutathione peroxidase in albino rats.

**Subjects and methods:** It was a randomized controlled trial (RCT)

This study was conducted at Physiology Department, Services Institute of Medical Sciences (SIMS), Lahore from August 2012 to February 2014. The study was carried out on 120 male albino rats. The rats were randomly divided into four groups of thirty each. Group A was given normal saline (control); group B was administered hepatotoxic dose of acetaminophen (negative control); group C was pretreated with Allium sativum Var Chinese exotic extract for 7 days before receiving hepatotoxic dose of acetaminophen (Experimental 1); and group D was pretreated with Allium sativum Var Lehsun Gulabi extract for 7 days before receiving hepatoprotective dose of acetaminophen (Experimental 2). Serum glutathione peroxidase levels in each group were measured from terminal blood sampling done 24 hours after acetaminophen administration after ether anesthesia.

**Results:** Highly significant (p=0.000) less reduction in serum glutathione peroxidase were manifested in experimental group D pretreated with ethanolic extract of Allium sativum Var Lehsun Gulabi as compared to reduction in this parameter in experimental group C pretreated with ethanolic extract of Allium sativum Var Chinese exotic.

**Conclusion:** Allium sativum Var Lehsun Gulabi has better antioxidative potential as compared to Allium Sativum Var Chinese exotic.

**Key Words:** Garlic, Glutathione peroxidase, Catalase

## INTRODUCTION

Glutathione peroxidase (glutathione: H<sub>2</sub>O<sub>2</sub> oxido-reductase E.C. 1.11.1.9) was discovered by Mills in 1957 in his search for the factors that function in the protection of erythrocytes against oxidative hemolysis.<sup>1</sup>

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Glutathione peroxidase is the general name for a family of multiple isozymes that catalyze the reduction of H<sub>2</sub>O<sub>2</sub> or organic hydroperoxides to water or corresponding alcohols using reduced glutathione (GSH) as an electron donor. Glutathione peroxidase is involved in protection against oxidative stress, and thus uses glutathione as a substrate. It participates in amino acid transport through the plasma membrane, scavenges hydroxyl radical and singlet

oxygen directly, detoxifying hydrogen peroxide and lipid peroxides by the catalytic action of GPX. Glutathione is able to regenerate the most important antioxidants; vitamins C and E back to their active forms. The intracellular content of glutathione depends on environmental factors and functions as a balance between its utilization and synthesis. Exposure to ROS (involving H<sub>2</sub>O<sub>2</sub>)/RNS, or to compounds which can generate ROS, can increase the content of GSH by increasing the rate of GSH synthesis. Significantly, GPx competes with catalase for H<sub>2</sub>O<sub>2</sub> as a substrate. Glutathione redox cycle is a major source of protection against mild oxidative stress, whereas catalase becomes increasingly important in protection against severe oxidative stress.<sup>2</sup>

*Allium sativum*, or “garlic” is widely used in culinary preparations.<sup>3</sup> Two varieties of *Allium sativum* grown in Punjab are Chinese (exotic), Lehson Gulabi (local).<sup>4</sup> Traditional uses of *Allium sativum* include; use in intestinal disorders, diarrhea, flatulence, worms, respiratory infections, skin diseases, wounds, symptoms of aging<sup>3</sup>, headache, flu, sore throat, fever and otitis media.<sup>5</sup>

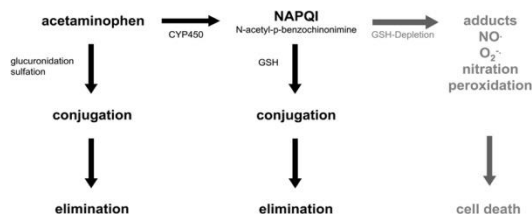
Garlic contains sulfur-containing constituents like  $\gamma$ -glutamyl-S-alkyl-l-cysteine and S-alkyl-l-cysteine, sulfoxides, allicin, steroidal glycosides, lectins, prostaglandins, fructan, pectin, essential oil, adenosine, vitamins B<sub>1</sub>, B<sub>2</sub>, B<sub>6</sub>, C and E, biotin, nicotinic acid, fatty acids, glycolipids, phospholipids, anthocyanins, flavonoids, phenolics and essential amino acids. Allicin and other thiosulfinates instantly decompose to other compounds, such as diallyl sulfide (DAS), diallyl disulfide (DADS) and diallyl trisulfide (DAT), dithiins and ajoene. At the same time,  $\gamma$ -glutamylcysteines are converted to S-allylcysteine (SAC).<sup>17</sup> These sulphur compounds of garlic have proved to be promising antioxidants against drug induced hepatitis.<sup>6-9</sup>

The United States National Cancer Institute tested the toxicity of SAC vs. other typical garlic compounds and found that it has 30-

fold less toxicity than allicin and DADS.<sup>10</sup> A study carried out to determine LD<sub>50</sub> of ethanolic extract of garlic in lab mice showed that the LD<sub>50</sub> in mice after oral ingestion was 8000 mg/kg.<sup>11</sup>

Acetaminophen (APAP), which is also named paracetamol, is a commonly used antipyretic and analgesic. Overdose of acetaminophen can lead to acute liver injury and histopathological changes characterized by centrilobular necrosis.<sup>12</sup> Chronic alcohol use may greatly increase susceptibility to hepatotoxicity from acetaminophen because of depleted glutathione stores.<sup>13</sup> The oxidative metabolite of acetaminophen is more toxic than the drug. Hepatotoxic doses of paracetamol deplete the normal levels of hepatic glutathione. The hepatic cytochrome P450 enzyme system metabolizes paracetamol, forming NAPQI (N-acetyl-p-benzo-quinone imine). NAPQI is then irreversibly conjugated with the sulfhydryl groups of glutathione. Conjugation depletes glutathione, a natural antioxidant. The highly reactive active metabolite NAPQI appears to mediate much of the acetaminophen-related damage to liver tissue by forming covalent bonds with cellular proteins and subsequent activation of inflammatory mediator TNF- $\alpha$  that in turn contribute to tissue necrosis.<sup>14</sup> (Figure 1)

The liver is a vital organ and a number of chemical agents and drugs that are used on a routine basis produce cellular as well as metabolic liver damage. Paracetamol is a well-known hepatotoxic drug. It damages liver cells mainly by inducing lipid peroxidation and oxidative stress. The scenario becomes complex while prescribing it to a patient on anti-tuberculous or anti-convulsive drug therapy or in case of patients with renal failure, diabetes mellitus or chronic hepatitis.



