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ORIGINAL ARTICLE

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Correlation of Hypovitaminosis D and Hypocalcaemia with Dental Caries

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Abstract

Objective: To find out the association of dental caries with hypovitaminosis D and hypocalcaemia.

Methodology: This study Cross sectional study was conducted at Islamic International Medical College from September 2015 to March 2016. Children, between 2-8 years of age, were selected. They were eighty in number and were placed into two groups. Group 1 consisted of children with compromised dental health and their number was sixty. Children with healthy dentition were twenty in number and were placed in group 2. To measure the extent of caries, we followed the diagnostic criteria given by WHO. Caries score was calculated from dmft index (decayed, missed, filled teeth). Calcium levels of the study population were determined by a direct colorimetric complexometric test (Arsenazo III) using microlab 200. Levels of 25-hydroxyvitamin D (25-OHD) was measured from serum samples by using enzyme linked immunosorbent assay (ELISA) . Correlation analysis was done with Pearson correlation and t test was applied to the results.

Results: Results have established that dental caries is prevalent in children with hypovitaminosis D and hypocalcemia. The t test has indicated that in children with hypovitaminosis D and with hypoplastic tooth surfaces, more non-cavitated and cavitated carious lesions were found than in children with normal vitamin D and calcium levels and having sound enamel surfaces and well-formed teeth ($p = 0.01$). This cross-sectional study has shown that caries, hypoplastic tooth surfaces, poorly mineralized teeth, and dental caries are directly related with each other.

Conclusion: Dental caries, hypovitaminosis D, lower calcium levels, hypoplastic tooth surfaces and poorly mineralized teeth are closely linked. Improving children's vitamin D and calcium levels by providing knowledge about vitamin D and calcium-rich foods and supplementation can help decrease the incidence of dental caries in young children and is a step towards strong bones and teeth.

Key Words: Decayed, Missed, Filled Teeth (DMFT), 25 Hydroxy Vitamin D (25OHD).

Conflict of Interest: None **Funding Source**: None

Introduction

Vitamin D is also known as calciferol is fat soluble sterol derived vitamin. It is a prohormone. Its two forms are vitamin D_2 and vitamin D_3. Vitamin D_2 or ergocalciferol is derived from plants, vitamin D_3 or cholecalciferol is synthesized in human skin from 7 dehydrocholesterol,[1] on exposure to ultraviolet B irradiation with wavelength 290 to 320 nm, 7dehydrocholesterol is converted to D_3.[2] Serum vitamin D levels depend on not only on Sun exposure but also on its dietary supply. Few of these dietary sources include cod liver oil, fishes like salmon, sardines, cod fish and mackerel, red meat and liver.[3] Vitamin D deficiency in humans produces defects in bone mineralization resulting in disease, rickets which occurs in children and osteomalacia, occurs in adults. Vitamin D also has a definitive role in regulating acquired and Innate Immunity immune response. Calcitriol also effect the differentiation and mineralization of osteoblasts. Vitamin D level is measured from plasma concentration of the circulating 25(OH)D.[4] Serum 25(OH)D levels < than 20 ng/ml shows deficiency: serum 25(OH)D levels between 20-30 ng/ml denotes insufficiency: 30-44 ng/ml as sufficiency and 50-70 ng/ml is considered as optimal level.[5]

Calcium is one of the most important mineral of human body as it is the part of bony skeleton and teeth. 99% of calcium occurs in bones. Calcium plays an important role in the nerve conduction, muscles and heart contraction.[6] Calcium acts as second messenger for certain hormones. It activates clotting factors in plasma. There should be sufficient calcium in the diet of children for their health, growth and proper functioning of bodies. Milk, cheese and yoghurt are the best sources of calcium.[7] Egg yolk, fish, nuts like almonds and green leafy vegetables like broccoli, spinach also contain sufficient amount of calcium. Children, as well as adult, should incorporate such foods in their diet so as to fulfill the calcium requirement.[8] Normal serum calcium levels are 9-10.5 mg/dl.[9] Hypocalcemia is defined as total serum calcium levels below 8.7 mg/dl.[10, 11]

An active form of vitamin D, calcitriol increases the absorption of calcium by inducing the synthesis of special transport protein Calbindin in the intestinal epithelial cells[(12)]. Parathyroid hormone and Calcitonin are involved in the homeostasis of calcium[13] and maintain the blood calcium level within a narrow range.

When there is hypocalcaemia, parathyroid hormone stimulates bone resorption, increases calcium reabsorption from distal convoluted tubules of kidney and increases the intestinal absorption of calcium by converting 25 Hydroxy Vitamin D (25OHD) into 1,25 dihydroxy Vitamin D ($1,25(OH)_2D$), the active form of vitamin D in the kidneys.[4]

Certain diseases, like hypoparathyroidism, rickets and renal osteodystrophy affect calcium homeostasis.[14] Thus blood calcium levels cannot be maintained, which will lead to hypocalcemia. If there is nutritional deficiency of vitamin D or active form of vitamin D cannot be synthesized by kidney due to certain pathology then it will also lead to hypocalcemia.[15] Hypomagnesemia and hyperphosphatemia may also disrupt calcium metabolism and hypocalcemia will be inevitable.[16]

An early symptom of hypocalcaemia is paresthesia around mouth, hands, arms and legs. Lethargy and poor muscle tone may also be seen.[17] Later the bones weaken, the risk of tooth decay and caries also increases. Growth and development of children is compromised.[18] In adults osteoporosis develop. Prolonged vitamin D deficiency, decrease serum calcium levels and increase parathyroid hormone result in tooth decay and more carious lesions.

If hypocalcaemia is present at the time of tooth development then there will be poor mineralization of tooth and it might be shown as enamel hypoplasia.[19, 20] Dentinal tubular defects may appear, the occlusal surfaces of posterior teeth may show abnormally deep fissures. The anatomy of pulp chamber may also be disrupted with large chambers and raised pulp horns accompanied by thin layer of enamel.[11,13] The dentinoenamel junction may also show defective mineralization. Such teeth are more prone to caries. Because of defective mineralization and enamel hypoplasia the bacteria which cause caries, accumulate in that region and cause visible dissolution of enamel which later on develop in carious defect.[20]

There should be some definitive regime for improving the health of growing children and increasing their awareness about dairy consumption, so that deficiency of vitamin D and calcium can be avoided.

The present study aims to investigate the correlation of vitamin D insufficiency and hypocalcaemia with dental caries in primary dentition. Our hypothesis is that vitamin D deficiency and hypocalcaemia are present in children with multiple carious teeth.

Methodology

It was a cross-sectional observational study, held in the Biochemistry department of IIMC-T (Islamic International Medical College) Rawalpindi in collaboration with IIDC (Islamic International Dental College) Islamabad after the approval from Institutional Review Committee, and Ethics Committee of Riphah International University from September 2015 till March 2016. The size of the sample was calculated, based on prevalence and duration of study period. Sixty Children with multiple caries were designated as group 1 and twenty children with sound, healthy teeth as group 2. The diagnosis of childhood caries was based on oral health diagnostic criteria defined by WHO. Total caries score, dmft index (decayed, missed, filled teeth) was obtained. Simple randomized sampling technique was used for sample collection. The patient were allocated without any bias or prior notification during the entire study period. Study samples were collected from different hospitals to ensure a fair degree of randomness.

Venipuncture of participants was done to determine serum vitamin D and calcium levels. Serum samples were stored in freezers of post graduate laboratory at -70°C, Biochemistry department of IIMC Rawalpindi. For data processing SPSS 21 was used. Frequencies, means and standard deviations were determined. *t* test was also applied. *p* value less than 0.05 was considered as significant.

Results

Results have established an association of low vitamin D and calcium levels in children with early childhood

dental caries. Total number of children participated in the study was 80. In them 43, 54% were male and 37, 46% were female. The mean age of the patient was 5 years and 3 months.

In table I *t*-test has showed that Childhood Caries has significant association with calcium levels. Statistically significant difference (p value less than 0.001) is seen in calcium levels of sample population with caries and without caries.

In table II, t-test has showed that Childhood Caries has significant association with Vitamin D levels. A statistically significant difference (p value less than 0.001) is seen in vitamin D levels of sample population with caries and without caries.

In table III, Combined correlation of Vitamin D levels, calcium levels and dental caries has revealed that Vitamin D and calcium level have positive correlation of value 0.946 whereas, vitamin D and calcium levels have reverse correlation with caries of values -0.890 and -0.827 respectively with p value is 0.00 and correlation is significant at the 0.01 level.

Discussion

The current study examined the correlation of vitamin D and calcium levels with extent of dental caries. This study has showed that calcium deficiency is significantly related with tooth decay or carious lesions. Hypovitaminosis D and Hypocalcaemia are strongly correlated to extent of dental caries in childhood.

Present study has also revealed that dental caries was more prevalent in children who had enamel and dentine defects. This conclusion is also in accordance with a study conducted on dental caries in preschool children by Carvalho et al who concluded that children with hypoplastic enamel had more carious teeth[21] Paixão-Gonçalves et al in 2019, also established that children with enamel defects had more chances of having dental caries.[22]

Hypocalcaemia leads to enamel hypoplasia and poor mineralization of teeth which are predisposing factors to dental caries. In a study by Reed et al in 2020 suggest a possible correlation of maternal calcium status with tooth mineralization and development, they also suggest that children of mothers having normal blood calcium level had sound enamel, well mineralized teeth that can withstand dental caries.[20] In a study conducted by Reed S.G. Forrest et al in 2011, has concluded that calcium deficiency is cause of enamel hypoplasia and dental caries.

A study conducted by Mohsenipour et al 2017, in Iran have found that abnormalities relating to tooth development and calcification were seen in children suffering from hypocalcemia, their findings also coincides with our results.[11]

A cross-sectional study performed in Canadian schools in 2015 by R.J. Schroth et al showed that hypovitaminosis D along with hypocalcemia is closely related with extensive dental caries.[25] The results of this study matches with our findings. A study held in Germany by Kühnisch et al. in 2015 suggested that higher serum vitamin D levels were linked with fewer chances of having extensive dental caries in permanent dentition, the results also support our study. [26]

Poor oral hygiene, consumption of fizzy drinks are the predisposing factors causing dissolution of enamel layer which later on develops into dental caries. We cannot fully explain all the factors associated with dental caries

Table III: T test for calcium levels in group with caries and without caries

Groups on the basis of Caries	N	Calcium level mg/dl Min.	Calcium Level mg/dl Max.	Mean	Std. Deviation	t test
Group no.1- Caries	60	7.9	8.7	8.2	0.35	0.001
Group no.2- No Caries	20	8.7	10.5	9.75	0.52	

Table II: t test comparing vitamin d levels in caries and without caries groups

Group on basis of Caries	N	Mean Vitamin D conc. (ng/ml)	Std. Deviation	Std. Error Mean	t test
No Caries	20	47.2	14.0	3.14	
Caries	60	20.0	5.9	0.76	0.001

Table I: Correlation of Vitamin D, Calcium levels with Caries

	Vit. D	Calcium	Caries	Significance
Vit. D level	1	0.946**	-0.890**	.000
Calcium level	0.946**	1	-0.827**	.000
Caries level	-0.890**	-0.827**	1	.000

**Correlation is significant at the 0.01 level

which exist with hypocalcemia. Advance research works are required to assist our findings.

