Editorial

HEAT WAVE IN PAKISTAN: A BURNING ISSUE

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Pakistan is ranked as the fifth most vulnerable country to climate change and faces extremely hot weather conditions[1]. A heat wave is an extreme weather event characterized by a period of abnormally high temperature exceeding the normal range for a given time and place. This period of scorching heat typically lasts two or more days. Humidity makes it feel much hotter. This results from the building of a high-pressure zone in the upper atmosphere, mainly due to anthropogenic greenhouse gases. Global warming has led to more frequent and severe heat waves all over the world[2]. According to the World Bank, Pakistan has faced an increase in average yearly temperature of 1.5°C since 1900. Pakistan is anticipated to experience more than 30 extreme heat days annually, compared to less than 10 days in the past years.

Urbanization contributes to the Urban Heat Island phenomenon by replacing the vegetation with concrete roads, buildings, and other structures. These surfaces absorb and hold heat rather than reflect it, thereby raising the surface temperatures and overall ambient temperatures in these urban areas. Rapid urbanization, deforestation, and the burning of fossil fuels underpin this predicament. In Pakistan, Karachi, Lahore, Rawalpindi, Gujranwala, Multan, and Faisalabad suffer from the Urban Heat Island phenomenon.

Heat waves have multifaceted implications. The health impacts of heat waves range from heat exhaustion (heavy sweating, weak pulse, muscle cramps, headache, nausea, and dizziness), heat stress (rapid heartbeat, headache, cramps, weakness, chest pain, difficulty breathing) to heat stroke (high body temperature, fast and strong pulse, losing consciousness, nausea, headache, and dizziness). Heat stroke is an emergency condition that can be fatal if not appropriately managed. Childhood, pregnancy, old age, working outdoors, and low socioeconomic conditions are highly at a higher risk[3].

Heat waves also cause drought by damaging the crops, thereby aggravating food insecurity. Global Climate Risk Index estimated that nearly 10,000 Pakistanis died due to climate change impacts, and the country suffered an economic loss of approximately $3.8 billion between 1999 and 2018. Heat waves exacerbate the water shortage. Energy demand has also increased. Heat stress causes dehydration and fatigue, which reduces labor productivity. Subsequently, the country suffers economic loss. An estimated 100 million people will be forced to cross the poverty line in 2030, South Asia being the most affected region.

Heat waves impoverish the poor and the marginalized, rendering them more exposed to heat. They usually do not have adequate access to health care. World Bank has warned that climate change could push an additional 100 million people into poverty by 2030, South Asia being one of the most affected regions.

Pakistan is expected to suffer a drop of 6.8% in its GDP by 2050 due to climate change. This calls for a shift from a reactive to a proactive and strategic approach. This needs to develop workable and sustainable solutions. For example, Miami, Phoenix, Athens, and Freetown have appointed chief heat officers to coordinate the response to extreme heat.

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Raising awareness identifies at-risk communities and implements sustainable solutions. The Temporary Employment Program (PET1) in Mexico provides a social safety net to vulnerable groups. Singapore has implemented several programs to support urban farming, which has subsequently decreased the severity of its urban heat island effect by four °C over the last 30 years.

Pakistan shares less than 1 % of global greenhouse gas emissions, having a negligible carbon footprint[4]. Climate governance, by combining risk reduction, adaptation, and preparedness measures along with mitigation, will provide a comprehensive strategy for Pakistan. Focusing on preparedness by integrating disaster risk management and climate change adaptation through early warning systems and social protection plans holds promise to save Pakistan from the negative impacts of heat waves. Resilient, sustainable, and inclusive urban planning is fundamental for both preparedness and response to such hot weather conditions. Furthermore, along with inter-governmental coordination at the global level, commitment to the Paris Agreement will help Pakistan deal with this scorching reality[5].

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Original Article

FREQUENCY AND RISK FACTORS OF POSTSURGICAL SITE INFECTIONS IN PATIENTS VISITING TERTIARY CARE HOSPITALS IN DISTRICT PESHAWAR

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Abstract:

Background: According to WHO report in 2016 the post-surgical site infection rate in patients was 11%. In Pakistan, 12.7% SSI rates were reported in emergency cases and 4.6% in elective surgeries. In Objective of this study is to find surgical site infection (SSI) frequency and risk factors in patients admitted to tertiary care hospitals in Peshawar.

Materials and Methods: A cross-sectional analytical study was conducted from October 2021 to March 2022 using a non-probability consecutive sampling technique. One hundred and thirty patients who had undergone surgery were selected. Data was collected using a questionnaire and analyzed using SSPSS-23.

Results: The frequency of SSIs in Peshawar was 30%, highest frequency is reported un age group between 15 -20 years. Emergency surgery got 31% SSIs, while 28% of patients on whom elective surgery was performed got 33% SSIs. Laparoscopic surgery had 33% frequency of SSIs as compared to 29% with open conventional surgery. SSIs was reported in 62% of smokers, 33% of hypertensive and 40% with diabetes.

Conclusion: The study has found that the frequency of SSIs in Peshawar is 30%. Males, emergency and laparoscopic surgery is at a higher risk of getting SSIs. Smokers, Diabetics and hypertensive patients are more prone to SSIs.

Keywords: Infections, Post-surgical, Tertiary care hospital

INTRODUCTION:

A postoperative surgical site infection is defined as any infection that occurs within 30 days of surgery. Surgical site infections (SSIs) may occur after surgery, and that may delay healing, therefore increasing the cost of care[1]. Most commonly isolated in SSIs are extended-spectrum β-lactamase-producing Escherichia coli, followed by Enterococcus species[2].

Different types of SSIs include superficial Incision surgical infection, deep incision surgical site infection, organ/space site infection, cellulitis, necrotizing soft tissues infection, necrotizing fasciitis, gas gangrene, impetigo, erysipelas, tetanus etc[3]. The Risk factors included in many studies were obesity, complicated emergency surgery, prolonged surgical duration, chronic obstructive pulmonary disease, and other respiratory conditions, diabetes, smoking, coronary artery

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disease, peripheral vascular disease or limb ischemia, hypertension, bleeding disorders, renal disease, preoperative sepsis, and female gender[4].

When the microbiological flora concentration is more than 10,000 microorganisms per gram of tissue, there is a high risk for an infected wound[5]. According to the 2016 WHO report, the post-surgical site infection rate in patients was 11%[3]. In one of the studies, it showed Surgical site infections (SSI) associated with colorectal surgery are 4 times more than any other abdominal surgery. Four frequently reported factors leading to a higher incidence of infections include; advanced age, peri operative complications leading to morbidity, type of surgical wound (clean, clean-contaminated, contaminated or dirty), and surgeries for neoplasm in Pakistan[6]. In a study conducted in Ghana on post-surgical infection-causing organisms, the most common species included Escherichia coli, Pseudomonas aeruginosa, Klebsiella pneumoniae, Staphylococcus aureus, and Acinetobacter baumannii. The majority of organisms were multi-drug resistant, including 86% of E. coli, 52% of A. baumannii and 86% of K. pneumoniae, and 65% (17/26) of the cefotaxime-resistant K. pneumoniae were extended spectrum β-lactamase producing[7]. Due to the increasing number of surgical procedures daily, the number of SSIs increases accordingly. Surgical site infections (SSI) are a significant health issue for both developed and developing countries. Incidence of SSIs in the mainland China was reported as 4.5% and 14.8% in Africa[8]. Another study done in Japan reported that postoperative infections occurred in 10.7% of 6582 patients who had undergone digestive surgery (6.8% for endoscopic surgery and 18.7% for open surgery)[9]. In another study, data was collected from 84 different areas of Pakistan from 858 patients. Among those 6.5% of patients develop SSI[10].

This research studied the frequency and risk factors of infections in patients after undergoing surgeries in tertiary care hospitals in Peshawar.

MATERIALS AND METHODS:

A cross-sectional analytical study was done from October 2021 to March 2022 using non probability consecutive sampling technique. This study was conducted at Surgical and Allied Wards/OPDs in Tertiary Care Hospitals in Peshawar including Khyber Teaching Hospital Peshawar, Lady Reading hospital Peshawar and Hayatabad Medical Complex on patients who have been operated. The inclusion criterion was Postoperative patients with age 15 to 90 years reporting within one month of surgical procedure with and without surgical site infection. An exclusion criterion was patient's not giving consent.

Duration of study was six months after approval of synopsis. According to WHO formula with prevalence 9.294%[4] with margin of error 5% and 95% confidence interval the calculated sample size is 130. After approval from Ethical Committee of Khyber Medical College (IREB NO.54/DME/KMC), the data was collected by questionnaire. The participants were assured that this survey was purely for research, data review and their confidentiality will be maintained and if agreed upon a written informed consent was obtained from them. All the included patients were interviewed on well-designed questionnaire. The data was collected by the researcher through face-to-face interview. The collected data was then analyzed to produce the results. Data was analyzed using SPSS-23. Descriptive analysis of the data was done and presented primarily in the form of frequencies, percentages, tables, and bar charts. Analytical analysis was done using Chi square between gender and Post Surgical Site Infections and P value of 0.05 or less was taken as significant.

RESULTS:

Frequency of SSIs in Tertiary care hospitals in Peshawar is reported in 39 patients constituting 30%. From age 15-30 out of total 62 people, 13 were infected (20.96%). From age 30-45 out of total 26 people 7 were infected (26%). From age 46-60 out of total 32 people 14 were infected (43%). From age 61-75 out of total 8

people 3 were infected (37.5%). From age 76-90 out of total 2 people 2 were infected (100%). 42% males and 23% females got SSIs. 31% on whom emergency surgery was performed got SSIs while 28% patients got infected on whom elective surgery was performed. 33% on whom laparoscopic surgery was performed got infected while 29% patients on whom open conventional surgery was performed got infected. 27% non-smokers got SSIs while 62% smokers got SSIs. The frequency of SSI among the Non-hypertensive patients was 29% while

in hypertensive patients it was 33%. In non-diabetic patients the frequency of SSIs was 28% while it was 40% in diabetics.

Table 1: Frequency of SSI and its relation with age of the patients.