**Figure 1:** Decomposition of acetaminophen

There is a need to develop new, safer drugs for hepatitis patients suffering from multi-organ failure. Search for new drugs for limiting hepatic injury has been of interest recently. Garlic is a natural component of diet in Pakistan and efforts should be channeled towards bringing down the incidence of acute hepatitis in our country by improving intake of this natural antioxidant. We, in our study used ethanolic extracts of two varieties of garlic to determine and compare their effects on an antioxidative biomarker, serum glutathione peroxidase in albino rats.

## METHODS

One hundred twenty male albino rats weighing 200-250 grams were obtained from were obtained from National Institute of Health (NIH), Islamabad. Animals were housed in groups of 30 per cage for at least one week before the start of the experiments. Housing conditions were thermostatically maintained at  $26 \pm 2$  °C and a light/dark cycle (lights on: 0900-2100).<sup>15</sup> The animals were fed with commercially available standard pellet diet ad libitum and were provided with tap water in clean bottles.

## PREPERATION OF EXTRACT

Allium sativum Var Chinese exotic and Allium sativum Var Lehsun Gulabi were obtained from the local market of Lahore and were identified by a qualified taxonomist. Ethanolic extract of Allium sativum Var Chinese exotic and Allium sativum Var Lehsun gulabi were made and standardized using Facilities available at the Applied Chemistry Research Centre, PCSIR labs, Lahore. Their bulbs were first dried in

the shade and then crushed into a coarse powder using an electric grinder. This powder was then extracted in a Soxhlet extractor with 99.9% ethanol. The extract thus obtained, was filtered and the solvent (ethanol) evaporated in vacuum with a rotary evaporator. After evaporation a dark brown concentrate was obtained. This concentrate was kept at 4 °C prior to use. The crude extract was then dissolved in normal saline and then diluted to the desired concentration.<sup>16,17</sup>

**Induction of acetaminophen toxicity:** A single intraperitoneal dose of acetaminophen 750 mg/kg<sup>18</sup> dissolved in normal saline was used to induce acute oxidative hepatic injury.

Group A (Negative Control, n=30): was given normal saline 10ml/kg body weight intraperitoneally for 7 days.

Group B (Positive Control, n=30): was given a single dose of acetaminophen 750 mg/kg<sup>18</sup> dissolved in normal saline intraperitoneally.

Group C (Experimental 1, n=30): was pretreated with Allium sativum Var Chinese exotic ethanolic extract in a daily dose of 500mg/kg body weight intraperitoneally<sup>19</sup>(Figure 2) for 7 days before a single intraperitoneal dose of acetaminophen 750 mg/kg<sup>18</sup> dissolved in normal saline.<sup>15</sup>

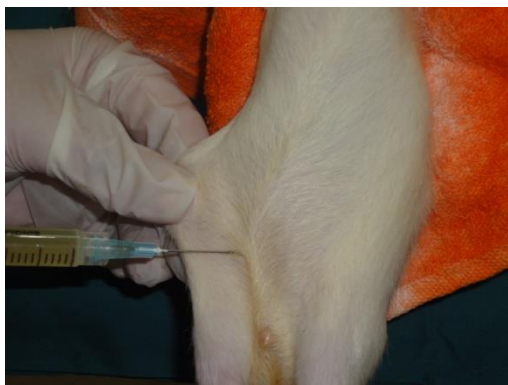
Group D (Experimental 2, n=30): was pretreated with Allium sativum Var Lehsun Gulabi ethanolic extract in a dose of 500mg/kg body weight intraperitoneally<sup>19</sup> for 7 days before a single intraperitoneal dose of acetaminophen 750 mg/kg<sup>18</sup> dissolved in normal saline.

After 24 hours of acetaminophen administration, each rat was anesthetized using ether. The needle of 5 ml disposable syringe was inserted directly into heart taking care that it may not pierce its posterior wall. Three-milliliter blood was drawn and was kept in the test tube for about 15-20 minutes, and allowed to clot. After 15-20 minutes, samples were centrifuged at 5000 RPM for 15 minutes. The serum, thus obtained, was preserved in labeled polypropylene storage tubes and stored at -

20 °C for determination of serum glutathione peroxidase.

## STATISTICAL ANALYSIS

Data was analyzed using PASW18. The arithmetic mean and standard deviation for quantitative variable, Serum glutathione were calculated. The statistical significance of difference amongst the four groups was determined by applying one way ANOVA followed by post hoc LSD (multiple comparisons) test. The values were considered significant if the p value was less than 0.05; and, highly significant if the p value was less than 0.001.



**Figure 2:** Administration of intraperitoneal dose of extract.

## RESULTS

After pretreatment with ethanolic extract of *Allium sativum* followed by acetaminophen hepatotoxicity, there was highly significant (\*p<.000) less decrease in glutathione peroxidase in both experimental groups as compared to both negative and positive control groups. (Table 1)

The positive control group (group B) having acetaminophen toxicity showed highly significant (p=0.000) decrease in serum glutathione peroxidase as compared to the value in the negative control group (group A) as depicted in (Table 2).

**Table 1-** Comparison of serum glutathione peroxidase in groups A, B, C and D. (One way ANOVA)

Parameter	Group A (n=30)	Group B (n=30)	Group C (n=30)	Group D (n=30)	p-value
Glutathione peroxidase (ng/ml)	21.49±0.79	4.62±0.60	5.27±0.71	15.03±1.25	0.000*

Values are presented as mean± SD

\*p<.000 highly significant

**Table 2-** Comparison of serum glutathione peroxidase in groups A and B. (Post hoc LSD)

Parameter	Group A (n=30)	Group B (n=30)	p-value
Serum glutathione peroxidase (ng/ml)	21.49±0.79	4.62±0.60	0.000*

Values are presented as mean± SD

\*p<.000-highly significant

After pretreatment with ethanolic extract of *Allium sativum* Var Chinese exotic followed by acetaminophen toxicity, the experimental group C had significant (p=0.025 significant) increase in serum glutathione peroxidase as compared to the value in negative control group (group B), (Table 3).