Thus hypovitaminosis D and hypocalcemia at the time of tooth formation is the major element causing defective mineralization and enamel hypoplasia, which are major risk factors for dental caries. Children of developing countries like Pakistan are suffering from nutritional deficiencies, vitamin D and calcium are among one of them, which increases the chances of enamel hypoplasia and predisposes them to caries. Our study might be informative in providing bases for the prevalence of dental caries in our country.

There should be some educational symposiums so that our public should be made aware of healthy eating habits, in particular, calcium and vitamin D intake of our young children should be increased in the form of dairy products or supplementation so that general health of our population will be improved.[24] Serum vitamin D and calcium should be checked as a part children health promotion programs. In this way hypocalcemia can be prevented.

Improving the diet of children by including food rich in vitamin D and calcium may have valuable effects on overall health of the child and on dental health.

Conclusion

Our study concludes that normal vitamin D and calcium levels in children have a significant role in decreasing dental caries and also on tooth mineralization. It is therefore suggested that by improving children's vitamin D and calcium levels we can also have our population with better dentition and strong bones.

Disclosure:

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Authors Contribution:

[1,3]Substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work & Final approval of the version to be published

[2,4,5] Drafting the work or revising it critically for important intellectual content;

ORIGINAL ARTICLE

OPEN ACCESS

Effect of Green Tea on Nicotine Induced Histological Changes in Chick Femur

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Abstract

Objective: To observe histological features of developing chick skeleton undergoing the effect of nicotine and camellia sinensis.

Methodology: This randomized controlled trial study was conducted in association of Poultry Research Institute, Rawalpindi, in the department of Anatomy at Army Medical College Rawalpindi, National university of science and technology, Islamabad. The study sample was consisting of four groups each having ten eggs. Chicks were given double exposure with the same quantity of working solutions. First exposure time was at forty eight hours of incubation and second after forty eight hours of chick birth. The group1 was known as G1 and was given 0.0001ml of normal saline. Different experimental groups were injected with different solution. Group (G2) was given in 0.1ml amount of camellia sinensis (green tea)extract, Group (G3) was administered with 0.1ml in quantity of 0.0001% nicotine solution and Group (G4) was administered both 0.0001% nicotine solution and green tea extract in the amount of 0.1ml. Chicks hatched from each group were given four weeks time to grow. Chicks at the age of one month were sacrificed for the collection of specimen. Femur from each group was collected for the slide formation and histological preparation done to calculate the height of proliferative zone.

Results: Control group G1 in comparison to experimental group G2 showed p value (0.385). G1 in comparison with G3 and G4 showed statistically significant result. Experimental groups when compared with each other such as, G2 in comparison with G3 and G4 showed result with p value (0.000).

Conclusion: From our research work it was concluded that nicotine, responsible of causing toxic effects on the developing thigh bone of chick and green tea to reduce its toxicity.

Key Words: Incubation, Cigarette smoke, Nicotine, Camellia sinensis, Height of proliferative zone and Femur.

Conflict of Interest: None **Funding Source**: None

Introduction

The intake of nicotine is either in the form of first and second hand smoking considered to be the biggest worldwide human health threats and killing more than 7 million people a year.[1] Cigarette smoking is causing many health diseases and its negative effects bringing environmental hazard. The skeleton of avian species was selected for research as it is best skeleton to study the teratogenicity. The calcification of femur of chick embryo starts on the 5th day while in case of tibia and fibula it starts on the 10th day of embryonic life.[2]

Camellia sinensis is a plant species whose leaves and leaf buds are involved in production of green tea. Green tea used in different countries of Asia with different cultures. The different constituents of green tea had protective role against free radical production in body.[3]

In the present research work was done to state the consequences of nicotine and *Camellia sinensis* on growing femur and able to see how green tea reverse the detrimental effects of nicotine. Nicotine affected the metabolism of bone by remodeling bone process and suppressing osteogenesis by decreasing in alkaline phosphatase and type 1 collagen production by osteoblast.[4] Chick femur undergoes the process of endochondral calcification that initiates at its center and move towards its end.[2]

The objective of this research work was done to study and observe how the nicotine effects the developing

thigh bone and can its toxic effects be prevented by the intake of *camellia sinensis*.

Methodology

The present study was conducted in National university of science and technology (NUST) in the department of Anatomy, Army Medical College Rawalpindi, in association of Poultry Research Institute, Rawalpindi. All methods granted approval by the Ethical review Committee of Army Medical College**.** For the experimental purpose fertilized chick eggs of Fayoumi species at zero hour of incubation eggs were included. From the Poultry Research institute, Rawalpindi eggs were purchased. Study technique was simple random sampling**.**[5] Proper process of fumigation and disinfecting the hatchery was conducted. The proper time monitoring for the incubation of egg was done very regularly. The criteria for temperature regulation was controlled at 37.5^0C. Eggs rotations were monitored 4 hourly. Placement of eggs were placed in hatchery at the age that is day zero. Four experimental groups labeled as G1, G2, G3 and G4. Every group was having count of ten eggs. G1 was known as control group, provided with 0.1ml of normal saline G2 with green tea extract G3 with 0.0001% nicotine solution and G4 was given both 0.0001% nicotine solution and green tea extract in 0.1ml of quantity.[5] All the groups provided their working solutions by the piercing at the blunt end of the eggs with the help of insulin gauge needle. Injection of doses were given two times. First injection at forty eight hours of incubation and 2^{nd} at forty eight hours of post natal period.

Chicks at age of one month, were dissected at their pelvic region by removing the lumbar vertebrae at L4 from L5. Sampels were collected for histological observation.. By using the decalcification technique tissue were processed (Figure 1). Paraffin wax was used with melting point range from 40-70℃ for embedding. The block was allowed to cool on cold plate. The oculometer scale was aligned with the help of stage micrometer at 10X magnification. Heights were measured by aligning the oculometer parallel to the chondrocyte columns. In the central and peripheral part of this hypertrophy zone, height was measured then the observations were calculated.[4]

All data was entered in a database using SPSS (Statistical Package for Social Science) version 16. Data was presented as tables. Chi-square test was used for the comparison between the groups. p value < 0.05 was considered significant.

Results

For result the height of proliferative zone of control group G1 and G2 both groups showed mean value 211.111±6.054µm.Whereas G3 and G4 showed mean value 165.500±0.500 and 180.000±3.061 respectively (Table I). Control group G1 in comparison to experimental group G2 showed p value (0.385). G1 in comparison with G3 and G4 showed statistically significant result with p values of both groups were (0.000). Experimental groups when compared with each other such as, G2 in comparison with G3 and G4 showed result with p value (0.000). Comparison of G3 and G4 with each other showed statistically insignificant result with p value (0.626) (Table II).

Table I: Mean values of height of proliferative zone (µm) among different groups of one month old chicks

Dependent Variable	Groups	Mean ± SEM
Height of proliferative Zone (µm)	G1	211.1111 ± 6.05403
	G2	211.1111 ± 6.05403
	G3	165.5000 ± 0.50000
	G4	180.0000 ± 3.06186

Table II: Comparison of height of proliferative zone among different groups of one month old chicks

Dependable Variable	**Comparison Between Groups**		**p value**
	Group	**Group**	
Height of Proliferative Zone (µm)	G1	G2	0.385
		G3	0.000
		G4	0.000
	G2	G1	0.385
		G3	0.000
		G4	0.000
	G3	G1	0.000
		G2	0.000
		G4	0.626
	G4	G1	0.000
		G2	0.000
		G3	0.626
P value ≤0.05 statistically significant			

Discussion

The results showed that the chicks in the control group compared with all the experimental groups and with each other. The research work was supported by other researches done by many studies conducted that showed that nicotine's mechanism effect on weight of the developing fetus and responsible for growth defect.[6]

However the positive effect of nicotine was that the up regulation or down regulation of osteocalcin, which in turn has effects on osteogenesis.[7] The theory of a biphasic effect on the nAChR subunit showed its limitation to osteoblasts. Moreover many studies showing involving large amount of nicotine causing negative effects but, studies done at less amount doses depicted positive effects[8] In other study done has shown that the Nicotine and lipopolysaccharide stimulate the

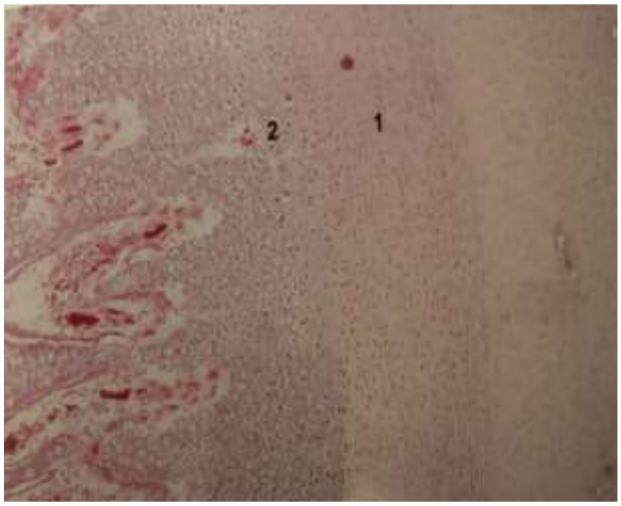

Fig.1 Photomicrograph showing one month old epiphyseal plate of contril group, '1' proliferativezone and '2' is hypertrophy zone. H&E Stain,X10.

formation of osteoclast-like cells by increasing macrophage colony-stimulating factor and prostaglandin E2 production by osteoblasts.[3] Nicotine has its influence on osteoclast as bone healing occurred by four overlapping phases; the initial inflammatory response, soft callus formation, hard callus formation, bony union and bone remodeling.[9]In many other studies done to show smoking-induced adverse biochemical changes in plasma and blood but upon green tea consumption in smokers causing protection by interacting with biomolecules at membrane and sub cellular levels by altering the pathways.[10] *Camellia sinensis* that is green tea largely used beverages in the world. Grean tea extracts consumption provide polyphenols, which act as antioxidants. An antioxidant is a molecule capable of inhibiting the oxidation of other molecules.[11]In many other researches it was observed that the plant having antioxidants properties used as the therapeutic entities.[12]

In other research work the antioxidant property of green tea also supporting this concept.[13] Nicotine one of the constituent of cigarette smoke responsible of giving negative impact on the development of neural system. [14]

Our study concluded that the nicotine responsible for causing oxidative stress in the development of skeleton of chick can be overcome by the consumption of antioxidant that is green tea extract (*camellia sinensis*). All the harm done by nicotine can not be undone but harmful effect can be decreased.

Conclusion

From this study it was elicited through the histological observations in the developing skeleton of chick under the effect of nicotine a major product of cigarette smoke and how its stressful affect can be suppressed by the use of antioxidant such as green tea. The research work revealed injection of antioxidant significantly safeguard effects of nicotine. From all the observations made we summed up that the nicotine, one of the basic part of cigarette smoke responsible of the skeleton deformity of developing chick. By injecting antioxidant counterbalance some, but not all the unpleasant effects.