Surgical Site Infection	Age of Study Respondent					Total
	15-30	31-45	46-60	61-75	76-90	
No	49	19	18	5	0	91
Yes	13	7	14	3	2	39
Total	62	26	32	8	2	130
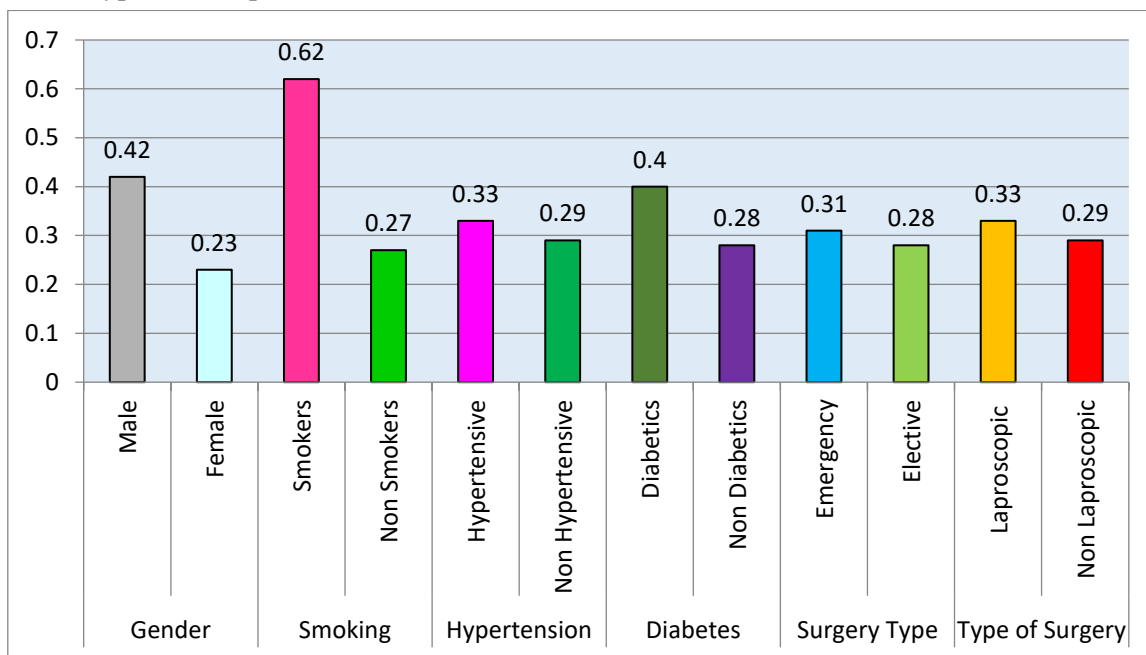
Graph 1 : Frequency and Risk factor of surgical site infections

Chi square shows there is a significant association between gender and PSSIs as value of 0.027 which shows male gender is more prone to post-surgical site infection.
Chi square test depicts a significant association between Surgical site Infection and age as a value of 0.036 which shows increasing age has increased association with post-surgical site infection.

DISCUSSIONS:
This study found that the frequency of SSIs in tertiary care hospitals in district Peshawar is 30%. A study done in HMC Peshawar have found that prevalence of SSIs was 27.5%[11] while according to WHO its prevalence is 11% worldwide[3]. The possibility of such a great

difference of prevalence between developed and developing countries can be hygiene problems in the hospitals, lack of proper education among people about the proper care of wounds and stitches and increased frequency of co morbidities like diabetes and hypertension among the population. In a tertiary care hospital in Abbottabad SSI rates were 33.68% with 32 patients developing SSIs of 95[12], which is near to our study result. In our study the first variable that we have studied is age, and our study showed that there is relation between age and SSIs. The rate of SSIs was 20.96% in age group of 15 to 30, 26% in age group from 31 to 45, 43% in age group from 46 to 60, 37.5% in age group from 61 to 75 and 100% in age group from 76 to 90. Ansari Hassan has done a

retrospective study in tertiary care hospitals of Pakistan and has found that elderly people are more prone to SSIs[13]. With increasing age, it takes more time for healing of wounds and because of increased immunodeficiency with age the risk of SSIs increases in elderly people. One of the potential risk factors for increased risk of infection is gender. Our results showed that among 42 males 18 were infected (42%) while out of 88 only 21 were infected (23%). So, males are more prone to SSIs but a study done before in HMC Peshawar has shown contrary results in which 26.8 % males were infected while 29.4% females were infected[7] Another risk factor that we have studied is type of surgery and in our sample 31.9% on which emergency surgery has been performed got infected and 28.9% on whom elective surgery has been performed. Ansari Hassan in his study has also proved that the rate of SSIs in emergency surgeries 19.2% is more than elective[13]. The possibility of increased risk may be because of rupture of an infected organ, pus formation, leakage and contamination of wound etc. We had also searched out for finding that whether there is an association between the type of surgery and SSIs. 33% of the people who got laparoscopic surgery were infected, while 29.5% who got open-conventional surgery were infected which showed that patients on whom laparoscopic surgeries have been performed are at higher risk than those on whom open-conventional surgery has been performed. On inquiring people about smoking, we found that rate of SSIs in smokers was 62.5% while in non-smokers it was 27.8% and it proved that with smoking surgical site infections risk is increased. The risk of infection rises because smoking disturbs the immune system, delays the wound healing as it delays nutritional supply that are necessary for healing. We investigated further about effect of co morbidities on infection rate after surgery like hypertension and diabetes. In our sample population 29.12% with the history of no hypertension got infected while 33.33 who were hypertensive got infected. The study in Egypt was done on patients on whom C-section

was performed for finding risk factors of SSIs and that had showed diabetes and hypertension in maternity as one of the risk factors for post-surgical infections[14]. The probable reason for this is that hypertension decrease blood flow to wound site and also prolong wound discharge. A study in China was done from Jan 2005 to July 2016 on a total of 786 patients who were followed up for 30 days have shown diabetes as a risk[15]. In patients about diabetes, we found that 40% of those who are diabetics got infected while only 28.18% non-diabetics were infected. The probable reason is that high blood sugar level causes bacteria to grow more efficiently and another probable reason is that diabetes cause nerve damage and blood vessels damage so proper nutritional supply to wound site is decreased.

CONCLUSION:
The study has found that the frequency of SSIs in Peshawar is 30%, which is much higher than that of other countries. Males are more prone to SSIs than females. Emergency and laparoscopic surgery is at a higher risk of getting SSIs. Smokers, Diabetics and hypertensive patients are more prone to SSIs.

AUTHOR'S CONTRIBUTION:
IU: Proposal Development/ Manuscript Review
JH: Data Analysis
MSK: Data Collection and Analyzing
MSK: Data Entry
UJ: Manuscript Writing
MM: Literature Review and Formatting

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Original Article

EFFECT OF TORILIS LEPTOPHYLLA WHOLE PLANT EXTRACT ON ORAL GLUCOSE TOLERANCE IN GLUCOSE INDUCED HYPERGLYCEMIC RATS

Tooba Malik[1], Saba Batool[2], Naseem Saud Ahmad[3], Bushra Shaheen[4], Saima Naureen[5], Javaria Fatima[6]

ABSTRACT

Background: Diabetes mellitus is an endocrine disorder characterized by persistently raised blood glucose levels. Defects in insulin secretion and its peripheral actions lead to imbalance in glycemic homeostasis. This research is designed to determine the effect of Torillis leptophylla on glycemic changes after oral glucose challenge in rats in comparison with glibenclamide.

Material and Methods: This study was conducted at University of Health Sciences, Lahore from April, 2016 to September, 2016. Thirty adult albino Wistar rats of male sex, weighing 140-180 g were assigned to five groups (n=6) randomly. Animals were subjected to 12 hours fast. Fasting blood glucose levels were measured at zero hour, drawing blood samples from tail vein. Afterwards, distilled water was given to group A (negative control). Whole plant extract of Torillis leptophylla was administered orally to groups B, C and D at the doses of 100, 200 and 400 mg/kg respectively. Positive control was given glibenclamide by gavage as a reference drug at the dose of 5 mg/kg following the protocol described elsewhere.[15] The rats were administered 4 g/kg oral glucose load ½ hour after the drug treatment. Repeated blood sampling was done at ½, 1, 1½ and 2 hours after glucose challenge. Changes in blood glucose level were noted. Data was analyzed with the help of SPSS, taking p value < 0.05 to be statistically significant.

Results: Torillis leptophylla and glibenclamide showed significant decline in blood glucose level (5.48 ±0.35 and 4.13 ±0.13 mmol/l respectively) as compared to negative control (7.67 ±0.13 mmol/l) after oral glucose load (p value < 0.0001).

Conclusion: Torillis leptophylla possesses glucose lowering activity comparable to glibenclamide. It could be used for developing new oral agents to treat diabetes mellitus.

Key Words: Blood Glucose Level, Glibenclamide, Oral Glucose Challenge, Torillis Leptophylla.

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INTRODUCTION:

Diabetes mellitus is a global health issue, affecting around 387 million people all over the world[1]. The prevalence of diabetes mellitus in Pakistan is alarmingly on rise with current value of 16.98%[2]. Poor glycemic control contributes to disease progression as atherosclerosis occurs at faster rate in diabetic patients. Chronic complications associated with micro and macro vascular systems add to the

increasing burden of morbidities and mortalities[3].

The therapeutic management of diabetes mellitus is based on the type of diabetes and specific needs of each patient. Insulin replacement strategy is mainstay of treatment in type I diabetes mellitus. Insulin sensitizers like metformin is prescribed as first line drugs in newly diagnosed type 2 diabetics. Insulin secretagogues, mainly presented by sulfonylureas, provide excellent glycemic control by augmenting insulin discharge from the pancreas. Drugs like sitagliptin prevent degradation of incretin and lower postprandial glycemic excursions. Glucose cotransporter inhibitors prevent hyperglycemia through inhibition of glucose absorption in the kidneys. Despite good glycemic response, severe hypoglycemia, lactic acidosis, fluid retention, systemic infections, insulin allergy and many other side effects are encountered with the use of these medications[4]. There is a growing interest in evaluating new compounds having better glycemic control and fewer side effects.

Oral glucose tolerance test provides a measure of physiological ability to control carbohydrate load and predicts the efficiency of a medication in acute hyperglycemia[5]. Hyperglycemia induced by oral glucose load in healthy rats offers a model for initial testing of any agent regarding its effects on post-meal glucose excursions. A drug that could minimize this post-meal blood glucose elevation can be investigated further for its potential anti-diabetic properties. Herbal medicines are in exercise since centuries. These are accessible and economical with negligible side effects making it imperative to study their effect of on improving glycemic changes[6].

Torilis leptophylla is member of Apiaceae family. Its local name is "charikanger"[7]. It is found in Hazara, Chitral, Kashmir and Margalla hills from April to July. Presence of alkaloids, glycosides, flavonoids, tannins and terpenoids with significantly high total flavonoid content has been established via the phytochemical screening[8,9,10]. Torilis leptophylla have shown remarkable antibacterial, anti-inflammatory and neuroprotective activity[9,11]. Limited work is done regarding effect of plant on blood glucose level (BGL) as per literature review. In the light of composition and therapeutic safety in folk medicine, the present research model is designed to examine the effect of Torilis leptophylla on oral glucose tolerance in glucose loaded hyperglycemic rats.

MATERIAL AND METHODS

It was an experimental study conducted after thorough consideration and registered consent by Ethical Review Committee and Advanced Studies & Research Board, University of Health Sciences (UHS), Lahore dated 4th February, 2016. The work was carried out in Pharmacology Department, UHS, Lahore from April to September, 2016. Adult albino Wistar rats of male sex with weight around 140-180 g were procured from the Experimental Research Laboratory, UHS, Lahore. They were kept in polycarbonate cages with room temperature set at 22-24°C and humidity kept around 45-46% under the light/dark cycle of 12/12 hours (h). Standard Rat diet and water were supplied to the animal's ad libitum[7]. Guidelines provided by the Ethical Review Committee for Medical and Biomedical Research, UHS, Lahore, were strictly followed throughout the research.