**Table 3-** Comparison of serum glutathione peroxidase in groups B and C. (Post hoc LSD)

Parameter	Group B (n=30)	Group C (n=30)	p-value
Serum glutathione peroxidase (ng/ml)	4.62±0.60	5.27±0.71	0.025**

Values are presented as mean± SD

\*\*p<.05-significant

After pretreatment with ethanolic extract of *Allium sativum* Var Lehsun Gulabi followed by acetaminophen toxicity, the experimental group D showed highly significant (p=0.000) increase in serum levels of glutathione peroxidase as compared to those in the positive control group (group B), (Table 4).



**Table 4-** Comparison of serum glutathione peroxidase in groups B and D. (Post hoc LSD)

Parameter	Group B (n=30)	Group D (n=30)	p-value
Serum glutathione peroxidase (ng/ml)	4.62±0.60	15.03±1.25	0.000*

Values are presented as mean± SD

\*p<.000-highly significant

Highly significantly (p=0.000) less reduction in serum glutathione peroxidase was manifested in experimental group D pretreated with ethanolic extract of *Allium sativum* Var *Lehsun Gulabi* as compared to reduction in these parameters in experimental group C pretreated with ethanolic extract of *Allium sativum* Var *Chinese exotic* (Table 5).

**Table 5-** Comparison of serum glutathione peroxidase in groups C and D. (Post hoc LSD)

Parameter	Group C (n=30)	Group D (n=30)	p-value
Serum glutathione peroxidase (ng/ml)	5.27±0.71	15.03±1.25	0.000*

Values are presented as mean± SD

\*p<.000-highly significant

\*\*p<.05-significant

## DISCUSSION

Our study compared the effects of ethanolic extracts of two varieties of garlic (*Allium sativum* Var *Chinese exotic* and *Allium sativum* Var *Lehsun Gulabi*) on experimentally induced hepatotoxicity and compared their effects on an antioxidative biomarker, serum glutathione peroxidase in albino rats. Acetaminophen was used to produce hepatotoxicity and oxidative stress, which manifested as reduced serum glutathione peroxidase.

This study showed that pretreatment of rats with ethanolic extract of two varieties of garlic grown in Pakistan prevented the decrease in serum glutathione peroxidase, due to acetaminophen toxicity. This effect

was exhibited more strongly by *Lehsun Gulabi* extract when compared to that of *Chinese exotic*. This adds to several reports on the pharmacological usefulness of garlic extracts as liver protective agents.

Lee et al (2016) investigated the protective effect of fermented garlic extract by lactic acid bacteria (LAFGE) against acetaminophen induced acute liver injury in rats. Their findings revealed that LAFGE modulates the signaling pathways involved in hepatic apoptosis through cellular redox control, as indicated by the inhibition of lipid peroxidation, glutathione and ATP depletion, and the elevation of antioxidant enzyme activities. These findings indicate that LAFGE ameliorates AAP-induced liver injury by preventing oxidative stress-mediated apoptosis, thereby establishing LAFGE as a potential supplement in the treatment of AAP-induced liver injury.<sup>20</sup>

Allyl methyl disulfide (AMDS) is as one of the bioactive components in fresh garlic paste and was investigated for its Hepatoprotective effect against acetaminophen (APAP) -induced acute liver damage in mice. Results reveal that AMDS significantly (p < 0.05) reduced the Maleicdialdehyde (MDA) level in liver tissues and restored the activities of antioxidant enzymes SOD, GSH-PX and GSH towards normal levels.<sup>21</sup>

Hepatoprotective effects of *Allium sativum* methanolic extracts on paracetamol induced hepatotoxic rats were investigated and it was suggested that the possible mechanism of action may be by the active ingredients in *Allium sativum* (allyl propyl disulfide) that could have increased the levels of glutathione to bind with the toxic metabolites of paracetamol such as N-acetyl- p- benzoquinone imine (NAPQI) and increased its rate of excretion from the body. It might also have inhibited the levels of the cytochrome P- 450 enzyme system that decreased the formation of NAPQI from ingested paracetamol. These possible mechanisms of action of *Allium sativum* extracts may be through their antioxidative effects that are capable of free radical

scavenging in living system.<sup>22</sup>

Sumioka et al studied the mechanism of protection by S-Allylmercaptocysteine (SAMC) against acetaminophen induced liver injury in mice. SAMC, one of the water-soluble organosulfur compounds in ethanol extracts of garlic, suppressed the plasma ALT activity and prevented reductions in hepatic glutathione levels.<sup>15</sup>

Rashed et al (2014) investigated the effect of garlic oil (GO) alone or in combination with low dose total body gamma ( $\gamma$ ) -irradiation (LDR) against paracetamol (APAP) - induced hepatotoxicity in rats. Findings showed that the combination of GO and LDR produced considerable comparable effects to either treatment alone in preventing the decreased hepatic glutathione content as a result of APAP toxicity. This remarkable synergistic protection against APAP-induced hepatotoxicity might be attributed partly to the suppressive effect of both GO constituents and LDR on lipid peroxidation by free radical scavenging properties or by restoration of glutathione content and cytochrome P4502E1 enzyme in the liver.<sup>23</sup>

## CONCLUSION

Allium sativum Var Lehsun Gulabi has better antioxidative potential as compared to Allium sativum Var Chinese exotic.

## RECOMMENDATION

Thus garlic may be considered as a useful dietary supplementary compound to patients treated with regular high doses of paracetamol such as of tuberculosis, cancer, dengue fever and arthritis. The antioxidative potential of Allium sativum should be further investigated in human studies. The medical implication of this finding could be that consumption of this variety of garlic might be a useful prophylactic and therapeutic strategy against oxidative stress of toxic hepatitis in Pakistan.

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## Original Article

# COMPARISON OF ANTHROPOMETRIC MEASUREMENTS BETWEEN ATHLETE AND NON-ATHLETE FEMALE STUDENTS

Shumaela Kanwal,<sup>1</sup> Hamid Javaid Qureshi,<sup>2</sup> Muhammad Sohail Aslam<sup>3</sup> and Shahroona Masud<sup>4</sup>

### ABSTRACT

**Background:** Participation in sports and exercise has a variety of health related benefits. This study was planned to compare the anthropometric parameters between athlete and non-athlete female students.