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ORIGINAL ARTICLE

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Histopathological Analysis of Hysterectomy Specimens with Clinicopathologic Correlation at HBS Medical College Laboratory

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Abstract

Objective: To determine the frequency of various histopathologic lesions in the hysterectomy specimen received in HBS Laboratory and distribution of different lesions in relation to age and to correlate the histopathologic diagnosis with clinical diagnosis

Methodology: This descriptive cross sectional study was conducted at the Department of Pathology, HBS Medical & Dental College & Hospital, Islamabad from January 21, 2019 to January 30, 2020. Eighty-four hysterectomy specimen including total abdominal hysterectomy (TAH), vaginal hysterectomy (VH), total abdominal hysterectomy with bilateral (TAH & BSO) between ages 20-70 years presenting with abnormal uterine bleeding (AUB) were included while hysterectomies due to pregnancy related complications were excluded. Data was collected by purposive sampling from patients who fulfilled the inclusion criteria on a predesigned proforma with presenting complaints and clinical diagnosis. Specimen were fixed in 10% buffered formalin and histopathologic diagnosis was done from hematoxylin and eosin stained slides of representative sections. The frequency of all types of histopathologic diagnosis was calculated and clinicopathologic correlation was done for structural lesions of uterus causing abnormal bleeding. SPSS version 20 was used for statistical analysis. Mcnemar test was used to find the concordance index.

Results: The most common structural uterine lesion causing abnormal bleeding was leiomyoma (36 cases, (42.8%) followed by adenomyosis (21.4%). There was a strong clinicopathologic correlation in hysterectomy specimen. But clinically malignancy was suspected in more cases than it was diagnosed histologically (p=0.05)

Conclusion: The most common non- endometrial pathology was leiomyoma and endometrial pathology was hormonal imbalance. The clinicopathologic correlation in hysterectomy specimen was good but histopathology is pivotal for the accurate diagnosis.

Key Words: Total abdominal hysterectomy, leiomyoma, adenomyosis

Conflict of Interest: None **Funding Source**: None

Introduction

The uterus is a common site for various types of neoplastic and non-neoplastic lesions. These diseases occur across all age groups and are a cause of significant morbidity and mortality during the life time of a woman.[1] The most common gynaecologic complaint is abnormal uterine bleeding which can be due to a variety of reasons of which not all produce a structural uterine lesion (dysfunctional uterine bleeding).[2]

When planning a hormonal therapy, it is important to rule out precancerous conditions such as hyperplasia and subclinical endometrial cancer.[3] Histopathology is the cornerstone for providing an exact diagnosis. Many treatment options are available for dealing with these cases and hysterectomy is one of them.[4] Hysterectomy is the definitive management for diseases like adenomyosis, dysfunctional bleeding, fibroid, prolapsed uterus and malignant uterine and adnexal lesions.[5]

It is estimated by age of sixty around 20% of women have undergone surgical removal of uterus and almost 40% of them have been diagnosed with abnormal uterine bleeding.[6] Hysterectomy is one of the most common specimen is histopathology lab.[7] Histopathologic

examination of hysterectomy specimens has ethical, legal, diagnostic and therapeutic significance for the patient.[8] Histopathology is also necessary to justify the indication of hysterectomy.[9]

This study aims to determine the frequency of various histopathologic lesions in the hysterectomy specimen received in HBS Laboratory and distribution of different lesions in relation to age and to correlate the histopathologic diagnosis of structural lesions with clinical diagnosis.

Methodology

This study was conducted in the department of Pathology of HBS Medical College and Hospital, Islamabad, from 21 January 2019 till 30 January 2020. Eighty four hysterectomy specimen including total abdominal hysterectomy (TAH), vaginal hysterectomy (VH), total abdominal hysterectomy with bilateral (TAH & BSO) between ages 20-70 years presenting with abnormal uterine bleeding (AUB) were included while those of pregnancy related complications were excluded. Data was collected by purposive sampling from patients who fulfilled the inclusion criteria on a predesigned proforma with presenting complaints and clinical diagnosis. Specimen were fixed in 10% buffered formalin and histopathologic diagnosis was done from hematoxylin and eosin stained slides of representative sections. The frequency of all types of histopathologic diagnosis was calculated and clinicopathologic correlation was done for structural lesions of uterus causing abnormal bleeding.

Results

During the study period of one year 84 specimen of hysterectomy which fulfilled the inclusion criteria were received in the HBS Medical College laboratory. Among those 84 specimen there were 56 cases of TAH (66.6%), 20 cases of TAH & BSO (23.8%) and 8 vaginal hysterectomies (9.3%).

The age distribution of cases ranged from 22 years (minimum) to 70 years (maximum). Average age of patients in the study was 44.6 years. Maximum number of cases were present in the age group of 41- 50 years (42 cases, (50 %). The age distribution of cases is shown in Figure 1.

There were 8 vaginal hysterectomies in this study. 4 were in women more than 60 years of age and 4 women were between 45-55 years of age. The most common histpathologic diagnosis was leiomyoma (36 cases, (42.8%) while there were 18 cases of adenomyosis (21.4%). Both fibroid and adenomyosis was present in 6 cases (7.1%). Ovarian and tubal endometriosis was present in 4 cases (4.7%) while TAH & BSO was done due to ovarian cysts in 14 cases (16.6%). The distribution of these non- endometrial lesions in relation to the age is shown in table I

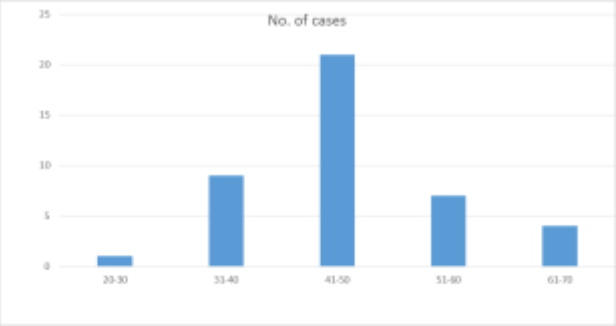

Figure 1. Distribution of cases in different age groups (n=84)

Table I: Distribution of lesions other than endometrial in the hysterectomy specimens

	31-40 years	41- 50 years	>50 years	Total
Leiomyoma	12 (33.3%)	20 (55.5%)	4 (11.1%)	36 cases
Adenomyosis	6 (33.3%)	10 (55.5%)	2 (11.1%)	18 cases
Leiomyoma+ adenomyosis	0 (0.0%)	6 (100.0%)	0 (0.0%)	6 cases
Endometriosis	2 (50.0%)	2 (50.0%)	0 (0.0%)	4 cases
Ovarian cyst (other than endometriotic)	10 (71.4%)	2 (14.2%)	2 (14.2%)	14 cases

The endometrial pathologies seen in 84 cases of hysterectomies are as shown in Table II

Table II: Distribution of endometrial pathologies in 84 cases (n=84) of hysterectomies

Histopathologic diagnosis	Number of cases	Percentage
Hormonal imbalance	28	33.3%
Endometrial polyp	5	5.9%
Disordered proliferative endometrium	7	8.3%
Endometrial hyperplasia	12	14.2%
Proliferative phase	15	17.8%
Secretory phase	4	4.7%
Pill effect	4	4.7%
Endometrial carcinoma	6	7.1%
Atrophic endometrium	3	3.5%

Hormonal imbalance with estrogen dominance pattern was the most common endometrial pathology (33.3%) while normal endometrial cyclic pattern of proliferative and secretory endometrium was also seen in 15 (17.8%) and 2 (4.7%) cases respectively. There were 6 case of endometrial carcinoma (7.1%). The predominant pathology in hysterectomy specimen was benign (92.8% of cases).

Table III: Concordance between clinical and histopathological diagnosis

Organic lesion in uterus	Clinical diagnosis. Total number of cases (N=72)	Histopathologic diagnosis in total number of cases (N=72)	Correlation between clinical & histopathology in positive cases (Concordance index/%age)	*p*
Adenomyosis	7	18	28.0%	0.02
Leiomyoma	32	36	47.1%	0.61
Endometrial polyp	1	5	16.6%	0.20
Malignancy	**14**	**6**	**70.0%**	**0.05**
Adenomyosis+ leiomyoma	1	6	14.2%	0.11
Adenomyosis+ leiomyoma+ polyp	0	1	0.0%	1.0

Out of N=84 cases of hysterectomy clinicopathologic concordance was checked in structural uterine lesions causing abnormal bleeding (N=72 cases) as shown in the table III.

Discussion

In our study, the ages of women varied from 20 to 70 years. The maximum number of hysterectomies were done in 41-50 years of age group and the major complaint was menorrhagia. Talukdar B found the same age distribution in a tertiary care hospital of Assam, India.[10]

A total of 84 cases of hysterectomy were included in the study. Among the structural causes of bleeding, Leiomyoma, a smooth muscle tumour, was the most common cause of abnormal uterine bleeding (42.8%) which was followed by adenmyosis (21.4%) cases. It can be explained on the basis that leiomyoma can be easily diagnosed in clinical examination and radiological investigations. This relatively high frequency of leiomyoma in our study is consistent with that of Neis K[11], Amin A. et al [12], Subrata P[13]

Out of n=84 case, clinicopathological correlation for structural causes was done in 72 cases of hysterectomies (N=72 cases). The correlation between clinical and histopathological diagnosis was done using concordance index (%). The highest concordance index was found for malignancy between clinical and histopathological diagnosis. Similarly, leimyomas (47.1%) and Adenomyosis (28.0%) also had fair level concordance index. However, the lesions of Adenomyosis+leiomyoma+polyps had the least concordance (0.0%), whereas Adnmomyosis+leiomyoma also had low level concordance index. When the difference in diagnosis was assessed between clinical and histopathologic diagnosis, adenomyosis and malignancy were found significantly varied (p-value, 0.02). Histopathology was able to detect benign structural lesions in 25/72 (34.7%) more cases than clinically alone. And the presence of multiple structural lesions (leiomyoma+ adenomyosis and leiomyoma+ adenomyosis+ polyp) was confirmed on histopathology in 6 cases while it was suspected clinically in only one case. The higher yield of histopathology as compared to clinical suspicion was also evident in studies by Singh K. et al (2019)[14] and Kumar A.[15]

The malignancy was clinically suspected in 14 cases but was histologically proven in 6 cases. The endometrial curettage in 5 cases was suspicious for malignancy. While curetting's in six cases was of various types of hyperplasia. In one case cancer was not suspected and no curetting's were done while two cases were clinically diagnosed as polyps. Singh K. et al found a good clinicopathologic correlation in this category but clinical suspicion was more than histologic diagnosis.[14]

Regarding adenomyosis, the clinical diagnosis was confirmed histopathologically for 7 cases. However, additional 11 cases were diagnosed on histopathology which were missed clinically. Adenomyosis may be easily missed clinically due to lack of specific signs and symptoms. The noninvasive diagnosis of adenomyosis lacks specificity and requires use of sophisticated radiologic techniqes as is pointed out by Chaperon et al [16] and Abbot JA.[17] Bosco RJ found adenomyosis in 25% of cases in his study in Tamil Nadu, India when adenomyosis was clinically suspected in 12% of cases.[18]

Among the endometrial pathologies a high percentage of cases were of hormonal imbalance (45.2%) largely with estrogen dominance pattern. Shaheen U. et al[19], Smriti S. et al[20] also found hormonal imbalance as the most common endometrial pathology in their studies though the percentage of cases is higher in our study than compared with theirs i-e 28% and 22.22% versus 45.2% in our study. The indications for hysterectomy in women of different regions are heterogeneous and findings are consequently subject to demographic variation.