Fresh flowering shoots of the plant were collected from the National Agriculture Research Centre Islamabad, shade-dried, crushed and soaked in 2 L methanol at 25°C for 48 h[8,12]. A Rotary evaporator was used to concentrate the filtrate under decreased pressure, keeping the temperature around 40°C. The concentrated extract was then freeze-dried with the help of a lyophilizer. The obtained sample was stored at 4°C[7,12]. Fresh samples were used, keeping the dose around 1 ml, with the final strengths of whole plant extract prepared as 100, 200 and 400 mg/kg body weight (b.w.) according to the groups. Aqueous solutions were vortexed scrupulously at 10×100 rpm to create well-homogenized mixtures. Thirty adult male animals were allocated into 5 groups named A, B, C, D and E (n=6) randomly[13]. Rats were subjected to 12 h fast. At 0 h, blood samples were drawn from the tail vein, and fasting BGL was measured using an Accu chek active glucometer (Roche Diagnostics, SR0033182)[14]. Group A (Negative Control) was given a single dose of distilled water (d.w). Whole plant extract of Torilis leptophylla was administered orally to groups B, C and D at the doses of 100, 200 and 400 mg/kg, respectively. Group E was

administered glibenclamide 5 mg/kg b.w. of pharmaceutical grade by gavage. Glibenclamide, a sulfonylurea, is used as a reference drug in oral glucose tolerance tests to standardize the findings[15]. Half an hour after the treatment, animals were challenged with 4 g/kg oral glucose load[14]. Tail vein was punctured at regular intervals after oral glucose challenge (½, 1, 1½ and 2 h) and BGL was monitored with glucometer to assess the extent of glycemic changes[13].

Values were presented as Means ± Standard Deviation (SD). One-way analysis of variance (ANOVA) was applied to measure any statistical difference between the groups treated with whole plant extract of Torillis leptophylla, positive control group and negative control group, followed by the post hoc Tukey's test. Analysis was conducted using the SPSS 20. A difference in the Mean values of $p < 0.05$ was noted as statistically significant difference. Graphs were drawn with the help of Microsoft Office Excel 2007[7].
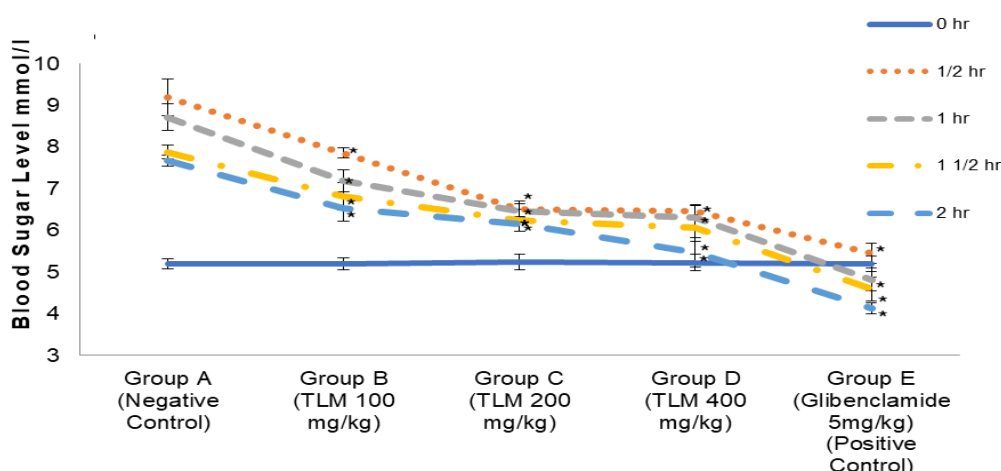
RESULTS
At zero-hour, blood glucose level of all animals was 5 to 5.5 mmol/l (Table 1) with no significant difference between the groups (Figure 1). Half hour after glucose challenge, group A (negative control) showed highest BGL of 9.2 ±0.44 mmol/l in comparison to group B, (Torilis leptophylla 100 mg/kg) 7.86 ±0.13 mmol/l, group C (Torilis leptophylla 200 mg/kg) 6.51 ±0.19 mmol/l, group D (Torilis leptophylla 400 mg/kg) 6.46 ±0.15 mmol/l and

group E (glibenclamide 5 mg/kg; reference drug) 5.45 ±0.24 mmol/l (Table 1) with significant difference from all groups ($P < 0.001$) (Table 1). At 2 h BGL of group A was still notably higher with significant difference from all treated groups ($P < 0.001$) (Table 1).

Table 1. Changes in glycemic profile of rats after oral glucose challenge (n=6).

Group	Blood Sugar Level (mmol/l)				
Time	0 h	½ h	1 h	1½ h	2 h
Group A (Negative Control)	5.19 ±0.12	9.2 ±0.44	8.71 ±0.32	7.88 ±0.16	7.67 ±0.13
Group B (Torilis leptophylla 100 mg/kg)	5.2 ±0.14	7.86 * ±0.13	7.19 * ± 0.26	6.81 * ±0.33	6.53 * ±0.3
Group C (Torilis leptophylla 200 mg/kg)	5.25 ±0.19	6.51 * ±0.19	6.46 * ± 0.18	6.25 * ±0.26	6.15 * ±0.18
Group D (Torilis leptophylla 400 mg/kg)	5.23 ±0.2	6.46 * ±0.15	6.31 * ± 0.28	6.06 * ±0.32	5.48 * ±0.35
Group E (glibenclamide 5 mg/kg) (Positive control)	5.2 ±0.19	5.45 * ±0.24	4.82 * ±0.27	4.59 * ±0.28	4.13 * ±0.13

Results are written as Mean ±SD. * denotes p value < 0.001, indicating significant difference as compared to control group.

Figure 1. Changes in glycemic profile of rats after oral glucose challenge (n=6).

Results are written as Mean ±SD. * denotes p value < 0.001, indicating significant difference as compared to control group.

DISCUSSION

Diabetes mellitus is an endocrine disorder represented by gradual decline in functioning β cells of pancreas[4]. Loss of β cell function over time is best explained by individuals who progress from states of impaired glucose metabolism to advanced disease stage labeled as diabetes mellitus[16]. Suppressed insulin sensitivity further deteriorates the glycemic control in type 2 diabetic patients[4,17]. Oral glucose load is considered as highly efficient tool to assess any abnormality in glycemic homeostasis at initial stages of metabolic dysfunction[14,15].

In the present experimental study, the whole plant extract of Torilis leptophylla has shown remarkable improvement in oral glucose tolerance of rats. After the oral glucose challenge, Negative control rats initially developed a state of hyperglycemia with their BGL rising up to 90% of 0 h BGL. This is in accordance with the previous studies conducted by Zambrana et al. who exhibited around a 100% rise in BGL after the oral glucose load[13]. Torilis leptophylla minimized blood glucose excursions after glucose load and kept the BGL near to the fasting BGL value (5.48 ±0.35 mmol/l at 2 h vs 5.23 ±0.2 mmol/l at 0 h, Table1) with significant difference (P < 0.0001) from Negative control group (Table: 1, Fig: 1). Mnif and Aifa have reported a noticeable decrease in area under the glucose tolerance curve with Cuminum cyminum L, producing 11% decline in 2 h post load glucose level as compared to control which is significantly less than Torilis leptophylla.[18] In another study 36% decrease in 2 h post load glucose level was observed with Ammodaucus leucotrichus which is significantly more pronounced than Torilis leptophylla[19].

Glibenclamide, as a reference drug, exhibited significant increase (P < 0.0001) in glucose tolerance when comparison with negative control (Table: 1, Fig: 1). Similar results were earlier shown by Burnett et al. and Singh et al. They noted that glibenclamide prevented BGL from rising beyond 5 mmol/lit after oral glucose challenge[20,21]. Glibenclamide enhances insulin secretion from β cells of pancreas. The drug inhibits ATP-sensitive K^+ channels present on cell membrane leading to depolarization that ultimately open up voltage gated calcium channels. Elevated plasma calcium level then triggers the release of insulin from storage vesicles. The raised serum insulin levels prevent a steep rise in postprandial BGL after oral glucose challenge and increases glucose tolerance[22].

The whole plant extract of Torilis leptophylla produced comparable results with those of glibenclamide with 29 % decline in 2 h post load BGL. The insulin-mimetic and insulin-secretagogue activity of plant extracts contribute to their blood glucose lowering function[7,8]. Phytochemical components of plants, categorized into terpenoids, alkaloids, flavonoids, phenolics, etc. possess these antidiabetic properties as shown by many previous researches[5,8,12]. The statistically significant reduction in BGL observed with Torilis leptophylla and glibenclamide after oral glucose challenge indirectly proves insulin secretagogue activity of Torilis leptophylla. This effect may explain the plant's underlying mechanism of increasing glucose tolerance by stimulating insulin release like glibenclamide.

Many similar studies conducted on plants belonging to the Apiaceae family have shown their beneficial effects on glucose metabolism such as Anethum graveolens, Trachyspermum ammi, Foeniculum vulgare, Carum carvi, Coriandrum sativum and Pimpinella anisu[19]. The glucose lowering effect observed with Torilis leptophylla can be attributed to the significant amount of flavonoids present in it as reported by many studies[6,7,8]. It is confirmed by Saeed et al. that Torilis leptophylla possesses remarkable antioxidant properties as evidenced by a significantly reduced thiobarbituric acid reactive substance (TBARS) content of the liver (P < 0.05)[7]. Many previous studies have reported strong association between TBARS content in the liver and serum HbA1c levels[12,15,24].

Diabetes mellitus is associated with multiple complications such as neuropathies, ischemic heart disease, atherosclerotic degenerative changes, interstitial nephritis and retinopathies.

Polyphenolic compounds such as flavonoids naturally occur in plants and vegetables. Research conducted on these plant constituents has established clearly their hypoglycemic potential by stimulating insulin release and enhancing insulin sensitivity[25]. Flavonoids also reduce inflammation and oxidative stress thus providing a cheap and effective remedy for curing diabetes as well as its co-morbidities[26]. Further advances in the production of flavonoid-based drugs may have a significant impact on diabetes mellitus and its complications.

CONCLUSION

It can be concluded from this study that Torilis leptophylla significantly improved tolerance for oral glucose load most likely via stimulating insulin secretion like glibenclamide and can be used to develop new anti-diabetic agents. Incidence of diabetes mellitus is on rapid rise, alarmingly increasing morbidity and mortality day by day. Traditionally used medicinal plants should be explored to discover new remedies for diabetes mellitus with higher efficiency, stronger potency, lesser toxicity and long-term benefits to curtail this global pandemic.

CONFLICT OF INTEREST:
None.

AUTHOR'S CONTRIBUTION:
TM: Conceptualization & Manuscript Writing
SB: Data Collection
NSA: Data Analysis
BS: Manuscript Writeup
SN: Literature Review
JF: Critical Review

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Original Article

EVALUATION OF KNOWLEDGE AND FREQUENCY OF TETANUS VACCINATION AMONG UNIVERSITY STUDENTS OF KARACHI.

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ABSTRACT:

Background: Knowledge about Tetanus toxoid (TT) vaccination in students is lacking in our setup. The objective of this study was to evaluate the knowledge and frequency of tetanus vaccination among university students of Karachi.