**Subjects and methods:** The study population consisted of 132 female students. Of these, 66 were athletes and 66 were non-athletes. Weight and height of each participant were taken by standardized procedure. BMI of each subject was calculated using WHO criteria.

**Results:** Results of the study showed that BMI was significantly low in athletes as compared to non-athletes ( $p$ -value $<0.05$ ). Height of athletic students was significantly more than non-athletic students while weight was non-significantly different between two groups. Regarding groups of BMI, more students were over-weight and obese in non-athletic groups compared to athletic group.

**Conclusion:** It was concluded that weight and BMI are lower in athlete than non-athlete students. Athlete students are taller than non-athlete students.

**Key Words:** Athletes, Body Mass Index, Anthropometry

## INTRODUCTION

Anthropometry is the study of human body measurements to understand the physique of different populations.<sup>1</sup> These measurements indicate the health of individuals in relation to growth and nutritional status.<sup>2</sup> Height and weight are the important measurements from anthropometric point of view. The height of an individual depends on genetic and environmental factors while weight depends on lifestyle and dietary habits of individuals.<sup>3</sup> Body mass index (BMI) relates the weight to height. It is a common method to determine that weight is in healthy range.<sup>4</sup> These parameters are important in the field of medicine, sports, ergonomics and biomechanics etc.<sup>5</sup> The knowledge of anthropometry is being increasingly appreciated by sports administrators.<sup>6</sup> Assessment of body composition in athletes is important because these measurements

show the effect of physical activity and nutrition.<sup>7</sup>

Regular physical activity has a favorable effect on weight, height and BMI of individuals. Decreased physical activity combined with lifestyle and eating habits is the main causes of overweight and obesity.<sup>8</sup> Studies have suggested that athletes have different anthropometric characteristics as compared to the general population because of participation in sports.<sup>9</sup>

The objective of this study was to compare anthropometric parameters between athlete and non-athlete female students.

## METHODS

This was a cross-sectional study, carried out at Lahore College for Women University, Kinnaird College, University of the Punjab and Samanabad Girls College in Lahore. The participants of the study included 132 female students. The subjects belonged to two groups, athletes (66) and non-athletes (66). Athlete students were regular participants of competitive sports played at the board and university level. Non-athlete

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subjects were not involved in sports or any other type of regular physical activity. The study was approved by the Institutional Ethical Review Board. Written informed consent was taken from each participant. Age of students, duration of participation in sports, amount of physical activity each day and types of games played by athletes were recorded on a standardized Performa. Weight and height of each participant were taken by standardized procedure using height and weight scale (Health Care). Weight was measured in kilograms and height was measured in meters. BMI was calculated using following formula;  

$$\text{BMI} = \text{weight (Kg)} / \text{height (m}^2\text{)}$$
 BMI groups of participants were determined using WHO criteria.<sup>10</sup>  
 Data was entered and analyzed using SPSS. Mean and standard deviations for quantitative parameters were calculated. For comparison of anthropometric measurements, student t-Test was applied. Qualitative variables were described using frequencies and percentages.

## RESULTS

The general characteristics of athletes are given in table-1.

**Table.1.** General Characteristics of athletes and non-athletes (n=132)

	Athletes (n=66)	Non-athletes (n=66)
Age	18.5±1.18	19.5±1.2
Hours of exercise/day	2.77±0.9	Nil
Age at start of athletic activity	14.24±2.03	-

This table shows that height and BMI are significantly different between two groups while weight is insignificantly different between two groups. Table.3. Shows BMI groups of athlete and non-athlete students.

**Table.2.** Comparison of anthropometric measurements between athlete and non-athlete female students (n=132)

Parameters	Athletes (66)	Non-athletes (66)	p- value
Weight (Kg)	52.18±7.17	54.25±8.74	0.13
Height (m)	1.17±0.80	1.57±0.005	0.05*
BMI	19.76±2.56	21.77±3.53	0.003*

\*p value ≤ 0.05

**Table.3.** BMI groups among athletes and non-athletes (n=132)

	Athletes (n=66)	Non-athletes (n=66)
Underweight	19(28.8%)	11(16.6%)
Normal weight	44(66.7%)	45(68.16%)
Overweight	03(4.4%)	09(13.64%)
Obese	0(0%)	01(1.51%)
Total	66	66

## DISCUSSION

The present study was conducted to find out the differences of anthropometric measurements in athletes and non-athletes. Three anthropometric parameters measured included weight, height and BMI. The results of the study showed that athletes were significantly taller than non-athletes. Saha et al (2015) also found that athletes had more height than non-athletes. However, the difference found was not significant while the mean weight of athletes was significantly greater than non-athletes, a finding, contrary to results of present study.<sup>11</sup> In the present study, athletes were found to have less weight as compared to non-athlete subjects, however the difference was not significant, while BMI was significantly less in athletes. Radu et al did a comparison of anthropometric measurements between athletes and non-athletes. They reported presence of differences in body weight and BMI between athletes and non-athletes. It was

found that body weight and BMI were low as compared to their control group. However, there was no difference of height between two groups.<sup>1</sup> Similar results were also reported in other study.<sup>12</sup> Madhu et al (2015) also found that BMI was less in physically active female students as compared to those who were physically non-active.<sup>13</sup> A study done on the lipid status of athletes also reported that athletes differ in anthropometric characteristics as compared to non-athletes. Athletes in their study had low body weight, BMI but more height as compared to non-athletes.<sup>14</sup> In another study, it was concluded that exercise reduces the BMI and improves physical fitness.<sup>15</sup> In the present study, more athletes were found to be having normal and under-weight as compared to the weight in the control group. A study done on comparison of body composition between athlete and non-athlete high school students also found a higher incidence of over-weight and obese participants among non-athletes as compared to athletes.<sup>16</sup>

## CONCLUSION

It was concluded on the basis of results that weight and BMI is low in athletic students as compared to non-athletes while mean height is more in athletes as compared to non-athletes.