Nasir A. et al has also reported a similar frequency of endometrial hyperplasia and disordered proliferative endometrium as ours.[21] The distribution of leiomyoma and adenomyosis in relation to the age groups is the same as reported by Rashid A. et al.[22]

The life time risk of hysterectomy is 30-40%. It is a major surgery and not without risk of complications. The frequency of pathologies in our study are comparable to findings quoted in various studies of south Asia. The high percentage of estrogen related pathologies like leiomyoma, hormonal imbalance, hyperplasia and disordered proliferative endometrium calls for the need for further research in this field regarding environmental factors and treatment options. Along with surgical complications, the procedure also has many psychosocial effects on women's life. Taking in view the availability of new medical treatments the decision for hysterectomy must be made carefully as many cases of hormonal imbalance in our study were associated with an organic cause of abnormal bleeding like fibroid. But at the same time there were cases in which the reason for bleeding was hormonal imbalance alone.

Conclusion

The most common age group for hysterectomy was 41-50 years and the most common non- endometrial pathology was leiomyoma and endometrial pathology was hormonal imbalance. The clinicopathologic correlation in uterine structural lesions causing abnormal bleeding is good but many uterine tumors present with similar clinical features and histopathology plays an important role in the accurate diagnosis of different types of tumors and thus helps in providing the patient with appropriate management.

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Authors Contribution:

[1,3]Substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work & Final approval of the version to be published

[2,4,5] Drafting the work or revising it critically for important intellectual content;

ORIGINAL ARTICLE

OPEN ACCESS

Maternal Risk Factors of Low Birth Weight among New Born Babies at Tertiary Care Hospital, Lahore

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Abstract

Objective: To identify maternal risk factors associated with low birth weight among newborn babies at Lady Aitchison Hospital, Lahore.

Methodology: It was case control study that was done among 150 newborn babies delivered at Lady Aitchison Hospital, Lahore through non probability convenient sampling. Results were obtained using SPSS version 23.0. Chi Square and Odds ratio was calculated and also logistic regression was applied.

Results: The mean weight of case and control babies was 1.72±0.38 Kg and 3.37±0.49 Kg while mean gestational age was 34.63±2.35 weeks and 36.91±1.35 weeks respectively. The baby's gender showed that 50.7% were males and remaining were females. There were 68.7% pre-term babies and consanguinity was seen in 46% couples. Applying logistic regression showed that mother occupation [AOR (95% CI): 11.248 (2.316-54.627)] and family class [AOR (95% CI): 10.551 (2.168-51.344)] remained risk factors while term pregnancy [AOR (95% CI): 0.082 (0.026-0.260)] and better hemoglobin level [AOR (95% CI): 0.132 (0.042-0.413)] showed protective effect.

Conclusion: Results from this emphasizes that the sociodemographic profile as well as pregnancy duration with better hemoglobin levels must be monitored for better outcome.

Key words: Low Birth Weight, Pre Term, Risk Factors.

Conflict of Interest: None **Funding Source**: None

Introduction

The multifactorial phenomenon characterized by weight of new born <2500 gram (gm) is termed as low birth weight (LBW). The adverse result ranges from short term to long term thus making it major problem of public health nature around the globe. Babies with a birth weight of less than 2500g, irrespective of the period of their gestation, are termed as LBW babies. The prevalence of LBW being problem of public health nature among developing countries is preventable. The contribution of LBW is substantially high to mortalities related to childhood, infant, as well as neonatal and also, enhances morbidity among these age groups. The weight gained by the infant from birth serves as an important maternal health indicator as well as nutritional status either during the course of pregnancy or the prior period of her life. [1]

For determining the health status regarding any community, the most important indicator used is infant's birth weight which is highly associated with neonatal deaths as well as natural growth and development processes in children. [2] In 2000, the WHO also released a report, stating that LBW infants made up 14% of all births throughout the world, and such a value accounted for 56.11% of all births in Iran. [3] The incidence of LBW in different parts of the world is similarly varied; in other words, LBW rates in Africa, Asia, Europe, and Latin America have been reported to be 14.3%, 18.3%, 4.6%, 10%; respectively. [4] This amount has been also reported by 10% and 4.4% in Iran, and in the city of Yazd, respectively. [5] Moreover; LBW occurring in developed and developing countries can impose heavy burdens on family members, and health systems. [6] There is acute problem of LBW in almost 50% neonates born in South Asia, while in Pakistan the percentage of LBW among neonates is almost 5%. The statistics from Pakistan national surveys showed that there was an estimated 12 to 25 percent occurrence of LBW among new born and also scarce literature is available comprising risk factors

among reproductive age group women (15-49 years) that could cause LBW. [7]

The occurrence of LBW is associated with women low body mass index as well as anemia as shown from literature from Karachi, Quetta, Larkana and Turkey. [8-12] Socioeconomic status and acceptability of antenatal care is also risk factors that need to be addressed.[13] Recent research studies have also revealed that adolescents born with LBW are three times more likely to suffer from psychiatric and behavioral disorders including attention deficit hyperactivity disorder (ADHD). [14] Likewise, it has been reported that LBW infants have lower intelligence quotient (IQ) scores than normal babies.[15]

Furthermore, recent epidemiological studies have shown that LBW can augment the risk of mortality during infancy and other life stages; it is even associated with diseases, such as hypertension, atherosclerosis, [16] diabetes, stroke, and obesity in adulthood.[17] In Iran, infants constitute the most common age group affected with child mortality, and 50% of these cases are due to LBW. [15]

It should be noted that various factors including genetic, environmental, fetal, maternal, and paternal ones can affect LBW.[18] In addition, factors such as hyperglycemia, history of pregnancy-induced hypertension, types of obstetric violence, maternal age, birth season, use of iron supplements during pregnancy, birth order, gestational age, and maternal education can have an impact on birth weight. [18, 19]

The data for evaluating as well as monitoring the set goals of progress for nation regarding reduced neonatal problems and also infant mortalities or morbidities by using birth weight statistics. The available data should be improved by conducting exploratory population based researches time to time. As can be seen, local studies have sufficient information regarding low birth weight problems in infants a topic which has been regularly taken up in international and regional data. The policy makers, therefore, have to rely on national as well as international figures to prevent and control low birth weight in our country, province and Lahore district alike. It is due to the facts mentioned above that this very important study was taken up to be conducted at Lady Aitchison Hospital, Lahore for assessing low birth weight babies incidence delivering at tertiary care level hospital in Lahore city and also the associated risk factors.

Methodology

This case control study was carried out among 150 new born babies delivered at Lady Aitchison Hospital, Lahore. The cases and controls were selected conveniently during specified period (15-01-2020 to 15-06-2020). The sample size was calculated using WHO sample size calculator 2.0 taking 44.3% proportion among cases and 31.4% among controls. [20] The macrosomic or congenital anomalies babies were excluded from the study. After informed consent from parents, the newborn babies were examined and data regarding socio-demographic and risk factors were collected on a structured questionnaire. The researcher herself interviewed the parents/guardian and record data of maternal factors. The data was reviewed and entered on questionnaire was analyzed using SPSS Version 23.0. The normality was checked using Kolmogorov-Smirnov test. Frequency along with percentages was calculated for categorical variables and Mean±SD was calculated for quantitative variables. Mann Whitney test and chi square test was used for association; odds ratio was also calculated and OR>1 was considered as risk factor and p-value <0.05 were taken as significant. Logistic regression was also applied.

Results

A total of 150 mothers (75 cases and 75 controls) having single ton live births were enrolled in the study. The mean age among enrolled mothers was 29.89±4.98 years. The mean weight of case and control babies was 1.72±0.38 Kg and 3.37±0.49 Kg while mean gestational age was 34.63±2.35 weeks and 36.91±1.35 weeks respectively. The baby's gender showed that 50.7% were males and the remaining were females. There were 68.7% pre term babies and consanguinity was seen in 46% couples. The mean distance of respondent from the health facility was 34.02±54.86 Km.

The table below shows the mean comparison of various factors among cases and controls. The hemoglobin levels was lower in cases as compared to controls, pre term babies were mostly present in cases, lower marriage duration also found significant and distance from the health facility also showed significant results (Table I).

Mother occupation showed 61.4% were housewives while 35.8% were working mothers (p=0.002). There were 37.7% poor mothers among cases and 56.7% were not poor (p=0.026). Regarding complications and other medical conditions, it was observed that 67.9% of the mothers had complications during pregnancy as compared to 2.4% cases that had no complication during pregnancy (p<0.001). It was also observed that 61.7% of the mothers were having complications during delivery as compared to 42.2% of the mothers who were not having complications during delivery (p=0.020). Regarding term pregnancy, 75.9% were pre term and

Table I: Comparing Means of various factors within Study Groups

Variables	Study Groups		Mann Whitney Test	p value
	Cases	Controls		
	Mean±SD	Mean ± SD		
Hemoglobin Level (g/dL)	7.32±1.17	8.95±0.98	-7.349	<0.001*
Babies Weight (Kg)	1.72±0.38	3.37±0.49	-10.617	<0.001*
Gestational Age (Weeks)	34.63±2.35	36.91±1.35	-6.385	<0.001*
Marriage Duration (Years)	7.69±3.74	9.92±3.90	-3.721	<0.001*
Distance Health Facility (KM)	34.39±44.29	33.65±64.02	-2.723	0.006*

*p-value <0.05

21.1% were full term among cases (p<0.001). The cases showed 44.8% antenatal visits was ≤4 and 76% was >4 visits (p=0.004). The cases showed 83.1% hemoglobin levels was ≤8 and 20.3% was >8 level (p<0.001). Applying logistic regression showed that mother occupation [AOR (95% CI): 11.248 (2.316-54.627)] and

family class [AOR (95% CI): 10.551 (2.168-51.344)] remained risk factors for low birth weight while term pregnancy [AOR (95% CI): 0.082 (0.026-0.260)] and better hemoglobin level [AOR (95% CI): 0.132 (0.042-0.413)] showed protective effect (Table II).

Discussion

Low birth weight among babies is considered an important public health problem across the globe particularly among the people of developing countries. The estimates shown by WHO showed that almost 25 million babies that are born every year have LBW and among them, five million die worldwide. [21] LBW was caused by various factors that contribute towards it, both related to fetus and mother. There is an interrelation seen among social and biological maternal risk factors. The mortality related to LBW could possibly be reduced very easily because the modifications could be made to the risk factors if they are detected earlier and therefore managed using simple techniques. [22]

In this study, the mean weight of cases was comparable with the study done by Dr. Naveed et al, showing the almost same weight of their study participants as ours. [23] In a study by Abida Sultana et al, Gulnaz et al, and Brig. Khalid showed that LBW was present among 27.4%, 10.04% and 32.46% babies respectively. [24-26] In another study by Marziyeh Safari and associates showed the prevalence of LBW was very low i.e., 4.7%. [27] This implies that low birth weight is found in almost every part of the world and there must be strategies to reduce its prevalence.