Methods: A crosssectional survey was conducted after. ERB approval was taken from Shaheed Mohtarma Benazir Bhutto Medical College Lyari Karachi. Convenience sampling was used to collect data for six months after the approval in July 2022. Data was analyzed by using SPSS 24. Descriptive statistics were applied for quantitative and qualitative variables. The association of qualitative variables was tested by applying the Chi-square test. P-value <0.05 was taken as significant.

Result: The mean age 21+ 2 years were enrolled. The majority of the students 93.3% had heard about the Tetanus disease and 59.5% had heard of the Tetanus vaccination. A total of 93% of students knew that the Tetanus vaccine is injectable. Only 36% of the students were vaccinated, 25% were unvaccinated, and 39% did not know about their vaccination status. Among the students who were vaccinated, injury was the single most common reason for getting the tetanus vaccine.

Conclusion: The knowledge level and vaccination status of the students were unsatisfactory. So, awareness campaigns and immunization programs should be started.

Key Words: Tetanus, Vaccination, University, Students, Karachi.

INTRODUCTION

Tetanus is caused by the bacterium Clostridium tetani (C. tetani), which is a gram positive (+ve) strictly anaerobic bacillus. Its spores are present commonly in our environment, especially in damp soil, manure, and on the surfaces of skin and rusty tools like needles, nails and, barbed wires etc. It usually enters human body through an open wound or cut caused by contaminated objects. In most cases, it presents within 14 days of exposure to the bacterial spores, with an incubation period varying from 3 to 21 days. Tetanus cannot be transmitted from one person to another[1-3]. It can occur neonatally due to poor umbilical cord care practices, in adult life following any injury as well as during pregnancy or soon after delivery. Neonatal Tetanus (Tetanus within the first 28 days of life) and maternal Tetanus (Tetanus during pregnancy or within 6 weeks after delivery) in un-immunized or insufficiently immunized pregnant women can be a serious condition and is an important cause of neonatal and maternal

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morbidity and mortality. The significant reasons for acquirement of maternal Tetanus are unhygienic delivery conditions[1, 4, 5].

C. tetani releases toxin called tetanospasmin, an extremely potent neurotoxin responsible for severely painful and sustained muscular contractions and autonomic nervous system dysfunction. Characteristic features include spasm of masseter and other facial muscles, causing risus sardonicus, spasm of muscles of jaw, causing trismus or lockjaw, and muscles of the neck and back, causing a characteristic posture with arched back and extended neck, called opisthotons which can lead to respiratory distress. Spasms of laryngeal muscles can lead to breathing cessation. Prolonged contractions of the vertebral muscles and those surrounding long bones can lead to fractures. Other significant symptoms include seizures, headache, pyrexia, diaphoresis, altered blood pressure, and dysrhythmias, and are due to altered activity of the autonomic nervous system[1, 2, 6].

Tetanus is a vaccine-preventable disease and it can be prevented well by immunization with tetanus-toxoid-containing vaccines, abbreviated as TTCV, which have been included in routine immunization programs globally[1]. There are four types of TTCV, which include: Diphtheria, Tetanus, and Pertussis (DTaP) vaccine, Tetanus, diphtheria, and Pertussis (Tdap) vaccine, Tetanus and diphtheria (Td) vaccine, Diphtheria and Tetanus (DT) vaccine[7]. In Pakistan, infants receive the DTaP vaccine in five doses at two, four, six, and eighteen months of age, with an additional dose administered when the child is four to six years old. Subsequently, a booster shot is recommended every ten years. Pregnant women are advised to receive the tetanus toxoid between the 27th and 36th weeks of pregnancy for prevention of maternal and neonatal Tetanus[8]. It is essential to highlight that inadequate vaccination can be a result of vaccine hesitancy, intuitive thinking or simple lack of awareness among the population. In Pakistan, factors contributing to limited vaccination coverage comprise living in rural regions, no or low level of formal education, insufficient awareness regarding the appropriate time and location of vaccination, and a lack of understanding regarding the significance of getting vaccinated[8]. Past studies have assessed the knowledge regarding Tetanus, its vaccine, and rate of vaccination among pregnant women, women of reproductive age[9,10] and children[11]. Very few studies have focused on vaccination status of university students, especially males, and assessment of their knowledge regarding it[12]. This study will provide knowledge regarding the frequency of vaccination and identify gaps in knowledge and opportunities for improving the attitude of young folks regarding tetanus vaccination.

METHODOLOGY:
This cross-sectional survey was conducted among the students of various universities of Karachi from both the public and private sector. ERB approval was taken from SMBBMC Lyari, Karachi (No. F-SMBBMCL / (ERC) / 2021-22 / 0456, on Date: July 12th, 2022). Sample size was calculated from openepi.com. The hypothesized frequency of outcome in population (p) is unknown, so was taken at 50% as no previous estimates were available from similar populations. At the confidence level of 95% and bound on error of 5%, we obtained a minimum sample size of 384. Considering a non-response rate of about 4%, the adjusted sample size of 402 was enrolled in the study. Data was collected for six months through convenience sampling from July to December 2022. All consenting university students above the age of eighteen years were eligible. A self-structured, pretested questionnaire was self-administered after taking informed written consent from all participants. The information was collected through pre-tested structured questionnaire. The Quantitative variables like age were represented as mean and standard deviation (+) and qualitative variables like gender and ethnicity were represented as frequency and percentage. The association of qualitative variables was tested by applying

Chi-square test. Chi square test was applied to compare the knowledge and practices of public versus private medical college students regarding tetanus vaccination, and to find the association of gender with knowledge and practices regarding tetanus vaccination. P-value of less than 0.05 was taken as significant.

RESULTS:

A sample of N=402 students with a mean age of 21+ 2 years was included. Males were n=90 (22.4%), females were n= 312 (77.6%). Most participants were Urdu speaking 50% (n=202) followed by Punjabi 19% (n=77), Sindhi 11% (n=45), Pashtun 7.5% (n=30), Baloch 1% (n=4) and others 10% (n=41).

Majority of the students 93% had heard of the disease Tetanus (n=375) and total 59.5% (n=239) had heard of Tetanus vaccination as shown in Table 1.

Table 1: Knowledge of study participants regarding Tetanus (N=402)

Knowledge regarding Tetanus	n	%
Have you heard about the disease Tetanus?		
Yes	374	93
No	28	7
Have you heard about the Tetanus vaccination?		
Yes	239	59.5
No	163	40.5
Knowledge about the types of tetanus vaccines		
4 types (correct)	100	25
2 types	178	44
Others	124	31
Mode of vaccine administration		
Injection (Correct)	374	93
Oral/ Nasal	28	7
Site of Tetanus vaccine injection among adults		
Arm	249	62
Buttock	93	23
Thigh	60	15
Recommended time of tetanus vaccine (multiple options correct)		
Right after birth	83	21
Infancy	178	44
Adolescent (12-19yrs)	47	12
After injury or accident	285	71
Recommended doses of vaccine		
5 times (correct)	13	3
4 times	45	11.2
3 times	130	32
2 times	184	45.8
Recommended booster dose of Tetanus		
Every ten years (correct)	85	21
Every three years	147	37
Every five years	151	38
Vaccine recommended for unvaccinated females during pregnancy		
Yes	60	14.9
No	342	85
Tetanus-prone wounds as identified by students (multiple options correct)		
Cut and injury	227	56
Contaminated wound	244	61
Animal bite	186	46
Human bite	49	12
Burns	35	9
Knowledge about adverse effects of tetanus vaccine (multiple options correct)		
Pain/ tenderness on the injection site	260	65
Local reaction	188	47
Fever	152	40
Headache	50	12
Fatigue	68	17
No adverse effects of the vaccine	82	22
Contraindication of Tetanus vaccine (multiple options correct)		
Seizures	142	35
HIV	96	24
Vaccination within past four weeks	142	54

At present, most of the students were either unvaccinated according to the recommended dosage schedule or did not know their tetanus vaccination status. (Figure 1)
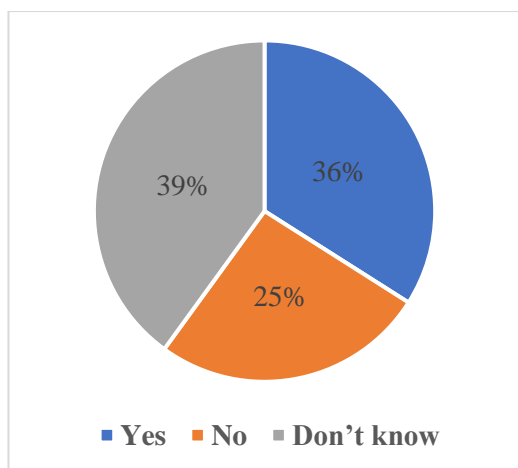
Figure 1: **Students' Current Tetanus Vaccination Status.**

Most frequent reason for not getting vaccinated was that they never thought of it as necessary (86%) followed by plain laziness (8%) and considering it unimportant (6%). The students who were vaccinated were asked the reason for their vaccination. Injury was a common reason reported by many of the students for getting the tetanus vaccine. (Figure 2)
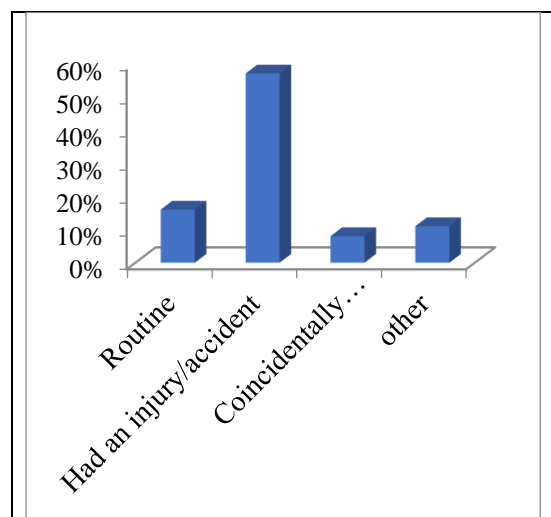
Figure 2: Reason for getting tetanus vaccine.
Students were also assessed for when they received the last dose of vaccine, in case they got any dose in their life-time, and also how many were completely unvaccinated and had never got a single shot. 33% (n=132) of the students did not remember how much time had passed since their last Tetanus Vaccine. Around 16% (n=64) of students got the tetanus vaccine within the previous year, 20% (n=80) got it within last 5 years, 10% (n=40) got it within the last 10 years, 13% (n=52) got it more than 10 years ago and 8.5% (n=34) never got vaccinated against Tetanus.

Table 2: Association of types of institutes with knowledge and practices regarding Tetanus vaccine.