## LIMITATION:

The limitation of this study was the lack of information about dietary habits of participants as this can also affect the anthropometric parameters measured in the study.

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## **Original Article**

### **A STUDY OF RISK FACTORS IN DIABETIC FOOT ULCER IN A TERTIARY CARE HOSPITAL AND STRATEGY OF PREVENTION.**

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#### **ABSTRACT:**

**Objective:** To identify common risk factors in diabetic patients who presented with foot ulceration and present a programme for their prevention.

**Methodology:** This is a hospital based descriptive study. This study was conducted in the department of surgery Unit – I from Jan, 2015 to July, 2017 at Akhtar Saeed Trust Hospital Lahore 150 consecutive patients with a diabetic foot ulcer (DFU) were included in the study. Various risk factors such as age; gender; peripheral arterial disease; peripheral neuropathy; duration, control and type of diabetes; smoking and education about foot care were noted. During their stay at hospital glycemic control was achieved and diabetic ulcer was treated.

**Results:** The majority of the patients were males with male to female ratio 3:1. The maximum number of patients were in the 6th decade (40%) followed by 5<sup>th</sup> decade (31%). All the patients except one were suffering from type 2 diabetes. Diabetic control was poor in 98% patients at the time of admission. 50% of the patients were suffering from diabetes for more than 10 years. 52% patients were smokers. Peripheral neuropathy was noted in 82% patients, whereas peripheral pulses were palpable in 82% patients. 56% patients presented in Wagner's grade 3 and 4 Diabetic ulcer. 15% patients ended up with amputation. 80% of the patients were not educated about foot care by the treating physician. 45% patients were not aware of foot care. Screening and education of high risk patients are recommended.

**Conclusion:** Males, smoking, peripheral neuropathy, long duration, poor control, type 2 diabetes and lack of knowledge about foot care are the main reasons for diabetic foot ulcer. Screening of high risk patients is recommended.

**Key Words.** Risk factors, Smoking, Type 2 diabetes

## **INTRODUCTION**

Diabetes mellitus is one of the biggest health problems in the modern world. It is estimated that in 2012, 370 million people were suffering from diabetes and by the year 2030 it will affect over 552 million adult population.<sup>1</sup> In Pakistan prevalence of diabetes is reported to be 11%. Among this population incidence of foot ulceration is 10%.<sup>2</sup> This is a multisystem disease and can affect various organs. Among them foot ulceration is one of the most common complications.

The lesion varies from fissure, cellulitis, abscess to osteomyelitis and gangrene. The higher risk of lower limb amputation in patients with diabetes is noted in comparison with non diabetic patients.<sup>3</sup> Foot ulcers and amputations in diabetic patients adversely affect the patient's financial status and the quality of life.

The objective of the study was to identify the risk factors in diabetic patients who presented with foot ulcerations and present a plan for screening and educating the patients.

## **METHODS**

This descriptive study was conducted at the surgical department of Akhtar Saeed Trust Hospital, Lahore from Jan 2015 to- July 2017. All the diabetic patients who reported

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with foot ulcers were included in the study. History included age, gender, smoking, peripheral arterial disease, neuropathy, duration, control and type of diabetes. Neurological assessment was carried out by checking touch sensation and vibration sensations. Any deformity, dryness, absence of sweating and vascular status of the foot was assessed by noticing skin color changes, temperature difference and palpating pulses of femoral, popliteal, posterior tibial and dorsalispedis arteries. Foot ulcers were classified according to the Wagner's grade. Knowledge about foot care and shoes wear was recorded. The response was divided into 3 categories, poor, fair and good. Any instructions given to them regarding foot care by primary physicians during the management of diabetes was enquired. Baseline investigations were carried out including HBA1C. Radiographs of the feet were taken to rule out osteomyelitis. Pus was sent for culture and sensitivity. Appropriate wound management was done under suitable anesthesia. Glycemic control was achieved by appropriate medication.

## RESULTS

150 patients were enrolled in this study. Out of these 112 (74.7%) patients were males and 38 (24.3%) were females. Male to female ratio is 3 to 1. The youngest patient was 30 years and the oldest was 85 years. The maximum number of patients were in the sixth decade (41%) followed by 5<sup>th</sup> decade (31%). (Table1) The average age was 52 years.

**Table 1** Age group of the patients

Table 1. Age Group		
Age	No. of Patients	%Age
30 - 39	10	7
40 -49	47	31
50 – 59	61	41
60 – 69	26	17
70 – 79	4	3
> 80	2	1

Right foot was affected in 91 (62%) patients, left foot in 48 (32 %) patients while both feet were affected in 9 (6%) patients. All the patients except one were suffering from type II diabetes. Diabetic control was poor in 98% patients.

The duration of diabetes varied between less than 1 year to more than 20 years (Table 2) Minimum duration was 9 months and maximum duration was 25 years. 64 % patients were suffering from diabetes for more than 9 years followed by 17% for 5 years.

**Table 2** Duration and treatment of illness

Treatment	No. of Patients	%Age
< 1 Year	27	18
> 1 – 5	24	16
6 - 9	24	16
10 – 15	30	20
16 – 20	24	16
> 20	21	14

78 (52 %) patients were smokers. 72 (48 %) patients were non smokers. All the patients except one were males. In 123 (82%) patient's peripheral pulses were either present or feebly palpable. In 27 (18%) patients they were not palpable. 123 (82%) patients were suffering from neuropathy with equal frequency in males and females. 15 % Patients underwent amputation. (Table 3)

**Table 3** Type of Treatment.

Treatment	No. of Patients	%Age
Dressing	19	13
Debridement	105	70
Incision and drainage of abscess	4	3
Amputation	22	15

56 % patients fell in category iii and iv of Wagner ulcer classification (Table 4)

**Table 4** Wegner's ulcer classification.

Sr. No.	Wagner's Classification	No. of Patient	%Age
1	Superficial Ulcer	34	23
2	Deeper, Full thickness extension of Ulcer	30	20
3	Deep abscess of osteomyelitis associated with Ulcer	60	40
4	Partial forefoot gangrene with ulcer	24	16
5	Extensive foot gangrene with ulcer	2	1

55% patients had poor knowledge of foot care. 25 % patients have fair knowledge while only 20% had good knowledge. The primary physicians examined and gave instructions in 20% patients only.