Mother occupation was considered as risk factor in the study results and previous literature showed that mother occupation was shown as a risk factor and in some literature it was not shown to be risk factor. [25, 27] The mean hemoglobin level of mothers was also found statistically significant Anemia was found to be risk factor in a study by Habib and others. [20] There were 59% anemic mothers in a study done at Rahim Yar Khan. [23]

Table II: Association of Maternal Factors with Low Birth Weight Occurrence

Variables		Study Groups		OR (CI-95%)	p-value	β	AOR (CI-95%)	p-value
		Cases (%)	Controls (%)					
Mother Occupation	**House Wife**	51 (61.4)	32 (38.6)	2.855 (1.459-5.593)	0.002	2.42	11.248 (2.316-54.627)	0.003*
	Working	24 (35.8)	43 (64.2)					
Family Class	**Poor**	20 (37.7)	33 (62.3)	0.463 (0.233-0.918)	0.026	2.356	10.551 (2.168-51.344)	0.004*
	Not Poor	55 (56.7)	42 (43.3)					
Complications During Pregnancy	**Yes**	74 (67.9)	35 (32.1)	84.571 (11.167-640.491)	<0.001	-4.211	1.015 (0.001-1.410)	0.065
	No	01 (2.4)	40 (97.6)					
Complications During Delivery	**Yes**	37 (61.7)	23 (38.3)	2.201 (1.129-4.292)	0.020	-0.214	0.807 (0.263-2.483)	0.807
	No	38 (42.2)	52 (57.8)					
Term Pregnancy	**Pre**	60 (75.9)	19 (24.1)	11.789 (5.466-25.429)	<0.001	-2.504	0.082 (0.026-0.260)	<0.001*
	Full	15 (21.1)	56 (78.9)					
Antenatal Visits	**≤ 4**	56 (44.8)	69 (55.2)	0.256 (0.096-0.685)	0.004	0.740	2.096 (0.541-8.128)	0.284
	> 4	19 (76)	06 (24)					
Hemoglobin Level	**≤ 8**	59 (83.1)	12 (16.9)	19.359 (8.455-44.328)	<0.001	-2.021	0.132 (0.042-0.413)	<0.001*
	> 8	16 (20.3)	63 (79.7)					

* p-value <0.05; OR = Odds Ratio; AOR = Adjusted Odds ratio; β = Regression Coefficient

Having low hemoglobin levels was found significant with low birth weight as demonstrated by results of Gulnaz and colleagues. [25]

The family class was also found significant , while in a study by Dr. Muhammad Naveed showed that socioeconomic level (59%) was a risk factor for LBW. [23] There were 32% low socioeconomic class mothers that gave birth to babies having low weight. [24] Family income was found significant with low birth weight in a study by Habib and others. [25]

Lower the antenatal visits i.e., ≤4, higher the chances of low birth weight. In a study by Muhammad Habib showed that having less than 2 antenatal visits was a risk factor for developing low birth weight [20] and study by Abida Sultana and others showed that antenatal visits were missing in 11.6% of the respondents. [24] In a study from Ethiopia showed that antenatal care was a risk factor for low birth weight babies. [28] Being pre term also served as risk factor for low birth weight as also shown in a study that 94% of the babies having low weight were premature. [23] In a study by Brig. Khalid Mehmood showed that 37% of LBW babies were preterm. [26] Complications either during pregnancy or delivery served as risk factor for low birth weight and the supported in study done by Gulnaz, [25] Brig. Khalid, [26], Dilip Kumar [29] and in study from Ethiopia. [28] In a study by Habib, showed that occupation (AOR: 1.82; 95% CI: 1.26-2.44) and having low social class was (AOR: 2.43; 95% CI: 1.34-2.88) risk factors. [20]

Conclusion

The mother's occupation, poor family class, had pre term baby, had less antenatal visits, suffered from complications, had low hemoglobin levels were associated with low birth weight babies. After adjusting the mother occupation and family class remained risk factors for low birth weight and protective effect was shown by having full term babies and higher hemoglobin levels.

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Authors Contribution:

[1,3]Substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work & Final approval of the version to be published

[2,4,5] Drafting the work or revising it critically for important intellectual content;

ORIGINAL ARTICLE

OPEN ACCESS

Post Dural Puncture Headache- A Comparison of 25 G and 27 G Quincke Spinal Needles in Patients Undergoing Elective Caesarean Section under Spinal Anaesthesia

About the Author(s)

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Abstract

Objective: To find out and compare the frequency of PDPH with 25 G and 27 G spinal needle when they were used in obstetrics patients undergoing cesarean section.

Methodology: This study was carried out over a period of one year from 1st February 2020 to 31st January 2021 in the department of Anesthesiology and ICU of HBS General Hospital Islamabad. Patients were randomly placed into two groups by coin toss method. Group I patients were given spinal anesthesia with 25 G Quincke needle and group II, patients were given spinal injection with 27 G Quincke needle. Frequency of headache and percentages were presented as qualitative variables and quantitative variables of the patients were presented as Mean ± SD. Paired sample t-test was applied on quantitative variables and Chi-square test was applied for comparison of PDPH. P value of less than 0.05 was considered significant.

Results: Six patients (15%) in group I developed PDPH whereas only one patient in group II (2.5 %) developed it. There was statistically significant difference (p =0.035) between the two groups.

Conclusions: We have concluded that 27 G Quincke spinal needle has clear cut advantage over 25 G Quincke spinal needle as far as frequency of PDPH is concerned in spinal anesthesia for cesarean section.

Keywords: Post dural puncture headache, spinal needles, elective cesarean section

Conflict of Interest: None **Funding Source**: None

Introduction

Spinal anesthesia has gained popularity as preferred anesthetic technique for elective cesaerian sections nowadays. Post dural puncture headache a serious complication of spinal anaesthesia results from leakage of CSF from dural puncture. Size of the needle used for spinal anesthesia, age and the sex of the patients are most important factors to determine the severity and frequency of the PDPH.

Nowadays general anesthesia for cesarean section has almost completely been replaced by regional anesthesia. This is mainly due to maternal risks involved in general anesthesia.[1] Spinal anesthesia has gained popularity as preferred anesthetic technique, because it is easy to administer, has immediate onset and provides excellent operating conditions. Spinal anesthesia also provides effective post-operative analgesia, avoids fetal as well as maternal complications of general anesthesia and requires minimal postoperative care.[2] But spinal anesthesia has its own complications. Post dural puncture headache (PDPH) is very disturbing complication of spinal anesthesia. PDPH is more common in young adults and particularly in obstetrics patients. It results from puncture of dura matter and signs and symptoms are caused due to leakage of cerebrospinal fluid (CSF), traction on the cranial contents and reflex cerebral vasodilatation[3]. PDPH may represent 2-7 days after lumber puncture and may persist up to six weeks. Characteristically it is worse on sitting, occipital in distribution and very disabling for the patient.

The single most important factor affecting the frequency and severity of PDPH is the size of the needle used for dural puncture. The incidence is reduced by using

smaller gauge or pencil point needles and by aligning the bevel of the needle to penetrate the dura in sagittal plane.[4] Pencil point needles are still not widely available in Pakistan and needles of smaller gauge less than 27 G are technically more difficult to use and are associated with high failure rate for spinal anesthesia. So 25 G, 26 G and 27 G Quincke needles are used frequently for this purpose. Incidence rate of PDPH in Pakistan is not available but overall incidence of PDPH ranges from 0 to 30 %.[5]

Methodology

This study was carried out over a period of one year from 1st February 2020 to 31st January 2021 in the department of Anesthesiology and ICU of HBS General Hospital Islamabad. After the approval of Institutional Ethics Committee and getting written informed consent, 80 patients having American Society of Anesthesiologists (ASA) physical status of I and II, scheduled for elective lower segment cesarean section (LSCS) were included in the study. All the parturients were having full term pregnancy. Patients with severe hypo-volemia, raised intracranial pressure, infection at the site of spinal injection, coagulopathy disorders, severe aortic or mitral stenosis, placenta previa grade II to IV, placenta accreta, twin pregnancy and pre-eclampsia were excluded from the study.

After clinical examination by the obstetrician, patients were investigated and evaluated for spinal anesthesia. Detailed physical and systemic examinations were carried out, airway of the patients were assessed and prepared for anesthesia and surgery. Sampling was done by consecutive probability technique and patients were randomly placed into two groups by coin toss method. Group I patients were given spinal anesthesia with 25 G Quincke needle and group II, patients were given spinal injection with 27 G Quincke needle. When the patients were shifted to operation theatre, intravenous line was maintained with 18 G intravenous cannula and monitors were attached to the patients. After preloading the patients with Ringer's lactate solution 07 ml per kg in initial 05 minutes, spinal anesthesia was administered to the patient in sitting position at L 3-4 or at L4-5 intervertebral space after subcutaneous infiltration of skin by 2ml of 2% lidocaine. Strict aseptic protocol was maintained while giving spinal injection and while penetrating the bevel of the needle was aligned in a sagittal plane to avoid cutting of dura fibres. An inj of 1.5 ml 0.75% hyperbaric bupivacaine was injected in to subarachnoid space. Patients were gently placed in supine position immediately after giving injection with left uterine displacement. PDPH was assessed after 12, 18, 24 and 48 hours after the operation. Post-dural puncture headache was defined as non-radiating severe headache felt in frontal or occipital areas, which increased in severity while attaining upright position and decreased when patient lied down.

Data was entered in SPSS version-22 for statistical analysis. Frequency of PDPH was presented as a number and percentage for qualitative variable, while quantitative variables like age, weight and height were denoted as mean ± SD. Chi-square test was applied for comparison of PDPH and paired sample T- test was applied on quantitative variables.

Results

A total of 80 full term pregnant patients planned for LSCS, who fulfilled the inclusion and exclusion criteria were included in the study. Each group had 40 patients. Ages of patients ranged between 19-41 years. The mean ages of patients were 23.88±2.74 and 24.43±4.37 years in group I and II respectively. The other variables recorded in demographic data were also similar in both of the groups as shown in table 1. However six patients (15 %) out of 40 patients in group I developed PDPH whereas only one patient (2.5 %) out of 40 patients in group II developed it which showed statistically significant difference with a P value of 0.035, as shown in fig 1.