Knowledge And Practices		Public Sector Universities		Private Sector Universities		P Value
		n	%	n	%	
Know about tetanus vaccination	Yes	84	57.1	157	61.5	0.042
	Minimum	51	34.7	60	23.5	
	No	12	8.2	38	14.9	
Site of tetanus vaccine administration in adults	Arm	99	67.3	150	58.8	0.086
	Thigh	16	1.9	44	17.3	
	Buttocks	32	21.8	61	23.9	
Most effective mode of tetanus vaccine	Nasal	4	2.7	5	1.9	0.050
	Oral	3	2	17	6.7	
	Injection	140	95.2	233	91.4	
Tetanus vaccine is recommended during infancy	Yes	77	52.4	105	41.2	0.019
	No	70	47.6	150	58.8	
Tetanus vaccine recommended during pregnancy (if unknown vaccination status)	Yes	26	17.7	34	12.8	0.047
	No	121	82.3	221	86.7	

Tetanus vaccination complete	Yes	40	27	104	40.8	0.037
	No	44	29.9	56	21.96	
	Don't Know	63	42.9	95	37.2	

There was a significant difference between the knowledge of private and public medical college students regarding the tetanus vaccine its recommendation during infancy and pregnancy. There was also a significant difference regarding vaccination status, as almost 40% of private college students said they were fully immunized against Tetanus compared to 27% of students from public sector colleges. (Table-2).

Table 3: Association of gender and knowledge and practices regarding tetanus vaccine

Knowledge And Practice		Male		Female		P Value
		n	%	n	%	
Know about tetanus vaccination	Yes	56	62.9	183	58.8	0.735
	Minimum	19	21.3	92	26.6	
	No	14	17	36	11.6	
Site of tetanus vaccine administration in adults	Arm	45	50.6	203	64.9	0.307
	Thigh	20	22.5	40	12.9	
	Buttocks	24	27	69	22.2	
The most effective mode of tetanus vaccine	Nasal	0	0	7	2.3	0.687
	Oral	7	7.9	13	4.2	
	Injection	82	92.1	289	92.9	
Tetanus vaccine is recommended during infancy	Yes	25	27.7	157	50.3	0.0001
	No	65	72.2	155	49.6	
Tetanus vaccine recommended during pregnancy (if unknown vaccination status)	Yes	8	8.8	52	16.7	0.012
	No	82	91.1	260	83.3	
Tetanus vaccination status complete	Yes	43	47.7	101	32.3	0.157
	No	21	23.3	79	25.3	
	Don't Know	26	28.8	132	42.3	

DISCUSSION

This study showed that majority (93%) of the university students knew about the tetanus disease but approximately just a little more than half of them (59.5%) were aware of the tetanus vaccine. Similar results were found in a recent study in South African students where majority (80.7%) of the students knew about the disease, but 65.5% knew about its prevention through vaccine[13]. Though medical university students get quite enough information and have a positive attitude towards vaccination, the students of other disciplines do not get adequate knowledge about the vaccine and its significance[14].

Enhanced maternal knowledge is associated with improved vaccination rates in infants, especially DPT & Hepatitis-B vaccine[15]. This fact should be given due importance as 8.5% of our study population had never got a single dose of tetanus vaccine. The 38.3% had never got a tetanus toxoid dose in reproductive age, especially in the married women of Lahore[16]. A tiny proportion (21%) of our study population knew that the booster doses should be given every 10 years. Study by Kerkez, M., & Çapuk, H., among university students in Turkey, also showed that only 29% of students knew about vaccination to be done every 10 years[17]. Only

15 % students in the current study thought that the vaccine should be given to the un-immunized female in pregnancy. This low positive ratio is critical, as vaccination during pregnancy, especially to the unvaccinated is essential to prevent the chances of maternal or neonatal Tetanus. In a study conducted among female students in Dhaka, 25.7% of students considered pregnant women to be a target group for Tetanus toxoid vaccination[18].

Students had a difference of opinion regarding the types of wounds which can be Tetanus prone, with the majority of them considering contaminated wounds, cuts and injuries to be more prone to tetanus infection, followed by animal bites, human bites and burns. This is similar to a study conducted in India where more than 90% of the study population considered contaminated wounds, animal bites and burns to be Tetanus prone[19].

Current vaccination status among the students was found to be unsatisfactory. The notably low vaccination rate emphasizes the urgency of implementing an intensive and mandatory tetanus vaccination program to expand vaccine coverage. Only 36% of the students were fully vaccinated. Malinga found the very same results (36.7% students vaccinated), M. et al[13].

In our study, a significant difference was found regarding the knowledge and rate of tetanus vaccination among the among private universities students. There were a significantly greater number of completely vaccinated students from private universities as compared to the public ones (table 2). Though, we cannot associate established factors with more excellent rates in private universities and further studies should target the reasons for lower vaccination status in government sector institutes.

The current survey revealed no significant difference between genders about the awareness of vaccination and there was a mixed trend with regards to knowledge of site and most effective mode of vaccine administration. However, a significantly greater number of females considered vaccine to be recommended during infancy and pregnancy, while majority of the males considered it unnecessary in such conditions. More significant percentage of males (47.7%) was completely vaccinated as compared to the females (32.3%) (Table-3). Shafiq, Yasir, et al. have also shown low vaccine coverage in females in his study where less than 50% females were vaccinated[20]. In a study conducted in 2010 in Karachi, only 40% women had received at least 1 out of 5 doses, while only 2.9% were completely immunized[21]. This shows that vaccination coverage has been at a lower level among the females of Pakistan, for a quite long time. Assessment survey in United States by C.A. Rencken, et al. also showed male gender to be more associated with up-to-date vaccination[22].

The current study did not employ random sampling technique and the results cannot be generalized. The study did not enroll equal number of public and private sector students due to constraints. A more representative survey which employs random sampling technique is thus recommended.

CONCLUSION

The knowledge regarding Tetanus vaccination is lacking and the students do not give it due importance. There is an ominous need of advocacy for immunization among adults. Awareness sessions and immunization campaigns should be conducted among university students to improve the tetanus vaccination rates.

AUTHOR'S CONTRIBUTION:

SUA: Research Proposal, Manuscript
GA: Review of Article, Data Collection, Analysis and Results Writing
MTK: Data Collection, Discussion Writing
QS: Research Proposal, Data Collection and Analysis
NR: Review of Article, Data Collection
MA: Review of Article, Data Collection

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Original Article

TRENDS IN CAESAREAN SECTION RATE AND ITS DETERMINANTS IN DISTRICT HOSPITAL GUJRANWALA

Fazeela Shahzad[1], Nudrat Sohail[2], Zulekha Nasim[3], Irfan Qayyum[4], Shumaila Yaseen[5], Uzma Altaf[6]

ABSTRACT

Background: C-section are showing increasing trend worldwide. This study aimed to measure the rate and various indications of Cesarean sections in DHQ-Teaching hospital, Gujranwala.

Material & Methods: This was a cross-sectional descriptive study retrospective data was collected from hospital records. The mode of delivery and basic demographics of the patients who underwent elective and emergency cesarean section were noted down. Clinical indications were recorded. Data was analyzed in SPSS version 21.0

Results: A total of 7159 pregnant women, booked and un-booked were admitted for delivery out of which 4038 (56.4%) patients had a vaginal delivery and 3121(43.6%) underwent cesarean section. Among Cesarean sections, 67.7 % (n=2112) were emergency cesarean sections and 32.3 % (n=1009) were elective cesarean sections. The top six indicators for cesarean sections were previous multiple Cesarean sections 49.8 % (n=1554), fetal distress 14.8% (n=462), failure to progress of labor 8.6 % (n=269), cephalo pelvic disproportion (CPD) 7.8 % (n=244), breech presentation 3.6% (n=112) and pregnancy-induced hypertension (PIH) 2.7% (n=84).

Conclusion: The rate of cesarean section was 43.6% in Gujranwala. Most of the cesarean sections were emergency cesarean sections with fetal distress as a major risk factor.

Keywords: Trends; caesarean section; rate; determinants; hospital.

INTRODUCTION

For the last few decades, there has been concern regarding the global rise in cesarean section, particularly in Latin America, Eastern Asia, and Western Asia[1-2]. It is generally thought that Caesarean section rates in Asia are lower, though some countries have been facing

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an unexpected and unjustified rise. China has the highest rate of Cesarean section in Asia without a single specific reason. Cesarean section rates climbed rapidly during the early 20th century in China, to a maximum reported rate of 46.2%, among primipara up to 49.6 % reported in early 2010[3].

The alarming rise of cesarean section rates worldwide has been one of the most debated matters in maternity care. Cesarean section is a major surgical procedure and like every surgical procedure, carries a significant associated risk of maternal morbidity and mortality. Guidelines must be established and implemented for Caesarean section and it should be performed in the presence of definite and clearly defined medical indications only[5].

Many obstetricians consider elective cesarean section delivery as quite simple, effortless, legally secure, and psychologically well-tolerated procedures by patients with less risk of pelvic floor and urinary complications. In some clinical situations "ambiguous clinical indication" is observed when there is no single clearly defined indication for the C section and the final decision is determined by the individual attitudes of the clinician[6].

Controversy over the rate of cesarean section in low and middle-income countries and its determinants also exist. In today's era, cesarean section accounts for almost 15– 25% of all deliveries in developed countries, with associated maternal mortality of less than 1:10,000[7].

Controversy over the rate of cesarean section in low and middle-income countries and its determinants also exist. In today's era, cesarean section accounts for almost 15-25% of all deliveries in developed countries, with associated maternal mortality of less than 1:10,000[7].

MATERIAL AND METHODS

This is a descriptive cross-sectional study conducted over 12 months in Gujranwala Medical College, District headquarters, Teaching hospital, Gujranwala from 1st Jan 2020 to 31st Dec 2020. This study included a total of 7159 pregnant females who presented in DHQ hospital either for delivery, the trial of labor, emergency, or elective Caesarean section. All pregnant women between the ages of 20 to 40 years were included in the study, both booked and unbooked. Pregnant women having gestation less than 28 weeks were excluded.

After admission, a detailed evaluation of patients was done for assessment of the mode of delivery, and for patients who were booked, their plan of delivery was re-evaluated. The mode of delivery and basic demographics of the patients who underwent elective and emergency cesarean section (n=3121) were noted down. Baseline investigations were carried out including blood group, Rh factor,

complete blood counts, Hepatitis B and C serology, and random blood sugar levels along with urine complete analysis. Specific investigations like Biophysical profiles, Doppler scans, and other serological tests were done according to the needs of individual patients. The plan of delivery was made after consultation with a consultant available around the clock in the department. CTG and an ultrasound machine remain available in the emergency for fetal monitoring. Clinical indications were recorded. The chi-square test was applied to find out the frequency of various causes of operative birth. Data was analyzed in SPSS version: 21.0.

RESULTS

A total of 7159 pregnant women, booked and un-booked were hospitalized for delivery. Out of these 4038 (56.4%) pregnant women had a vaginal birth and 3121(43.6%) underwent cesarean section. Among Cesarean births, 67.7% (n=2112) were emergency and 32.3% (n=1009) were elective cesarean births. Principal indications for operative births were past multiple Cesarean sections 49.8% (n=1554), the passage of meconium and non-reactive CTG 14.8% (n=462), dysfunctional labor 8.6% (n=269), cephalopelvic disproportion 7.8% (n=244), breech presentation 3.6% (n=112) and gestational hypertension and pre-eclampsia 2.7% (n=84).