## DISCUSSION

Our study reveals that males are more commonly affected than females. Male predominance has been reported in other studies also.<sup>4,5</sup> Male preponderance is due to various reasons. The main reason is their outdoor activities as they are the earning members of the family. Therefore they are more exposed to trauma as compared to females. Tobacco smoking among males also increases the risk.<sup>6,7</sup> In this study all the patients except one were suffering from type 2 diabetes with poor glycemic control. These two factors (Poor glycemic control in type 2 diabetes) increase the risk of DFU.<sup>8</sup> Peripheral neuropathy and vasculopathy are known predisposing factors for diabetic foot ulcer.<sup>9</sup> Absence of protective sensations such as touch and pain due to peripheral neuropathy was the reported in 82% patients in our series. The highest incidence is also reported in other series.<sup>10,11</sup> Poor glycemic control increases the risk of neuropathy, especially during old age.<sup>12,13</sup> Duration of disease has a direct impact on the incidence of peripheral neuropathy.<sup>14</sup> The chances of

neuropathy are related to type. Gill et al has reported higher %age of peripheral neuropathy in Type II diabetes than type I diabetes.<sup>15</sup> Associated autonomic neuropathy causes an hydrosis leading to dry skin, cracking and fissuring. It acts as a portal of entry for bacteria and invasion of deeper tissues.<sup>16</sup> Motor neuropathy leads to atrophic changes in the foot musculature. It results in foot deformity and limited joint mobility.<sup>17</sup> Vasculopathy especially in older age compromises blood supply.<sup>18</sup> According to this study majority of the patients (76%) are equal or above the age of fifty years. The risk of peripheral arterial disease increases with age. It is twice as common in diabetes than in non diabetics.<sup>19</sup> Peripheral pulses were palpable in 82% patients, but palpable pulsations is not a reliable sign for adequate blood supply. In diabetes, micro-vascular disease compromises local blood supply. Chandrashekar reported that repetitive low pressure trauma due to tight and ill fitting shoes during standing and walking results in local ischemia. The ulcers form on skin at bony prominences.<sup>20</sup> Another reason of high risk in older persons is their diminished ability for self care and foot examination. Poor vision in this age group also predisposes to injury. This study reveals that our patients have poor knowledge of foot care, however they are conscious about foot wear. This study also reveals that very few primary physicians inquire about any symptoms of foot disease and routinely examine the patient's feet. Therefore, many patients with neuropathy and vasculo-pathy remain undiagnosed in early stage. Due to delay in diagnosis these patients develop ulcer which otherwise would have been avoided. An opportunity to educate and early diagnosis is lost and many patients end up with ulcers and amputation. In this series 15% patients underwent amputation. This catastrophe can only be avoided by screening of individuals at high risk at least once a year.<sup>21</sup> On every visit the doctor should rule out distal neuropathy. He should examine the feet for

decreased blood supply by palpating posterior tibial and dorsalis pedis pulses and look for skin changes. They should be educated and trained to protect their feet against adverse effects of pressure, friction or shear<sup>22</sup> Moreover, these patients can be advised special footwear to reduce the chances of ulcer formation.<sup>23-25</sup>

## CONCLUSION

Poor glycemic control, neuropathy, prolonged duration of disease, type 2 diabetes, cigarette smoking, older age and male gender are important risk factors. Health providers should not only manage the diabetes, but also screen, educate and train the patients about foot care. Many patients will continue to suffer from foot ulcers due to lack of screening and education programme.

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## **Review Article**

### **PHATHOPHYSIOLOGY OF ALZHEIMER'S DISEASE**

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#### **ABSTRACT:**

Alzheimer's disease is the age related degenerative disease of the nervous system. Initially, episodic memory decline is followed by loss of short term memory. This disease is due to premature aging of the brain. Its prevalence is higher in females. Patients are not able to perform daily activities and they require constant care. Old people who remain involved in intellectual activities and exercise have a decreased risk for this disease. Intake of high fat and carbohydrate rich diet increases the risk.

It is concluded that Alzheimer's disease is the most important neurodegenerative disease due to premature aging of the brain manifested by loss of memory and impairment of cognitive and other brain functions. Intellectual activities and physical exercise reduce risk for this disease.

**Key Words:** Dementia, Memory, Premature aging

#### **INTRODUCTION**

Alzheimer's disease (AD) is the most important age related disease due to degeneration of parts of the brain. Impairment of short term and episodic memory initially occurs with inability to recall recent events. It is followed by decline of cognitive and intellectual brain function.<sup>1-3</sup> There is progressive degeneration due to premature aging of the brain. Patients are unable to perform routine daily activities and need continuous care.<sup>4</sup> It has been named after the German Psychiatrist and pathologist, Alio Alzheimer in 1906. (Fig – 1).<sup>5</sup> It is a common type of dementia in old people. In western countries, it is a highly costly disease. Incidence of this disease doubles with every 5 years of the age. At the age of 60 years, it is 1% and at the age of 85 years, it is 30%. Prevalence of the disease is higher in females because of their longer life span. In two third of patients of dementia, Alzheimer's disease is the cause.<sup>4-7</sup>

Due to progressive brain deterioration, patients cannot live independently. Speech becomes difficult due to their inability to recall vocabulary resulting into incorrect substitution of words (paraphasias).<sup>8</sup>

Due to decreased motor coordination, falling can occur. As the long term memory declines, they fail to recognize their close relatives. Behavioral changes begin such as wandering, irritability, crying, aggression or resistance to care giving. Some patients show sun downing. Urinary incontinence can start. These changes pose problems for the close relatives and caregivers. These patients can be moved from home care to special care centers. In late stages of the disease, their mobility decreases to the point where they become bed ridden and unable to feed. The disease itself is not the cause of death. Infection of pressure ulcers or pneumonia can lead to death.<sup>8-10</sup>

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## INHERITANCE

Autosomal-dominant inheritance is not common in cases of AD. Inheritance of the E4 allele of apolipoprotein E (APOE) gene is the known genetic risk factors.<sup>11,12</sup> 40–80% of patients with AD have at least one APOE 4 allele that increases the risk of the disease by 3 times in heterozygote and by 15 times in homozygotes.<sup>13</sup>