Table 1. Demographic Data. N=40

Study Groups	Group I	Group II
Mean age (Years)	23.88±2.74	24.43±4.37
Mean Weight (kg)	62.38±5.79	64.21±7.62
Mean Height (cm)	159.26±8.34	157.94±9.12
Primipara (No)	13(32.5%)	11(27.5%)
Multipara (No)	27(67.5%)	29(72.5%)
ASA I	22(55.0%)	19(47.5%)
ASA II	18(45.0%)	21(52.5%)

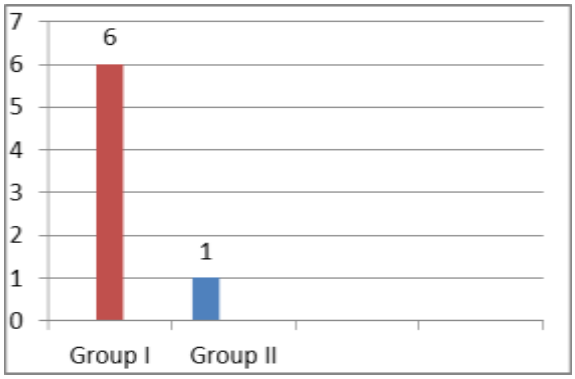

Fig 1. Incidence of Postdural puncture headache in group I and group II

Discussion

Among regional anaesthesia techniques, spinal anaesthesia is the most common in obsterics. Spinal anesthesia is safe and widely practiced anesthetic technique all over the world for operation of cesarean section. The advantages are reliability, dense motor block, rapid onset, simplicity and avoidance of airway complications. Spinal anaesthesia has different complications and one complication is post dural puncture headache which is associated with type of needle. PDHP is a very serious complication and is more common in parturients as most of them are young[6]. In majority of cases this resolves spontaneously but in some patients headache lasts for months and years. With the development of fine gauge spinal needle there is significant reduction in post dural puncture headache.[7]

Spinal anaesthesia has many advantages as compared to general anesthesia. Although the incidence of PDPH has grossly reduced all over the world by introducing a smaller guage spinal needles[8], still the reported incidence of PDPH after spinal anesthesia ranges from 4 to 40 % when 25 G Quincke spinal needle is used in patient for cesarean section. The frequency of PDPH with 27 G Quincke needle ranges from 1.1 % to 12.8 % but in some studies incidence of PDPH was 0 % with 27 G needle when spinal anesthesia was performed by consultants[9]. The intensity of headache may range from mild to severe and symptoms may start on first or second day after spinal injection and may last for 72 hours. In most studies, symptoms of PDPH are less severe with 27 G Quincke needles and more with 25 G needles. Apart from other factors PDPH is related to the types of spinal needle used as well size of spinal needles.[10]

The use of smaller guage spinal needle progressively reduces the incidence as well as severity of PDPH. The introduction of pencil point needle has maximally reduced the incidence of PDPH as it is considered producing less damage to the dural fibers by splitting them instead of cutting them and allowing the hole to close more rapidly. Thus out of all types of needles, pencil point needles have lowest incidence of PDPH[11]. In current study as we observed the rate of PDPH was 15 % with 25 G needles, which was clearly more than the rate of PDPH noted with 27 G needles which was 2.5%. Therefore it was clearly demonstrated that there was a significant reduction in the incidence of post-dural puncture headache when 27 G, Quincke spinal needle was used for spinal anesthesia as compared to 25 G Quincke spinal needle. Our results are comparable with the other studies, as the incidence of PDPH in our settings is almost similar to these. [12,13,14]

Conclusion

We have concluded that 27 G Quincke spinal needles have clear cut advantage over 25 G Quincke spinal needles as far as the frequency and severity of PDPH is concerned, when used for spinal anesthesia for cesarean section.

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Authors Contribution:

[1,3,6]Substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work & Final approval of the version to be published

[2,4,5] Drafting the work or revising it critically for important intellectual content;

ORIGINAL ARTICLE

OPEN ACCESS

To Determine the Pervasiveness of Homicidal Sharp Force Trauma in Rawalpindi and its Relationship with Age and Gender

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Abstract

Objective: To document the incidence of most embattled anatomical sites of the body in cases of sharp force injuries, focused on gender and age susceptibility, referred at the mortuary for autopsy.

Methodology: A Descriptive, retrospective Study.was conducted in the Medico-legal section of District Headquarters Hospital Rawalpindi for three-year duration from March 2016 to March 2019. The medico-legal record of hundred autopsy cases of the medical-legal department at the mortuary at DHQ Rawalpindi, were examined thoroughly. The variables measured were age, gender, cause of death, injury type, anatomical sites commonly involved and defence wounds in the homicidal outcome. The results were stated as percentages and numbers in the presentation planned for the study.

Results: The records of hundred autopsy cases in the medical-legal department showed that the homicidal injuries due to acute force trauma were in the 20-30 years age group, 65 (65%) of men and 35 (35%) of women with 30.88 the average age. 18 (18%) showed single lesions and 82 (82%) had multiple lesions. Of the deaths, 46 (46%) were due to bleeding, while the remaining 54 (54%) were due to injuries to the vital organs. In 26 (26%) of cases, defence wounds were observed and the 74 (74%) remaining had no such wounds. The abdomen was the most usual embattled anatomical part in males 25 (25%) and in women neck in 30 (30%) of bodies.

Conclusion: The analysis showed that acute force trauma injuries were male dominant with 20-30 years age group. The injuries were numerous and most of the victims did not have defence wounds. In males, the utmost focused anatomical area was abdomen and in women it was neck. In most cases, the death cause was vital organs injury. If sufficient laws are enacted to enforce law enforcement authorities to keep areas of appropriate penalties in accordance with the law, deaths will be reduced by acute force.

Key Words: acute force trauma, autopsy, homicidal injuries.

Conflict of Interest: None **Funding Source**: None

Introduction

The legal medical examination of death is the supreme important and crucial function of justice in the criminal justice system.[1-3] The officer is anxious with determining the reason, nature and duration of all unnatural suspicious and sudden deaths sent by law enforcement organisations to the medical legal facility of the Sector Hospital.[4-5] The application of sharp force causes an open wound due to the discontinuity of the skin and the rupture of the underlying tissues. The most common tools that inflict these are a knife, a sharp cut glass, a sword, a shaving blade, a metal piece, a pair of scissors and an axe.[6-7] The weapon characteristics, such as the size, shape and weapon type used, affect the size and shape of the wound. The extraordinarily little work has been completed in Pakistan on injuries due to sharp weapon and a downward trend has been reported. In Hyderabad, a 2-year analysis reported sharp weapons causes 10% of unnatural deaths. The 8% of physical trauma cases reported by Abbottabad's one-year study due to strident weapons[8]. This analysis was held to determine the death rate with sharp weapons by gaining the relevant authorities' attention to this terrible subject in Pakistan. The sharp weapons death is a trivial problem that requires appropriate consideration[9]. Various analysis

in Pakistan have described that in homicidal deaths; the second most important means are sharp force weapons.[10]

Methodology

This descriptive, retrospective Study was held in the Medico-legal section of District Headquarters Hospital Rawalpindi for three-years duration from March 2016 to March 2019. This study includes all homicidal deaths due to sharp force trauma. In the pre-designed proforma, existing registrations and the relevant information was recorded for three years. Autopsy cases during this period were 100 with sharp edge homicidal injuries. The incidence was determined based on gender, age, injuries frequency (multiple or single), armament, death cause, predilection for site of homicidal wounds infliction and defence injuries sustained. This information was collected in a table and calculations were made. The result was obtained, a conclusion was made, and commendations were provided.

Results

During the study period, 100 autopsy cases were examined in the medico legal department and it was found that sharp force trauma injuries were common in 65/100 (65%) men and 35/100 (35%) in females.

TABLE I: SEX DISTRIBUTION (n=100)

Sex	Number of cases	Percentage
Male	65	65%
Female	35	35%

TABLE II: AGE DISTRIBUTION

Age	Male	Female	Total	Percentage
0-09	0	3	03	3%
10-19	15	7	22	22%
20-29	19	11	30	30%
30-39	15	10	25	25%
40-49	08	02	10	10%
50-59	04	01	05	5%
60-69	04	01	05	5%
70-79	00	00	00	-
80-89	00	00	00	-

The corporate age group participating was 20-29 years 30/100 (30%). The mean age was 30.88 years. The single injury was noted among 18/100 (18%) victims, multiple injuries in 82/100 (82%) cases. The deaths occurring because of vital organs' injuries were due to haemorrhage 54/100 (54%) and 46/100 (46%).

There were defence injuries seen in (75%) 75/100 victims and 25/100 (25%) remaining cases had no defence injuries.

Common areas causing fatal outcomes include head 10/100 (10%), chest 20/100 (20%), neck 30/100 (30%), abdomen 25/100 (25%), upper limbs 10/100 (10%) and lower limbs 05/100 (05%).

TABLE III: INJURES PATTERN

Injury	Number of cases	Percentage
Single	18	18%
Multiple	82	82%

TABLE IV: CASUE OF DEATH

Cause	Number of cases	Percentage
Hemorrhage	46	46%
Damage to vital organs	54	54%

TABLE V: DEFENSE WOUNDS

Defense wounds	Number of cases	Percentage
Seen	75	75%
Not seen	25	25%

TABLE VI: COMMON SITES INVOLVED IN HOMICIDAL OUTCOME

Site	Number of cases	Percentage
Head & Face	10	10%
Neck	30	30%
Thorax	20	20%
Abdomen	25	25%
Upper loco motor	10	10%
Lower loco motor	05	05%

Discussion

In unnatural deaths, the most common cause of death is due to sharp force weapons. These injuries are the third cause of deaths globally.[10]

Figures from Wales and England show that the supreme usual method of homicide worldwide is due to sharp objects, followed by using sharp weapons, according to analysis in Pakistan, where the firearm was the first chosen weapon of homicide.[11] During the study period, 100 autopsy cases were reported in the medical-legal department, which showed that the age of the victims of acute force trauma was 20-30 years related to the analysis in the Rawalpindi where the common age varies between 28 and 60 years. In the US, age of people who died due to severe trauma was 22 to 51 years, because their growth began much earlier and produced all kinds of violence.[12-13] The homicidal death from sharp force trauma in India ranges from 22 to 31 years. This shows that the rate of sharp trauma is median at an early age

and higher than that of old age[14]. In our study, men were more susceptible to trauma due to sharp force than women.

This study showed that 65% were male and 35% female victims, which contrasted with a Peshawar study that showed that 86.15% were female and 13.85% were male. Here, in this part of Pakistan, more women are exposed to acute trauma. In our study, the injury pattern in 82% had multiple and 18% had single injury related to the analysis in Adana, where the victim suffered a single injury in 47.35%. In this analysis, fatal consequences (cause of death) was 46% bleeding and 54% had vital organs damage.[15] In this analysis, 75% had defensive wounds and 25% had no defensive wounds. This indicates that the victims were ignorant of the attacker's exact homicidal attack as compared to the study in Delhi, where only 36 (14%) and 83 (83%) cases had no defense wounds. In this analysis, the most susceptible anatomical part was the 30% neck compared to the studies performed in Karachi, where the most usual site was the intestine in 30%.

Conclusion

Most of the cases of acute force trauma were men, and the most common anatomic part of acute force trauma was the abdomen in men and neck in women who were fatal due to bleeding and shock affecting vital organs. The age group however was determined to be between 20 to 40 years of age with maximum percentage.

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Authors Contribution:

[1,3]Substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work & Final approval of the version to be published

[2,4,5] Drafting the work or revising it critically for important intellectual content;

CASE REPORT

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15 Years Old Boy Presenting with Congenital Bilateral Dislocation of Patella

About the Author(s)

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Abstract

Bilateral congenital patellar dislocation is a rare condition. In which the patella are dislocated permanently and it is not possible to reduce them manually. It results due to failure of internal rotation of myotome that forms femur, quadriceps muscle and extensor apparatus. It appears immediately after birth. In rare cases it remains undiagnosed until adolescence. It should be identified as early as possible so that surgical correction may be carried out and complications be avoided. A case of congenital bilateral dislocation of patellae is being presented here.