Table 1: Demographic variables of pregnant women

Variables	Frequency	%age
Age		
< 30 years	2778	89%
> 30 years	343	11%
Gravidity		
Primigravida	775	24.8%
G2 and G3	1508	48.3%
>More than G3	838	26.8%

Table II: Various indications of Cesarean sections

Indication	Frequency	(%age)
History of 2 or more Cesarean births	1554	(49.7%)
Meconium passage & Non-reactive CTG	462	(14.8%)
Dysfunctional labour	269	(8.6%)
Cephalopelvic disproportion	244	(7.8%)
Breech presentation	112	(3.6%)
Uncontrolled Gestational hypertension	84	(2.6%)
Previous 1 C-section & Postdate pregnancy	75	(2.4%)
IUGR with reduced AFI	71	(2.2%)
Low lying Placenta	47	(1.5%)
Obstructed labor	46	(1.4%)
Third-trimester APH	41	(1.3%)
Precious Pregnancy	34	(1.08%)
Eclampsia	31	(0.9%)
Multiple gestations	26	(0.8%)
Miscellaneous indications	25	(0.8%)
a. Mal presentation		13
b. Gestational diabetes		05
c. In-utero fetal demise		03
d. Ruptured membranes		02
e. Morbidly adherent Placenta		02
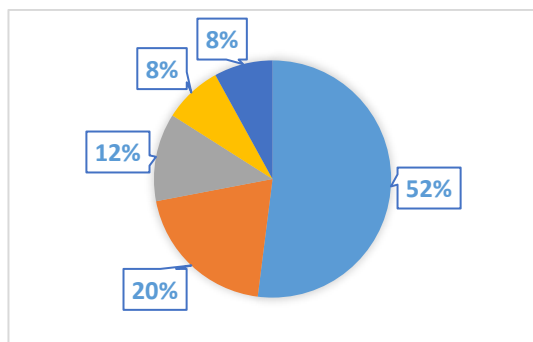
Chart 01: Miscellaneous Indications

DISCUSSION

During the 12-month study period, the rate of Cesarean section came out to be 43.6 per 100 deliveries which is much higher than recommended rate by WHO. The primary reason in the background of this high prevalence of operative delivery is that this hospital receives referred cases from five surrounding divisions and the majority of the cases are complicated, in risk factors, or have already been given a long trial of labor, so far rescuing of the life of the baby and the mother is by done Cesarean section.

Statistics collected from 169 countries of the world give an estimation that 16 million births occurred through C-section in the year 2000 and 29.7 million in the year 2015[7].

Non-clinical interventions to reduce unnecessary caesarean sections rate[8]. It is important to launch of awareness program to reduce the C-section rate[9]. The international healthcare community and WHO have considered the rate of 10% and 15% to be ideal for cesarean births[10]. In the USA it was 33% in 2011, the more alarming situation is in countries like Brazil where the rate has gone up to 55%[11]. Pakistan being a developing country is also facing a similar kind of alarming increase in caesarean section rate[12].

Cesarean birth is advocated when vaginal delivery might create any hazard to the mother or baby. C-sections are also carried out for individual and social reasons[12]. It is recommended to encourage counseling during antenatal care to identify the reasons for the maternal request for Cesarean section, address her worries about labor and provide information, and encourage vaginal delivery[13]. Elective Cesarean births at 38 weeks have shown an increased risk of some hazards in the newborn[14]. That is the reason, elective Cesarean births are not planned before 39 weeks of gestation until and unless there is any medical indication to do so[15].

We need to plan strategies and local protocols to avoid operative delivery in Primipara. Almost half of the patients in the study (49.7%) underwent C-sections because of previous C-

sections, which is quite alarming and needs consideration by Health organizations. So, from these results, we come to know that the Cesarean section rate is becoming far more common in this area, inheriting along with its higher maternal morbidity and mortality, especially hazards of morbidly adherent placenta, uterine rupture, and Obstetric hysterectomy. Private maternity centers and the private sector are some of the known and established factors behind the rising cesarean section rate[16-17].

The second common indication of the rising rate of Cesarean section in our study is the passage of meconium along with CTG changes. Facilities provided to the department for fetal monitoring in labor especially in complicated high-risk cases that have already got a trail of labor by trained or untrained birth attendants before coming to the hospital, do not fulfill the standard requirements and to save the life of the baby, doctors have to resort to Cesarean section earlier. Another factor could be that many patients are given a trial of labor, improper dose of prostaglandins and oxytocin then are referred to DHQ hospital with evident fetal distress either in the form of passage of meconium, hyperstimulation of uterus or CTG changes showing fetal compromise.

Another common indication of operative birth is dysfunctional labor in 8.6% and CPD in 7.8%. The reason behind this may be aggressive management of labor, lack of one-to-one monitoring of labor, improper use of oxytocin, and increasing use of prostaglandins for induction of labor which ends up in Cesarean delivery. CPD may be an overdiagnosis in our setup in Primigravida and demand for repeat Cesarean sections in subsequent pregnancies. To minimize these reasons, a proper audit is required every year. 112 Cesarean sections in our study were done for breech presentation. Although breech delivery has not proven any significant fetal morbidity as compared to elective Cesarean section because of prevailing medical litigations and patient's over-concerns, doctors

do not succeed in getting consent for vaginal breech delivery.

We also have a lack of good NICU facilities. 2.6% of sections were for uncontrolled gestational hypertension, most of which were admitted with uncontrolled hypertension in the third trimester and symptoms of imminent eclampsia, in that situation to expedite delivery and avoid other complications of hypertension, emergency Cesarean section is the only option left behind. 2.2% Cesarean sections were done for fetal growth retardation and reduced liquor where hypertension was not present to cause placental insufficiency and to rule out antiphospholipid syndrome hospital resources were not available. 2.4% of sections were for postdate pregnancy with the previous one Cesarean section. Most patients do not have dating scans to avoid mistaken calculation of postdate pregnancy so doctors have to rely on probable LMP or recent scans and have to go for elective Cesarean section. Over enthusiastic approach towards postdate pregnancy is also because patients are not compliant with follow-up and wait for spontaneous labor after the due date. 47 Cesarean sections were done for placenta praevia and 41 for APH which are now increasing further in number in our hospital with the passage of time as an increased number of skilled and trained staff now available since this hospital is now recognized as a teaching hospital. Blood bank services, ICU, and anesthesia services are also built up with the efforts of principal and hospital administration.

A total of 46 sections were done for obstructed labor and the majority of the cases were of neglected labor or mismanaged labor by untrained persons from the periphery. This is one of the prevalent issues in our country where more than two-thirds of deliveries are conducted outside health centers by untrained birth attendants and no proper data is available for associated morbidity. Thirty-four Cesarean sections were done for precious pregnancy and 26 for multiple gestation. Multiple gestations are emerging as usual indications due to a lot of advances in assisted reproductive techniques

and injudicious use of ovulation induction methods, in the private sector especially. A total of 31 Cesarean sections were done for eclampsia although, since the establishment of this public sector hospital decades ago, no facilities were available in this hospital to manage an eclamptic woman with standardized care, and all cases having a diagnosis of Eclampsia with pregnancy were referred to tertiary level health care centers of nearby cities. Twenty-five cesarean sections were done for miscellaneous indications like gestational diabetes, pre-labor rupture of membranes, fetal demise, and placenta accreta diagnosed antenatally. The World Health Organization statement published in 2015 about C C-section rate clearly emphasizes that "every effort should be made to provide Caesarean section to women in need, rather than striving to achieve a specific rate"[18,19]. Multiple dynamics are influencing rises in cesarean delivery rates[20].

CONCLUSION
The rate of cesarean section was 43.6% in Gujranwala. Most of the cesarean sections were emergency cesarean sections with fetal distress as a major risk factor.

AUTHOR'S CONTRIBUTION:
FS: Conception, Literature Search and Study Design, Data Collection and Processing, Data Analysis and/or Interpretation, Drafting of Manuscript, Critical Review
NS: Drafting of Manuscript, Critical Review
ZN: Data Analysis and/or Interpretation
IQ: Data Collection & Processing, Data Analysis and/or Interpretation
SY: Data Collection & Processing, Critical Review
UA: Drafting of Manuscript

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Original Article

KNOWLEDGE OF ARTIFICIAL INTELLIGENCE AND ITS APPLICATIONS IN HEALTH CARE WORKERS

Shamsa Arshad Butt[1], Ameelia Sadaqat[2], Amal Rana[3], Tahreem Khan[4], Muhammad Shoaib Nabi[5], Rabia Afzal,[6] Sadaf Saddiq[7]

Abstract:

Objective: To assess the knowledge and extent of application of artificial intelligence among healthcare workers along with comparison between male and female gender as well as seniority of healthcare workers.

Materials and Methods: A cross-sectional study was conducted among 300 healthcare professionals in two hospitals Ghurki Trust Teaching Hospital Lahore and Allied Hospital Faisalabad over 6 months using a questionnaire proforma by chat GPT.

Results: The study included 356 participants, mostly female (72.2%) with an average age of 28.08±4.20 years. Most had 1-9 years of work experience (61.5%). Nearly half (49.4%) had no AI application experience, and only 14.0% had formal AI training. Despite this, 80.3% recognized AI's importance in healthcare. AI was used by 24.4% of participants, mainly in patient monitoring (25.3%), research (27.2%), and diagnostics (19.7%). Challenges included clinical validation (33.1%) and cost (32.6%). Ethical concerns were significant, with 80.9% worried about privacy and 59.0% distrusting AI with sensitive data. Education and training (71.1%) were key for AI integration.

Conclusion: Learning and application of artificial intelligence is the need of the hours and the general opinion is that if used under doctors' supervision, it will help improve patient care.

Keywords: Artificial intelligence, Machine learning, Deep learning

INTRODUCTION

Artificial intelligence (AI) is nowadays understood as a system's ability to interpret and learn from data correctly, and to achieve specific goals and tasks through flexible adaptation to those learning[1]. Healthcare systems are complex for all stakeholders. Healthcare workers are on the frontlines of the battle against illness and disease, be they doctors, nurses, OT technicians, pharmacists, physiotherapists, radiology, or lab technicians. In this ever-advancing world, their knowledge and perception of the application of artificial intelligence in their field is of utmost importance as it can help improve patient care and streamline administrative tasks. Understanding AI's role in clinical practice is crucial for successful implementation by equipping healthcare providers with essential knowledge and tools[2]. The emergence of smartphones, wearables, sensors, and communication systems has revolutionized

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medicine with the capability of containing artificial intelligence (AI) powered tools (such as applications) in very small sizes[3].

Machine learning (ML) is a subdomain of AI that focuses on developing systems that learn or improve performance based on the data they ingest. It is the science of computer algorithms. Deep learning is a powerful subset of ML that involves training artificial neural networks with multiple layers to learn complex patterns and representations from data[4]. ML and AI technologies are increasingly being deployed in healthcare settings to process, interpret, refine, and act on the vast volume of data that is now available. AI promises benefits to the healthcare industry, but it also poses challenges in this new dimension of healthcare, and its impact on health professionals, organizations, and governments is yet unknown[5].

The purpose of this study was to assess the knowledge of healthcare workers about artificial intelligence and its applications in the field of medicine and to compare knowledge about AI among various healthcare workers. By gaining this insight, we wanted to determine the lag of our healthcare workers regarding recent advances in information and technology related to the medical field and make necessary measures for improvement. Utilization of AI technologies in the healthcare system improves efficiency, reduces the workload of healthcare workers, and offers benefits to the patients.