## HISTOPATHOLOGY

The Histopathological feature in AD is loss of neurons and synapses in cerebral cortex and other parts of the brain leading to atrophy of temporal and parietal lobes, parts of the frontal cortex, hippocampus and cingulate gyrus.<sup>14</sup> There is degeneration of cell bodies of cholinergic neurons in these areas leading to deficiency of acetyl choline. Neuronal death and loss of synaptic transmission results into dementia.<sup>15</sup> Reduction in size of these parts of the brain can be seen by Magnetic Resonance Imaging (MRI) and Positron Emission Tomography (PET).<sup>16,17</sup> Microscopy of these brain parts show beta amyloid plaques. These plaques are dense insoluble deposits of beta amyloid peptide and cellular material around neuron.<sup>18</sup> Neurofibrillary tangles are aggregates of microtubule associated protein tau that has become hyperphosphorylates.<sup>19</sup> It is rare to have lewy bodies in the brain of these patients.<sup>20</sup> Size of beta amyloid plaques varies from 10 um to several hundred um.<sup>7</sup>

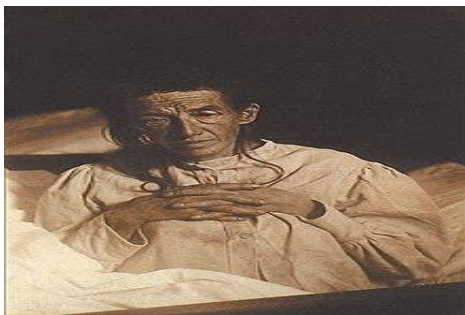


Figure I. Alois Alzheimer's patient

Auguste Deter in 1902. Hers was the first described case of Alzheimer's disease.

## DIAGNOSIS

Patient's medical history, history from relatives, observation of behavior, presence of specific neuropsychological features and absence of alternate conditions help to diagnose Alzheimer's disease.<sup>21,22</sup> Computed tomography (CT) or magnetic resonance imaging (MRI) or positron emission tomography (PET) can be used to exclude other subtypes of dementia.<sup>23</sup> In addition, it may predict conversion of mild cognitive decline to Alzheimer's disease.<sup>24</sup> Memory testing can determine the state of the disease.<sup>25</sup> Accurate diagnosis can be confirmed by postmortem examination of the brain.<sup>26</sup>

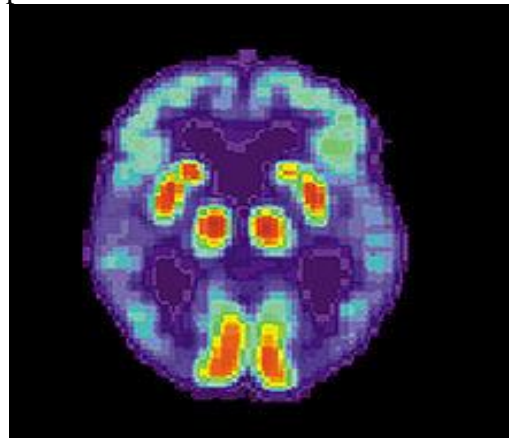


Figure II. PET scan of the brain of a patient with AD showing loss of function in the temporal lobe.

## RISK FACTORS

Risk Factors Include

- Age
- Chromosome 14 (Presenilin 1 mutations)
- Chromosome 1 (Presenilin 2 mutations)
- Gene for amyloid precursor protein
- Mutation of chromosome 21
- Chromosome 19 Apo E allele
- Trisomy 2

- Mutation in Alpha –2 macroglobulin gene (late onset disease)
- Apolipoprotein E gene abnormality.

Cigarette smoking and intense intellectual activity can prevent the disease to some extent.<sup>27</sup>

Lifestyle factors like diet, exercise, social engagement and mental stimulation may determine the chances to develop Alzheimer's disease.<sup>28</sup>

Hormonal disturbances. Cortisol increases chances to develop this disease while estrogens decrease the risk.<sup>7</sup>

Cardiovascular risk factors, such as hypercholesterolemia, hypertension and diabetes are associated with a higher risk of onset and course of AD.<sup>29,30</sup> Statins have not been effective in preventing or improving the course of the disease.<sup>31-33</sup>

Non-Steroidal anti-inflammatory drugs (NSAIDs) decrease risk of developing AD.<sup>34</sup> NSAIDs can decrease inflammation related to amyloid plaques.<sup>34</sup> These do not appear to be useful as a treatment.<sup>35</sup> Long acting anti-cholinesterases that cross the blood brain barrier may improve cognitive function in these patients.<sup>36</sup>

People who engage in intellectual activities such as reading, playing board games, completing crossword puzzles, playing musical instruments, or regular interaction with other people decreases risk for Alzheimer's disease.<sup>37</sup> Education and learning a second language delays onset of this disease.<sup>38,39</sup>

Physical exercise decreases rate of dementia<sup>38,40</sup> and also reduces symptom severity in Alzheimer's disease.<sup>41</sup>

## EFFECT OF DIET

In individuals on Japanese or Mediterranean diet, there is lower risk of AD.<sup>42,43</sup> Saturated fat and simple carbohydrate rich diet has a higher risk.<sup>44</sup> Cocoa, red wine and tea decrease the risk for AD.<sup>45-47</sup> Vitamins A,C,D folic acid, vitamin B<sub>12</sub>, have no

beneficial effect.<sup>48-52</sup> Selenium, zinc and omega – 3 do not benefit patient with Alzheimer's disease.<sup>53-55</sup>

## CONCLUSION

Alzheimer's disease is the most common neurodegenerative disorder due to premature aging of brain characterized by dementia and impairment of cognitive and other brain functions. Intellectual activities and physical exercise reduce risk for Alzheimer's disease.

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## **Case Report**

### **HETEROTOPIC PREGNANCY**

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#### **Abstract:**

Heterotopic pregnancy is a rare type of pregnancy and this report presents a detailed overview of a case of heterotopic pregnancy with live intrauterine gestation and ruptured right adenexal gestation. Coexistence of intrauterine and extrauterine gestation is known as heterotopic pregnancy and its incidence is 1: 30,000 of spontaneous pregnancies.<sup>1-2</sup> It is associated with significant maternal morbidity and mortality due to the risk of rupture of ectopic pregnancy. There is a false sense of security when an intrauterine gestational sac is seen. This results in the inadequate inspection of adenexae despite a strong initial clinical suspicion of ectopic pregnancy. Thorough holistic approach and ultrasonography are needed in managing these patients.