Key words: congenital patellar dislocation, bilateral patellar dislocation, trochlea, genu valgum, polydacatyly, syndacyly

Conflict of Interest: None **Funding Source**: None

Introduction

Congenital dislocation of patella is a rare disease. Exact prevalence is unknown. In this disease patella is dislocated laterally from the trochlear groove with flexion contracture and valgus deformity of the knee joint.[1] The cause is improper fetal myotome development.[2] It can be diagnosed immediately after birth. Occasionally patient may present after few years with quadriceps weakness and functional abnormalities. There may be other associated lower limb deformities or patient may have polymalformative syndrome.[3] Infants have genu valgum and contracture of the flexed knees.2 This condition is usually diagnosed on clinical findings but radiological investigations have supportive role. X-rays, computed tomography (CT) and magnetic resonance imaging (MRI) are modalities available for confirmation of the clinical findings.[4] Surgery is the mainstay of treatment for this condition. To avoid long term complications, early surgical intervention is needed.[5]

We are reporting a 15 years old boy who presented with congenital bilateral dislocation of patella.

Case Report

A 15 years old male patient presented in outpatient department of orthopaedics of HBSMDC, Islamabad with history of bilateral knee deformity since birth. Patient consulted different hospitals but diagnosis could not be established. Patient had no previous record of check up and investigations.

On examination there were bilateral hypoplastic patella which were dislocated laterally. They were resting adjacent to the lateral femoral condyles. The trochlear grooves were empty.There was also associated genuvalgus with 25degrees angle bilateral, polydactyly and syndactyly of both feet and polydactyly of both hands. The quadriceps were weak and patient had occasional anterior knee pain.

Figure 1: Bilateral patella dislocated

Plain radiographs of both knees were taken in weight bearing position which showed lateral patellar dislocation with trochlear dysplasia.

Patient was admitted and surgical correction of right side was performed by doing supracondylar femoral closing wedge osteotomy and his flexion at knee was performed on reaching 90degrees of flexion patella dislocated so his lateral patellar release and medial plication of patella was done, now on flexion his patella did not dislocate. Wound was closed in layers. Knee immobilizer was applied for six weeks. Patient is being followed up in OPD of orthopaedics. The patella is now in its central position and have not been dislocated after surgical correction. The patient is gaining strength of lower limbs.

Figure 2: x ray both knees standing position

Figure 3: Polydactyly and syndactyly of both feet

Figure 4: Polydactyly of both hands.

Figure 5: post operative x-rays.

Discussion

The congenital abnormalities of patella are absence, hypoplasia and permanent dislocation. In congenital dislocation the patella is constantly dislocated even if the leg is extended. Patella is permanently resting on lateral surface of femoral condyle. Patella is non reducible and needs surgical intervention. It is a rare condition and exact incidence is not known.[6] The disease may affect both legs and sometimes associated with polymalformative syndromes like nail-patella syndrome, Rubinstein-Taybi syndrome and William-Beuren syndrome.[7]

From eighth to tenth weeks of embryo development, there is internal rotation of myotome which leads to formation of extensor apparatus of lower limbs. Non-rotation is considered to be the etiology of this condition.[8]

The diagnosis may be missed at birth. X ray may show dislocation if the child age is 3-5 years and ossification of patella has started. But if ossification has not started, diagnosis may be delayed.[9] x-rays may show the size and position of the patella, hypoplasia of the lateral femoral condyle, diminution of the joint interline and position of tibia.[8] Computerized tomography (CT) scan gives better details of knee joint but due to its ionizing radiation, it is usually not recommended in children.[10] Magnetic resonance imaging (MRI) is a safe alternative to CT and gives good delineation of soft tissue structures.[11]

This condition must be recognized and corrected surgically as early as possible, otherwise patella remains hypoplastic and subchondral cysts can form.[12]

Treatment is mainly surgical in which patella is reduced within the trochlear groove and medialized to increase the length of anterior thigh structures. There are different surgical procedures done. Stanisavljevic's procedure is most commonly done.[8]

There may be recurrence of the deformity but it is rare. Extensor lag may be seen post operatively in few cases.

Conclusion

Congenital bilateral patella dislocation is a disorder that needs to be identified and corrected surgically as soon as possible to improve the quality of life of patient.

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CASE REPORT

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Foreign Body in Vagina an Uncommon Case of Vaginitis in Prepubertal Girl

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Abstract

Foreign body in vagina presents in women of all ages, but is considered as commonest cause of recurrent vulvovaginitis in young females .Here we report 3 years and 7 months old young girl with history of recurrent vulvovaginitis, on examination there was no sign of sexual abuse.Vulva and perineum was normal and hymen was intact ,on rectal examination a hard object felt along entire length of vagina.it was removed from vagina with small artery forceps after retracting labia n vagina with small nasal speculum.

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Introduction

Vaginal discharge secondary to foreign body in vagina is responsible for 4% childhood gynecology outpatient visit.[1] The most common symptoms of foreign body in vagina is foul smelling vaginal discharge with or without bleeding. Vaginal foreign bodies present in woman of all age group although objects found are different among different age groups. In children common objects found are toys, parts of toys, house hold objects.

In prepubertal girls the main presentations are purulent foul smelling discharge which is recurrent & resistant to antibiotics, less common symptoms are lower abdominal pain & urinary symptoms like dysuria, frequency & burning sensation.[2] Here we present a case of 3 years & 7months old girl who had a whistle lodged into the vagina.

Case Report

A 3 years & 7 months old girl living with her mother, father working abroad was presented to us in our OPD with one-year history of repeated ill smelling vaginal discharge. As reported by the mother of young girl there is no associated hematuria or dysuria or history of sexual abuse. Her mother took her to many private clinics in last one year where she was treated by several courses of antibiotics & vaginal Creams without any improvement. Past medical & surgical histories were not significant.

On physical examination, the young girl was vitally stable, but she was an apprehensive child. On abdominal examination she was mildly tender on deep palpation. On genital examination vulva, vagina was normal, hymen was intact on inspection & no signs of sexual abuse were there. Although yellowish discharge was observed. As she was irritable at the time of examination so high vaginal swab was not taken. Her EUA was planned. She was admitted, in her blood complete picture TLC was 11,000 cells\ul, Urine RE was clear and ultrasound showed some hyperechoic linear shadow in vagina. A day before EUA injection ceftriaxone was started.

Figure 1: A 4cm Plastic whistle coated with bloodand vaginal discharge removed from posterior forinx of Vagina

Next day EUA done, on inspection external genitalia was normal, hymen was intact, HVS was taken followed by rectal examination, a linear object was felt along the entire length of posterior vaginal wall. Labia was a parted with nasal speculum, object was pushed anteriorly by finger in rectum and removed from vagina with small artery forcep.at the end vagina was washed with povidone and normal saline solution. She was kept on i\v antibiotics for 24 hours and on oral antibiotics for next 7 days. Two weeks after EUA she was seen in outpatient department and was symptom free.

Discussion

Foreign bodies can be found in different orifices (ear, nose, vaginal) in young children.[3] They are usually reported by parents or relatives. Variety of foreign bodies may be found in vagina like pieces of toys, pencils, hair or safety pins toilet paper mainly in retarded young girls.[4] Sometimes they insert things in vagina out of curiosity.

Regarding foreign body in vagina recurrent vulvovaginits causes ulceration of vaginal wall & could lead to fistula formation.[5]

Commonest symptoms associated with vaginal foreign body are foul smelling vaginal discharge as noted in our case report.

Foreign body should be removed; vaginal wall heals by itself as noted in our case. Presence of foreign body can be because of sexual abuse, so possibility of sexual abuse & UTI must be kept in mind while examining child with vulvovaginits. [6]

At this age hymen is thin, delicate & translucent it might have allowed small object entry.

Chia-woei wang & colleagues[7] have noted that foreign body removal from vagina can be done by continuous flow vaginoscopy, which is successfully removed by hysteroscopy.

Vaginal examination & EUA reveals presence of foreign body in vagina, some imaging technique can also be used as helping tool. MRI is considered as best technique.[8]

Conclusion

Young females of prepubertal age group with persistent or recurrent vulvovaginits, foreign body in vagina should be kept in mind.

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REVIEW ARTICLE

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Challenges to E Learning in medical Education during Coronavirus disease 2019 (COVID-19): A literature review

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Abstract

Background: In the current situation of uncertainty, current study was aimed to review the literature on the known challengesto E-Learning in medical education faced by educators when developing and executing online learning programs for medical students.

Methods: An integrated review was conducted by an inter institutional research team. The search included PubMed, Medline, Google Scholar, Science Direct and Bio Medical sources. Serach terms included challenges, online learning, Medical educators, development, barriers, solutions and digital literacy. The search was carried out by two reviewrs. Screening of titles and abstracts was done autonomously and inclusion and exclusion criteria was defined. Articles to be included were selected consensus was drwn on which articles to be included. Data extraction was completed using the Cochrane Data Extraction Form and a modified extraction tool.

Results: Among the 38,875 abstracts identified from the search, ten full-text papers met the inclusion criteria. Data extraction was completed on seven papers of high methodological quality and on three lower quality papers. Findings suggest that the key barriers which affect the development and implementation of online learning in medical education include time constraints, poor technical skills, inadequate infrastructure, absence of institutional strategies and support and negative attitudes of all involved. Solutions to these include improved educator skilld, incentives and reward for the time involved with development and delivery of online content, improved institutional strategies and support and positive attitude amongst all those involved in the development and delivery of online content.

Conclusion: This review has identified barriers amongst medical educators to the implementation of online learning in medical education throughout world.

Keywords: E-learning, Online learning, Medical education, Medical faculty, Challenges, Pandemic

Conflict of Interest: None **Funding Source**: None

Introduction

In early December 2019, there was an outbreak of coronavirus disease 2019 (COVID-19), in Wuhan City, China. It was declared a Public Health Emergency of International by World Health Organization (WHO) in January 2020. Perceived risk of acquiring disease led many governments to impose a variety of control measures from curfews to lock downs. This led to closure of all of classrooms all over the world and forced 1.5 billion students and 63 million educators[1,2] to suddenly modify their face-to-face academic practices, wherever possible. The digital transformation of education systems in all levels has allowed incorporating a new teaching–learning ecosystem called e-learning. This led to cancellation of almost all clinical placements of medical students stopped as health-care settings focused on the care of patients with COVID-19 and teaching in classrooms and laboratories was stopped, leaving students to continue their studies remotely. We all know that Practice-based learning is the mainstay of the medical education. Hospitals, clinics, and community services are where future doctors learn, polish professional characteristics, and develop an alignment to patient-focused care that shape their practice. The COVID-19 pandemic has had devastating effects on

medical education resulting in worldwide disruptions not only to the healthcare system but also to medical education. [3]

As a result of lock down not only students, but the public as a whole has had travelling restrictions. Educational institutes and universities including all medical colleges were forced to stop operations physically with commencement of online learning activities. This became a challenge as clinical teachings required students to be in the healthcare setting which is considered as very high risk. Worldwide, many schools of medicine had to halt their clinical teachings and assessments. [4]

In the United Kingdom, some teaching hospitals that have had reports of COVID-19 cases adjourned teaching and clinical attachments.[5] In the US, discontinuation of clinical teaching activities for minimum two-week was indorsed by the American Association of Medical Colleges (AAMC).[6] In Australia and New Zealand, most medical schools converted to online teaching in the last 2 weeks of March of 2020.[7] Simultaneously in Singapore, full lockdown was endorsed and complete termination of activities were imposed in April 2020.[8]

Medical education in India also experienced a major troublesome change as a consequence of the COVID-19 Pandemic and nation-wide lockdown since March 2020. Measures to prevent spread and to guarantee social distancing led to the closure of medical schools and have forced the situation of working from home for both medical teachers and students. [9] The government of Pakistan suspended all activities in its institutes and universities. This helped in preventing spread of the pandemic; by keeping all those exposed safe, the critical issue to be addressed was continuing medical education.[10] Medical education is about highlighting and displaying good practices to trainees, which is the basis of good professionalism in medicine.[11] this helps to enhance students' responsibility, regular observation of their work, opportunities to practice problem solving skills, and attending to patients.[12]

Educational activities include LGIS, SGDs, Tutorials, Practicals, Skill lab performances, seminars bedside teaching, outpatient clinics teaching, and inter and intradepartmental clinicopathological (CPC's) meetings. There has been no review of evidence of challenges faced during online medical education at the discretion of the medical educator but there has been completed work on student barriers and solutions to improve online learning till date [13,14,15] Therefore this review aims to fill this gap in literature. We have done a literature review of online evidence to summarise information on the challenges faced due to COVID-19 pandemic on all such online medical education activites and challenges that were faced to chalk out solutions.