MATERIAL AND METHODS

The study was conducted by cross-sectional study design in Ghurki Trust Teaching Hospital Lahore and Allied Hospital Faisalabad. The study duration was 6 months and the sample size was 356 healthcare workers including doctors, dentists (House officers to consultants), nursing staff, pharmacists, radiology technicians, physiotherapists, operation theatre assistants, auditors, and human resource personnel. Staff from Basic departments of anatomy, physiology, biochemistry was excluded. The sampling technique was convenient proforma was generated by GPT-4 and the reliability of each

question was assessed by pilot testing we took the data initially from 20 participants and then analyzed each question through Chronbach's alpha, in our study the alpha value was obtained as 0.82 indicating that tool was reliable and then the final data collection was done accordingly. Ethical approval was obtained by IRB of Lahore Medical & Dental College. The questionnaire was composed of four sections. The first section contained awareness and understanding of AI, second section was about the impact of AI on patient outcomes and healthcare professionals about their apprehension about their expected replacement. The third section was about the ethics and privacy issues of using AI and the fourth one was about the future of AI in medicine. SPSS version 22 was used for data analysis. Data were presented as tables. Frequencies and percentages were given for categorical variables. The chi-square was applied to test the association between AI parameters and demographic characteristics of participants taking a p value less than 0.05 as significant.

RESULT

The study comprised 356 participants, predominantly female (72.2%), with an average age of 28.08±4.20 ranging from 23-52 years. Most had 1-9 years of working experience (61.5%), while fewer had 1-10 months (30.1%) or ≥10 years (8.4%). Regarding AI parameters, nearly half of the participants had no AI application experience (49.4%), and only a minority had formal AI training (14.0%). Nonetheless, 80.3% recognized the importance of AI in healthcare. Understanding of AI concepts varied, with only 24.4% having a clear understanding of both deep learning and machine learning.

In practice, AI was utilized in workplaces by 24.4% of participants, with common applications in patient monitoring (25.3%), research (27.2%), and diagnostics (19.7%). Challenges identified included clinical validation (33.1%) and cost (32.6%). The majority (85.7%) believed AI could improve

patient outcomes, though concerns about AI replacing jobs were mixed, with 41.3% not worried at all and 8.7% extremely worried. Ethical considerations were significant, with 80.9% concerned about privacy and 59.0% distrusting AI with sensitive data. Preparing staff for AI integration primarily involved education and training (71.1%). (Table 1)

Table 1: Summary statistics of different AI parameters

Awareness & understanding		
AI Application Experience	n	%
None	176	49.4
Less Than 01 Year	128	36.0
02 - 04 Years	46	12.9
More Than 04 Years	5	1.7
Knowledge of AI in Healthcare	n	%
Yes	119	33.4
No	237	66.6
Formal Training on AI	n	%
Yes	50	14.0
No	306	86.0
Importance of AI in Healthcare	n	%
Yes	286	80.3
No	70	19.7
Understanding Deep Learning VS Machine Learning	n	%
Not at All	87	24.4
I Know Only One Term	51	14.3
I Know Both Terms but The Difference Is Not Clear	131	36.8
I Know Both Terms and Differences Are Clear	87	24.4
Practice		
AI Applications in The Workplace	n	%
Yes	87	24.4
No	269	75.6
AI in Healthcare Tasks	n	%
Diagnostics	70	19.7
Admin Tasks	79	22.2
Patient Monitoring	90	25.3
Research	97	27.2
Diagnostics, Admin Tasks	1	0.3
Diagnostics, Research	6	1.7
Admin Tasks, Patient Monitoring	1	0.3
Patient Monitoring Research	1	0.3
Diagnostics, Patient Monitoring, Research	2	0.6
Diagnostics, Admin Tasks, Patient Monitoring, Research	5	1.4
Admin Tasks, Patient Monitoring, Research	4	1.1
Challenges with AI Technology	n	%
Clinical Validation	118	33.1
Cost	116	32.6
Data Breaches	46	12.9

Workforce Education	68	19.1
Clinical Validation, Workforce Education	8	2.2
Impact		
The Potential of AI To Improve Patient Outcomes	n	%
Yes	305	85.7
No	51	14.3
AI Compared to nuclear weapons	n	%
Yes	241	67.7
No	115	32.3
Concern About AI Replacing Jobs	n	%
Extremely Worried	31	8.7
Moderately Worried	63	17.7
Mildly Worried	115	32.3
Not Worried at All	147	41.3
Ethics Privacy and Trust		
Privacy Issues with AI	n	%
Yes	288	80.9
No	68	19.1
Trust In AI For Handling Sensitive Data	n	%
Yes	146	41.0
No	210	59.0
Preparing Staff for AI Integration	n	%
Education and Training	253	71.1
Investment in Tools	47	13.2
Promoting a Culture of Innovation	27	7.6
Expert Talks	23	6.5
Education, Training & Investment in Tools	1	0.3
Education, Training & Expert Talks	1	0.3
Education, Training & Investment in Tools & Expert Talks	2	0.6
Education, Training & Investment in Tools & Promoting Culture of Innovation & Expert Talks	2	0.6
Regulations For AI in Healthcare	n	%
Yes	328	92.1
No	28	7.9

Experience level also influenced AI understanding and application, with those having 1-9 years of experience showing greater AI utilization and optimism about its potential to improve patient outcomes. There were significant differences in preferred methods for preparing staff for AI based on experience, with education and training being the most favored approach as $p<.05$. Overall, while there is a strong recognition of AI's importance in healthcare, varied levels of experience and understanding, along with significant ethical and practical concerns, highlight the need for targeted education and training to maximize AI's benefits. (Table 2).

Table 2: Association between AI parameters and demographic characteristics of participants.

Parameters	Gender		p-value
	Male	Female	
AI in Healthcare Tasks			
Diagnostics	54(54.5)	36(14.01)	<.001
Admin tasks	17(17.17)	62(24.12)	
Patient monitoring	3(3.03)	67(26.07)	
Research	18(18.18)	79(30.74)	
Diagnostics and Admin tasks	-	1(0.39)	
Diagnostics and Research	-	6 (2.33)	
Admin tasks and patient monitoring	-	1(0.39)	
Patient monitoring Research	1(1.01)	-	
Diagnostics and patient monitoring and Research	2(2.02)	-	
Diagnostics and admin tasks and patient monitoring and Research	2(2.02)	3(1.17)	
admin tasks and patient monitoring and Research	2(2.02)	2(0.78)	
Challenges with AI Technology			
Clinical validation	37(37.4)	81(31.5)	.005
Cost	28(28.3)	88(34.2)	
Data breaches	5(5.1)	41(16.0)	
Workforce Education	24(24.2)	44(17.1)	
Clinical validation and workforce education	5(5.1)	3(1.2)	

Table 3:

Understanding Deep Learning vs. Machine Learning	Working Experience			p-value
	01 - 10 Months	01 - 09 Years	≥10 Years	
Not at all	25(23.4)	56(25.6)	6(20.0)	.001
I know only one term	10(9.3)	32(14.6)	9(30.0)	
I know both terms but the difference is notz clear	31(29.0)	88(40.2)	12(40.0)	
I know both terms and differences are clear	41(38.3)	43(19.6)	3(10.0)	
AI Applications in the Workplace	**Working Experience**			p-value
	01 - 10 Months	01 - 09 Years	≥10 Years	
Yes	20(18.7)	49(45.8)	18(60.0)	<.001
No	87(81.3)	170(77.6)	12(40.0)	
The potential of AI to Improve Patient Outcomes	**Working Experience**			p-value
	01 - 10 Months	01 - 09 Years	≥10 Years	
Yes	96(89.7)	180(82.2)	29(96.7)	.038
No	11(10.3)	39(17.8)	1(3.33)	
Preparing Staff for AI Integration	**Working Experience**			p-value
	01 - 10 Months	01 - 09 Years	≥10 Years	
Education and Training	72(67.3)	160(73.1)	21(70.0)	.049
Investment in Tools	20(18.7)	24(11.0)	3(10.0)	
Promoting a Culture of Innovation	10(9.3)	16(7.3)	1(3.3)	

Expert Talks	4(3.7)	16(7.3)	3(10.0)
Education and Training & Investment in Tools	-	-	1(3.3)
Education and Training & Expert Talks	-	1(0.5)	-
Education and Training & Investment in Tools & expert talks	1(0.9)	1(0.5)	-
Education and Training & Investment in Tools & Promoting Culture of Innovation & expert talks	-	1(0.5)	1(3.3)

Table 4:

Knowledge of AI in Healthcare	Job Title		p-value
	Paramedics	Doctors	
Yes	14(21.2)	105(36.2)	.021
No	52(78.8)	185(63.8)	
Understanding Deep Learning vs Machine Learning	Job Title		p-value
	Paramedics	Doctors	
Not at all	21(31.8)	66(22.8)	<.001
I know only one term	22(33.3)	29(10.0)	
I know both terms but the difference is not clear	18(27.3)	113(39.0)	
I know both terms and differences are clear	5(7.6)	82(28.3)	
AI Applications in the Workplace	Job Title		p-value
	Paramedics	Doctors	
Yes	27(40.9)	60(20.7)	.001
No	39(59.1)	230(79.3)	
Challenges with AI Technology	Job Title		p-value
	Paramedics	Doctors	
Clinical validation	7(10.6)	111(38.3)	<.001
Cost	25(37.9)	91(31.4)	
Data breaches	16(24.2)	30(10.3)	
Workforce Education	17(25.8)	51(17.6)	
Clinical validation, workforce education	1(1.5)	7(2.4)	
The potential of AI to Improve Patient Outcomes	Job Title		p-value
	Paramedics	Doctors	
Yes	63(95.5)	242(83.4)	.011
No	3(4.5)	49(16.9)	
Preparing Staff for AI Integration	Job Title		p-value
	Paramedics	Doctors	
Education and Training	54(81.8)	199(68.6)	.039
Investment in Tools	4(6.1)	43(14.8)	
Promoting a Culture of Innovation	1(1.5)	26(9.0)	
Expert Talks	6(9.1)	17(5.9)	
Education and Training & Investment in Tools	1(1.5)	-	
Education and Training & Expert Talks	-	1(0.3)	
Education and Training & Investment in Tools & expert talks	-	2(0.7)	
Education and Training & Investment in Tools & Promoting Culture of Innovation & expert talks	-	2(0.7),	

DISCUSSION

The World Health Organization and many national health systems around the world have flagged the importance of a health workforce that understands how to work properly with AI[6].

Regarding AI parameters, 66.6% of participants had no knowledge of AI, and nearly half (49.4%), of the participants in our study had no experience of AI application and only a minority had formal AI training (14.0%). Nonetheless, 80.3% recognized the importance of AI in healthcare. A study conducted in the United Kingdom showed 64% of respondents reported never coming across applications of AI in their work and 87% did not know the difference between machine learning and deep learning, although 50% knew at least one of the two terms[7]. A systematic review conducted by Chen et al concluded that 53% lacked basic knowledge of clinical AI and the experience of application was seen in 10-30% of participants[8].