**Key Words:** Heterotopic pregnancy, Acute abdomen, Salpingectomy

#### **INTRODUCTION**

Heterotopic pregnancy is defined as the coexistence of intrauterine and extrauterine gestation<sup>1-2</sup> incidence is estimated to be 1: 30,000 of natural pregnancy.<sup>2</sup> However there has been a rise in cases of ectopic pregnancy and heterotopic pregnancy in last decades.<sup>3-4</sup> Higher incidence of pelvic inflammatory disease and wide use of assisted reproductive technologies are some of the factors due to which cases of ectopic and heterotopic pregnancies have increased.<sup>4</sup> However spontaneous occurrence is still reported to be extremely rare<sup>5</sup> and it requires careful management of viable intrauterine pregnancy.<sup>1</sup>

It is an uncommon and infrequently occurring case history of heterotopic pregnancy in a clinically stable patient. This case report stresses the importance of a comprehensive approach and thorough ultrasonography in managing such patients.

#### **CASE REPORT**

A 32-year-old woman (G<sub>6</sub>P<sub>2</sub>A<sub>2+1</sub>) with previous two cesarean sections, two miscarriages and one ectopic pregnancy in which product of conception were removed from the right fallopian tube by milking it, three years back. She presented in our hospital in early pregnancy at 7<sup>+2</sup> weeks gestation to confirm the site of pregnancy as she had a previous ectopic pregnancy. This was a spontaneous conception with no previous fertility treatment. She never practiced any contraception except the barrier method off and on.

She was completely asymptomatic at the initial consultation. A trans-vaginal ultrasound report on 29/08/16 was showing a single alive intrauterine pregnancy at 7 weeks. There was evidence of partially collapsed corpus luteal cyst in right adenexa measuring 3.1 cm x 2.0 cm with the isoechoic focus of 1.9 x 1.5 cm, likely collapsed wall of ruptured cyst in right ovarian parenchyma and no free fluid in the peritoneum or in culde-sac.

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**Figure 1:** A transvaginal ultrasound report showing a single alive intrauterine pregnancy at 7 weeks.

The patient presented back after 10 days with a complaint of lower abdominal pain. The patient was admitted and managed conservatively, as she was hemodynamically stable. Her blood pressure was 100/70 mm hg, pulse 88/min. CBC report showed Hb% 13.3 g/dl and TLC was  $10.9 \times 10^6$ . Beta HCG level was 47605, corresponding to 9 weeks gestation. A rescan was scheduled showing alive intrauterine gestation at 9 weeks with evidence of complex right adnexal mass with multi septated cystic component measuring 5.8 x 4.8 x 4.4 cm, likely of ovarian origin with minimal adjacent free fluid in right adnexa and culde-sac region. The patient was sent home after a few days of observation.



**Figure 2:** A transvaginal ultrasound report showing a single alive intrauterine pregnancy at 9 weeks.

The patient was readmitted at 11<sup>+</sup>week gestation with severe lower abdominal pain. There was no vaginal bleeding. On examination, she was cold and clammy. Abdominal examination was suggestive of an acute abdomen with severe tenderness, guarding and rigidity. Clinical differential diagnosis at that stage was a ruptured corpus luteal cyst or ruptured ectopic pregnancy. Transvaginal ultrasound at that time was showing an alive intrauterine pregnancy at 11+ weeks gestation and right adnexal mass along with a streak of fluid in the hepatorenal pouch and mild to moderate fluid in culde-sac. This showed the likelihood of heterotopic pregnancy on the basis of these observations.



**Figure 3:** A transvaginal ultrasound report showing a single alive intrauterine pregnancy at 11 weeks.

Emergency laparotomy was planned on 24/9/16. Right salpingectomy was performed and about 500 cc blood clots were removed from peritoneal cavity and specimen was sent for histopathology.

Histopathology report revealed that the fallopian tube wall was showing hemorrhagic, fibrin decidual tissue with degenerated chorionic villi which suggested an ectopic pregnancy.

The patient made an unremarkable recovery from the surgery and was discharged with the advice of follow-up in the antenatal clinic. She had a regular antenatal checkup and her intrauterine pregnancy continued. At 38 weeks of gestation, elective cesarean section was done with left tubal ligation and a healthy male baby weighing 2.9 kg was delivered. Postnatal recovery was uneventful. Both mother & baby were discharged on the third postpartum day in stable condition.

## DISCUSSION

Heterotopic pregnancy can cause a diagnostic dilemma because on early transvaginal ultrasound, it may not be diagnosed as an extra-uterine gestation in all cases.<sup>5-6</sup> Sometimes the presence of haemorrhagic corpus luteum can confuse and delay the diagnosis of heterotopic pregnancy. A study of 192 cases of heterotopic pregnancy of 2007<sup>7</sup> showed that only one-third of the cases were diagnosed by ultrasonography pre-operatively.

A good history is crucial for identifying risk factors related to heterotopic pregnancy<sup>9-11</sup> such as fertility treatment and tubal pathologies like pelvic inflammatory disease, endometriosis or previous tubal surgeries, patients with previous ectopic pregnancy or patients who conceived while using the intrauterine device are also at risk.<sup>7-10</sup> The important learning point from our case was that the diagnosis was not suspected at the initial presentation and

the patient presented subsequently with acute abdominal pain and with intraperitoneal hemorrhage. The finding of an intrauterine gestational sac was a misleading observation and led to false assurance. In women who have previous ectopic gestation treated surgically or non-surgically, increased vigilance is required.<sup>8-11</sup> Even if they are asymptomatic and intrauterine gestation is confirmed, one of the differential diagnoses of heterotopic pregnancy should be considered.

## CONCLUSION

A holistic approach and repeated ultrasonographies are crucial for patients with high suspicion of ectopic pregnancy. Especially, in the presence of pelvic free fluid even with an intact intrauterine pregnancy, one must keep heterotopic pregnancy in mind.

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