Material and Methods

A review of the available literature was done to scrutinize it for inclusion of studies with varied methodologies such as those with both experimental and experimental designs. The Whittemore & Knafl framework was used to strengthen the rigour of the review.[16] The process involved the following five steps: identification of the research problem; execution of a well-defined literature search; data quality appraisal of the literature; analysis of the data; and declaration of conclusions. Studies using different research designs were included with the aim of presenting diverse perspectives and expanding knowledge.

Search strategies

A team of researchers consisting of six members developed a search strategy. Database included in the study were: PubMed, Medline, Google Scholar Science Direct, Bio Medical, JSTOR and Scopus. After a robust search on these databases Boolean operators (AND, OR) by means of the search terms "online learning", "distance learning", "challenges for medical educators" in online teaching and "digital literacy" have been used. The search was completed by researchers independently to certify that all relevant data was counted in. This is done by exploring the titles and abstracts independently. This was followed by analysing input from all authors to ensure that the results are the same. All included abstracts were explored for full text articles to be finally included or excluded from the study .

Inclusion and exclusion criteria

Consensus was made to include all the data, available in English language being published between March to August 2020 concentrating on the difficulties being a challenge for medical educators were involved. Scientific publications that considered distance learning / learning through electronic mode in undergraduate and postgraduate non-medical were omitted as well as the studies without experimental research and in languages other than English were not considered.

Data appraisal

Total ten articles were included in review after accomplishment of evaluation of the data by two reviewers through Critical Appraisal Skills Programme

(CASP) Qualitative Research Checklist for qualitative studies.[17]

Data extraction

Researchers performed data abstraction by using Supplementary Guidance Notes for Inclusion of Qualitative Research in Cochrane Systematic Reviews of Interventions from the included papers.[18]

Data analysis

For the mixed method studies thematic analysis was incorporated. Consensus was developed on analysis and coding under two headings i.e. 1. Implementing online teaching 2. Challenges to the implementation of online teaching. Concluding themes were approved by all authors.

Results

Search results

The initial search yielded 38,875 abstracts across all sources. A total of 38,765 articles were excluded following first evaluation of the literature rendering only 110 full text articles suitable for review (see Fig. 1 Algorithm of study selection). One hundred of these particular studies didn't not meet the contributor criteria were omitted. Rest of the 10 studies fitted into the inclusion criteria, were scrutinized for concluding analysis. Research team finally agreed upon four themes. These clusters are inclusive of barriers to the formulation and employment of online learning (see Fig. 2 Key themes recognised by coding process).

Expertise Lack: There is a large number of available technologies for online education but sometimes they create a lot of difficulties both for educators and learners. Insufficiencies in the skill area comprise poor fidelity of existing arrangements, connection / access instability; inadequate hardware / software; setup problems; insufficient organizational set-up; and scarce technical support. Not only this but there is also a lack of exposure to the clinical work as all treatment sessions are suspended. In addition to these medical students were not exposed to patients to mastery in taking history and treatment procedures such as catheterization and placement of intravenous cannula (IV). [19]

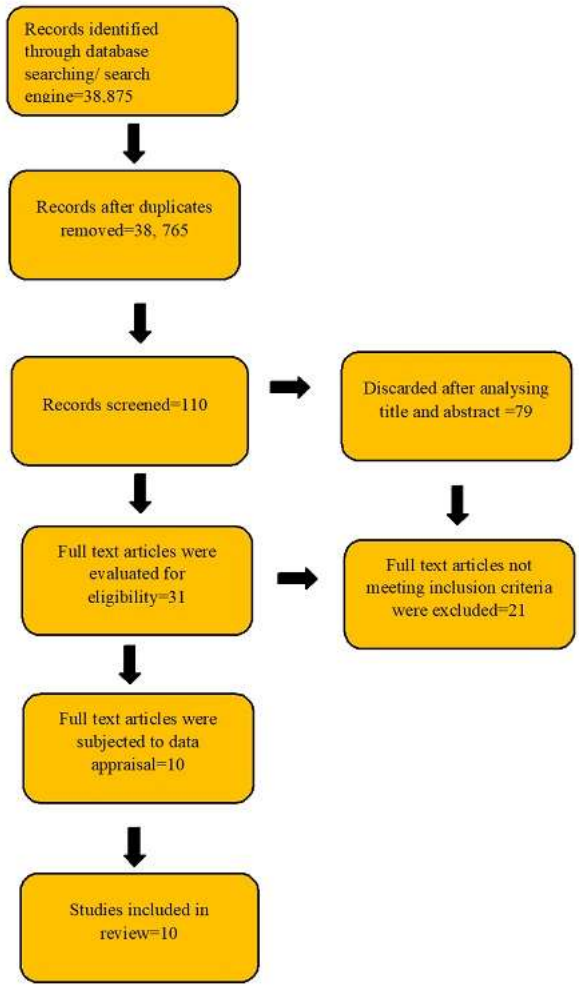

Fig.1 alogrithem of study selection

Time Deficit: Medical instructors find it difficult in fact, to devote plenty of time to complete online teaching, and uphold a work life balance in personal life chores. Therefore, inadequate time to offer to the be master in execution of online learning methods can be seen as a substantial barricade.

Gadget Deficit: In most of the families there is inadequate number of existing digital devices like mobile phones computers and tablets to be provided for online education.

Attitude Deficit: There is pronounced lack of awareness and interest of medical teachers to accept a new teaching approach. Instructors feel overburdened with the whole method of acquaintance with new approaches and having very less tolerance for rectification of negligeable technical problems.

Communication Deficit: There is no face-to-face interaction of students with their teachers in distant learning predisposing to lack of students' interest. This poses a major challenge of one-sided interaction.

Motivation Deficit: Some online learning approaches may not be interesting, while others may be difficult to get acquainted with. The hardest thing is that there are no colleagues or teachers who can encourage you to continue. The risk of being alone is another destructive feature. While online learning effects each student in its own way, it essentially sets him apart from other students.

Burn out: It is difficult for faculty and students to familiarise with emerging teaching and learning environment. There is lack of concentration during online instruction due to lack of eye contact, role modelling, and teaching place environment. Facing many demands as learners combine learning, work and family. Students can become overly stressed, or "burned out.

Fig.2 key themes recognized by coding process

Domestic barriers

The home environment is not conducive to the teaching and learning process. Students living in far-flung areas face difficulties in accessing online forums. Socioeconomic status affects computer ownership and ability and to pay for internet software and hardware. Impact of poverty also effects motivation for online classes

Institutional barriers

Administrative barriers comprise of a diversity of types such as backing facilities, pedagogy, and reachable course proposal.

Discussion

This review has thematically produced data comprehending substantial problems during implementation of online teaching. These comprised of various technical resources, learner related, domestic and institutional barriers with similar themes across many studies. This emphasises the ubiquity of barriers to online learning across diverse medical education systems all over the world during pandemic when it became inevitability to continue medical education. Literature on online medical education from different countries of the world suggest that various strategies have been in use for delivery of content online. Multiple podiums can be used to impart knowledge of the major bulk of pre-clinical subjects including anatomy, biochemistry, physiology, pharmacology. According to Miller's pyramid in medical education, most of the skills students must be trained in, for these subjects, are up to understanding of the concept.[20]

Although there is no face-to-face communication in online learning strategies being used therefore hands-on skills cannot be practiced in clinical years. In most of institutes, to overcome this, numerous videos attractively narrating and describing communication as well as clinical skills have been used. Other methods include simulated patients modelled by the lecturers or to clarify history taking on someone else simulated after practice. Even after all these adoptions students are prompted that this only theory, they would still be encouraged to perform the clinical examinations and hands-on sessions later after reopening of medical colleges. Few of them have described the same on the transformed method in education of the students of clinical years.[21,22,23]

Literature suggests that the best way to combat this by guaranteeing basic digital mastery (including fundamental knowledge of computer hardware), familiarity with the frequently mostly used programs, and know what support to look for when technical issues arise. Literature also stresses on the necessity of robust organizational backup support to cater such developments. Implementation of such programmes proved to be unsuccessful with lack of official backing and inadequate support elaborating the utilization of proper tools or programs.[24] It is strongly recommended that every institute must have clear and documented institutional strategy when implementing online learning.[25] Data reveals a requirement of harmony among the faculty members of different disciplines in clinical and preclinical departments to assurance of provision of congruous education for future doctors.[26]

Most of recognised themes in the current review are in agreement with former studies being published in context of health profession education. Childs et al in his study

clearly identified problems and their remedies for purposeful e-learning of health professionals and medical students. In the study they recognised unacquaintance with applied skills as major hinderance in smooth delivery of e learning and proposed the solutions to the above mentioned.[27] Pettersson & Olofsson highlighted on poor educator skills as a barrier which is consistent with current review.[28] The solution to this problem is introduction, implementation and proper follow up of basic computer mastery strategy was proposed by Childs et al. Time supposed to be one of the substantial barriers in the implementation of e-learning mechanics highlighted in present study is in accordance with the findings of Pettersson & Olofsson. They found out that there is inadequate time available for mastery in the newly emerged instruction strategies for the faculty consequence of which are toxic for self-confidence. Time constrains increased anxiety of faculty who is anxious about the teaching and administrative aspects of online teaching.[28] To permit teachers, the important chance to learn new advancements, organizations ought to consider ensured time for instructors to build up these abilities, learn ideas and duplicate on rehearses.[29]

Conclusions

The Coronavirus pandemic carried a stop to preclinical and clinical involved instructing because of security reasons. The issues are more to clinical versus the non-clinical years. Schedules made should be in order to make the students ready for the clinical sessions later Covid free period This pandemic has skilled the medical instructors to acclimatize to variations and heighten the use of technology, henceforth not hindering entirely the progression of teaching and learning. In this esteem however, more backing needs to be prearranged by medical organisations to provide support guarantying technical and mental health for the teachers and students both.

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