In practice, 75.6% of study participants had never used any AI application. Out of those who used AI (24.4%) participants, found its common applications in patient monitoring (25.3%), research (27.2%), and diagnostics (19.7 %). According to a study conducted in India AI has many applications in radiology, diagnostics, and robotic surgery[9].

Challenges identified in our study included clinical validation (33.1%) and cost (32.6%). A study conducted by Shaheen discovered that healthcare workers are challenged by bias, missteps, and accidents. Patient concern regarding confidentiality also posed as a challenge as the data can be accessible breaching privacy[10]. According to Novak et al provision of infrastructure as well as the regulatory framework is a major challenge[11] in AI using in health care.

The majority (85.7%) believed AI could improve patient outcomes, though concerns about AI replacing jobs were mixed, with 41.3% not worried at all and 8.7% extremely worried. A study conducted in Bangladesh at various nursing institutes revealed seven key themes reflecting healthcare workers' concerns, including job security and economic concerns; trust and acceptance of AI; ethical and moral dilemmas; quality of patient care; workforce role redefinition and training; patient-provider relationships; healthcare policy and regulation[12]. In a study conducted in Nigeria 29.3% (n=77) of the respondents agreed that human specialists will be replaced by AI in the near future[13].

Ethical considerations were significant, with 80.9% concerned about privacy and 59.0% distrusting AI with sensitive data. Preparing staff for AI integration primarily involved education and training (71.1%)[14].

A huge number (92.1%) of participants believed that there should be established regulations in hospitals related to the use of AI by healthcare workers as there may be ethical implications. A recent study by Ploug and Holm (2020) investigated the ethical concerns of AI for medical diagnostics and treatment planning. The authors argued that patients should be able to withdraw from being evaluated by AI because a trustful relationship between physicians and patients is essential for the success of the treatment process[15].

There is this huge concern about patient privacy. Eighty percent of our participants were concerned that the data that is being utilized by AI may breach the privacy of the patients. Doctor-patient confidentiality is a very important aspect of patient management[16].

Out of 356 participants, 71.1% advocated that education and training of healthcare staff is the most important aspect in implementing and promoting the use of AI while 13.2% thought investment in the latest tools is more important. Gender differences were notable, with more females thinking admin tasks, patient monitoring, and research are the areas where AI can be put to good use while most of the male participants thought AI has beneficial use in diagnostics which was a significant difference (p-value<0.001). Clinical validation, cost, and data breaches were the main concerns in females as compared to males (p-value 0.005). Research on the preference for AI in

healthcare among male and female workers is limited. Ogolodom found that healthcare workers, including both males and females, have a good understanding of AI and its potential benefits, but are concerned about job security[13]. Yun reported that male healthcare workers, particularly those with higher academic qualifications, have a better understanding and stronger willingness to participate in AI-related activities[17].

Based on seniority as in work experience, the most senior staff knew about AI, ML, and DL but were not clear about the differences between them while the junior staff was clear about the difference as well. Sixty percent of senior staff is already using AI in their workplace which was a significant difference from their junior colleagues(p-value<0.001). Participants belonging to all age groups believed that education and training are the way to prepare staff for the use of AI. Just like in our study Experienced healthcare workers generally have positive perceptions of AI, recognizing its potential benefits for patients and care pathways according to Fazakarley in the UK. However, they also express concerns about patient data security, misdiagnosis, and increased workloads[18].

AI is increasingly popular among paramedical staff, as evidenced by the development of various AI based systems and tools. Budijono (2021) discussed the use of AI in emergency response systems and paramedic assistant robots, respectively. Strum (2022) highlights the potential of machine learning in paramedicine, particularly in clinical decision-making and patient outcome prediction.[19,20] Our paramedical staff has yet to pull up their socks as they lack in-depth knowledge (78% did not know), understanding of the application of AI (59% had never used AI) as well as challenges associated with its use. However, most (95.4%) of them believed that AI has the potential to improve patient outcomes.

The limitations of the study were sample size, observer bias, and selection bias. The study predominantly included female participants (72.2%), which might have influenced the findings. Workshops and courses in the organization should be arrannged to facilitate our healthcare workers in becoming more proficient in the use of AI-based tools.

CONCLUSION
Overall, the perception of AI among healthcare workers is contingent upon the level of understanding, exposure, and experience with AI technology. Education and training programs that familiarize healthcare professionals with AI applications and demonstrate their potential benefits will likely foster greater acceptance and utilization of AI in healthcare settings

AUTHOR'S CONTRIBUTION:
SAB: Literature Search, Writing of manuscript
AS: Conceptualization of article, Manuscript writing, drafting and revision
AR: Data Collection
TK: Data Collection
MSN: Data Analysis
RA: Review of Manuscript
SS: Final Review

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Case Report

VERTICAL TRANSMISSION OF DENGUE INFECTION.

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ABSTRACT:

Dengue is a significant health concern in adults and children in many regions worldwide. Dengue infection is rarely reported in newborn babies. Here, we report a case of a 4-day-old neonate with dengue infection transmitted likely by maternofetal transmission. Mother developed fever, headache, vomiting, and generalized body aches at 38 weeks of gestation—her blood reports, including serology, confirmed dengue fever. Emergency cesarean section was carried out, and a healthy baby was born. At 4 days of life, the baby developed a fever and generalized petechial rash. The baby was admitted to the NICU of Farooq Hospital Lahore. His initial CBC revealed thrombocytopenia, dengue NS1 antigen, and anti-dengue IgM antibodies were also positive. Serial CBC showed a decreasing trend in platelet count in the next 4 days. On the 5th day of admission, the patient improved clinically and his CBC showed a rising trend in platelet count. In conclusion, vertical transmission of dengue virus is possible if infection occurs late in pregnancy. Further studies and evidence are required.

Key Words: Vertical Transmission, Dengue Fever, Thrombocytopenia

INTRODUCTION

Dengue fever, also known as break bone fever is a viral infection precisely, female Aides Aegypti mosquito[1]. It is more common in tropical and subtropical climates. Nowadays it is at its peak in Pakistan. The first outbreak in Pakistan was reported in 1994 with a dramatic rise in cases in 2005 particularly in Karachi. Later on, the epidemic occurred in areas of Punjab[2]. According to WHO data collected from January-September 2022, the total number of reported cases was 25932, with 62 deaths. The incidence varied in different provinces with the highest cases seen in Sindh (29%) followed by Punjab (29%), Khyber Pakhtunkhwa (25%), and Baluchistan (14%).

Dengue is defined as a viral systemic disease with signs and symptoms including severe headache, retro-orbital pain, myalgia, arthralgia, skin rash, leucopenia, and hemorrhagic manifestations[3]. Dengue virus constituents 4 serotypes (DENV1, DENV2, DENV3, and DENV4). The transmission of dengue fever is through mosquito bites, blood & and maternal-fetal routes.

Vertical transmission of dengue has an impact on both mother and child. Neonatal complications include miscarriage, perinatal death, low birth weight and preterm delivery.

Management is mainly supportive and symptomatic in the form of oral rehydration, antipyretics and IV fluids[4]. Vigilant Monitoring of Blood pressure, Pulse pressure, Urine output and capillary refill time is needed. It will also help in the early detection of complications and the initiation of interventions to prevent

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associated morbidity and mortality. The main objective of this report is to increase the awareness of vertical transmission of dengue and its effects on newborns.

CASE DESCRIPTION:

We report a case of newborn baby with dengue infection, likely infected by vertical transmission from his mother. Mother suffered from high grade fever at 38 weeks of gestation. She also had severe headaches, vomiting and generalized body aches and pain. Her initial CBC revealed leucopenia and thrombocytopenia. The result of dengue serology confirmed positive IgM and IgG using the ELISA method. Elective cesarean section was planned and carried out with stabilization of hemodynamic status. A 3.5 kg baby boy was delivered with an immediate cry and APGAR score was 8/10 and 9/10 at 1 minute and 5 minutes subsequently. The baby was handed over to the mother. Baby remained well for 4 days following discharge from hospital. On 4th day of life, he developed high grade fever noted to be 102° maximum. Fever was not associated with cough, diarrhoea or vomiting. Milk intake decreased initially. He was admitted in the NICU of Farooq hospital Lahore. On examination patient had high grade fever with generalized petechial rash all over the body, neonatal reflexes were intact, normal vesicular breathing with no added sounds, and cardiovascular and abdominal examination were unremarkable.

Laboratory workup was carried out on the line of early-onset sepsis but the only significant finding was marked thrombocytopenia, platelet count as:

Day of Admission	Platelet Count	Hematocrit	WBCs
1	108×10^9/l	50.5%	8.6×10^9/l
2	100×10^9/l	48.7%	8.69×10^9/l
3	85×10^9/l	50.1%	8.3×10^9/l
4	60×10^9/l	49.2%	10.1×10^9/l
5	130×10^9/l	43.9%	10.9×10^9/l

The complete serial blood count shows a decreasing trend in platelet count. Dengue virus antigen NS1 was positive and dengue virus serology IgM was also positive. Strict input and output monitoring was done, and urine output remained within the normal range. Chest X-ray showed right-sided pleural effusion. The baby remained distress-free and maintained saturation up to 95% in the room air. Ultrasound abdomen showed gall bladder wall edema with minimal ascetic fluid. The patient remained oral-free. Platelets showed a decreasing trend in the next 4 days of hospitalization. The patient improved clinically on the 5th day, the fever settled and the rash improved. The platelet counts also started to rise and the patient was discharged home.

DISCUSSION:

Dengue is a systemic viral infection transmitted amongst human beings via the Aedes Aegypti mosquito. The number and burden of dengue infection is progressively increasing. WHO estimates 50-100 million new cases of dengue anomaly worldwide[5]. Out of these 25000 patients die due to various complications of dengue infection. Transmission of dengue virus from pregnant mother to newborn (vertical transmission) is not very common. Because of the infrequent cases of neonatal dengue infection, very few original studies about vertical transmission of dengue infection have been published[6]. Most of the reported cases are published as case reports from different regions. Severe form of dengue infection during pregnancy can lead to miscarriage, perinatal death, or low birth weight babies while few survivals need neonatal intensive care admission for their stability[7].

We report a case of vertical transmission of dengue infection in a 4-day-old neonate who was born to a 38-year-old mother. This case report correlates with reported cases of vertical transmission. Important highlights are dengue in neonates common in mothers who are infected very late in pregnancy[8]. In our case, the mother was infected at 38 weeks of gestation; secondly, a latent period in newborns who are

infected by vertical transmission is 1-11 days after birth. In our index case, the dengue infection manifested on the 4th day of life with high-grade fever. The duration of symptoms in neonatal dengue fever is 1-5 days. In our case report, the baby started improving with the decline of fever, improving oral intake, and a rise in platelet count after 4th day of illness.

In conclusion, vertical transmission may be the probable mode of dengue infection in early neonatal dengue infection. Suppose a mother suffers from dengue infection late in pregnancy. In that case, delivery should be carried out in a tertiary care hospital that is well-equipped to diagnose and manage neonatal infection in a neonatal intensive care unit. Last but not least, in endemic areas, mothers and children should take preventive measures to avoid mosquito bites.

AUTHOR'S CONTRIBUTION
NA: Introduction and Review
UM: Case Description
SA: Introduction
SA: Abstract
MM: References
ASA: Review and Discussion

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