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Medical Negligence : A Burning Issue

Syed Shaiful Islam^{1*}

Medical negligence is defined as any act of omission and commission by a physician during treatment of a patient that deviates from accepted norms of practice in the medical community and causes an injury to the patient. Medical negligence or malpractice is a specific subset of tort law that deals with professional negligence.

Medical negligence also known as medical malpractice, medical errors and tort system is gradually and progressively is an increasing public health concern among healthcare providers worldwide as it affects patient safety. It poses a significant risk of patient injury, disease, disability or death.

The most comprehensive definition is **“An act of omission and commission in planning or execution that contributes or could contribute to an unintended result”**.¹

All clinical practitioners and healthcare providers (e.g. Physicians, nurses, medical technicians, paramedics, and other healthcare professionals) are responsible for any mistakes that could lead to medical negligence. There are several areas where medical negligence can arise, such as technical errors during surgical procedures, misdiagnosis of the disease, or prescribing the wrong medicine or incorrect dose.² These practices pose a significant risk of patient injury, disease, disability, or death. Subsequently, it may give rise to criminal and financial liabilities on hospitals and healthcare institutions.^{3,4} Medical negligence lawsuits are focused on the medical professional's damage, injury or failure to the patient. In general, medical negligence relief is given by means of penalties, i.e. monetary compensation.^{5,6}

Medical negligence has been recognized for a long time by many researchers from different backgrounds. Several previous studies focused on the economic burden of medical negligence either on clinical practitioners as individuals or healthcare organizations as a management system. However, due to the complicity of this issue, it is not easy to estimate the exact cost of liabilities and compensations on doctors, hospitals, and healthcare organizations.⁷

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The patient or the claimant has the right to file a lawsuit against clinicians by proving the following: the clinician owes a duty of care, there was a breach of that duty, and that breach caused the injury or damage.⁸⁻¹⁰ Many previous studies focus on the estimation of annual cost and the financial liabilities on both the public and the private healthcare systems. The cost is not only the direct monetary expense that the doctors must pay but it also includes indirect costs such as physician's time, stress, and loss of reputation.¹¹ Every year, thousands of cases are filed in the courts against healthcare professionals due to tort cases.¹² Despite the high occurrence of these cases, medical negligence is claimed to be under-reported in most healthcare settings.¹³ It is, therefore, difficult to provide accurate statistics about medical negligence cases due to difficulties in analyzing and evaluating.^{14,15}

Criminal and financial liabilities arising due to medical negligence and the increasing demand to improve patient safety and quality care, there is an increased international focus on improving patient outcomes, safety, and quality of care that has led stakeholders, policymakers, and healthcare organizations to adopt standardized processes for evaluating healthcare organizations. Hospitals and healthcare organizations are now adopting standardized processes and an international accreditation system.¹⁶ The accreditation and certification system provide recommended guidelines and international standards to improve healthcare and patient safety in hospitals. The result is certification by an independent external auditor. Despite the national and international strategies for pushing hospitals and healthcare centers to be certified by recognized accreditation bodies, patient safety remains below the acceptable levels.

It is challenging to provide consistent solutions to eliminate or minimize recurrent events and work toward improving patient safety.¹⁷ It is essential that the governing bodies for the healthcare system should enforce hospitals to establish a litigation system by providing guidelines and steps to resolve the matter either by out of court settlement or a full court trial. This system should include effective policy and procedure to ensure high standards of effectiveness, transparency and justice for all the involved parties.¹⁸

It may be conclude that research on medical negligence is getting the attention of the researchers, which has resulted in a sharp increase in the research output during the last two decades. This is of significance as the WHO set in motion a patient safety program almost two decades ago in the year 2004 recognizing deficiencies in patient safety as a global healthcare issue to be addressed (WHO, 2004).

Research on medical negligence is mostly concentrated in developed countries and contributing authors are inclined towards collaborative research. It is recommended to replicate this study after ten years to observe future research trends in the field.

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Application of Bethesda System in the Evaluation of Cervical Lesions by Conventional Paps Smear and its Histomorphological Correlation in a Tertiary Level Hospital in Bangladesh

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ABSTRACT

Background: Carcinoma of cervix in one of the commonest causes of death among the women in developing countries. This is due to lack of awareness to do the screening test that detect early precancerous lesion of cervix by conventional Pap smear study. The objectives of study is to assess the use of Pap smear as a screening test to detect precursors lesion in cervix and correlation the findings with histomorphologically.

Materials and methods: It's a retrospective study that carried out in CMH Chattogram. 550 patients were included the study who were attended Gynae OPD for various gynaecological problems and sent for Pap smear study. Sample also received from different hospitals and clinics of Chattogram city. Sample collected and tested as conventional Pap smear and evaluated by Bethesda system. Around 80 patients advised to do colposcopic biopsy for histopathological correlation.

Results: Total 550 cervical smears were evaluated during the study period and 20 samples were unsatisfactory due to inadequate sample. Age ranges were 20-70+ years and divided in 03 groups. Median age was 37.5. Largest number of samples from 40-59 years of age. Most common findings were inflammatory smear (43.40%) as vaginal discharge were the commonest problem followed by LSIL (10.56%), ASCUS (5.28%) and HSIL (3.77%). The findings were correlate with histopathological findings. The sensitivity, specificity, PPV, NPV and diagnostic accuracy was lower in low grade intraepithelial lesions (LSIL) than high grade intraepithelial lesions (HSIL & SCC). Here sensitivity 58.39%, specificity 94.06% and diagnostic accuracy 76.09% in LSIL whereas in HSIL it was 86.46%, 98.12% and 81.71% respectively. Overall sensitivity and specificity were 50.22% to 98.37% and 82.53% to 99.03% respectively. Diagnostic accuracy was 60.83% to 92.40%.

Conclusion: Although Pap smear is the conventional tests but still have high sensitive and specific methods to detect early precancerous cervical lesions. To prevent mortality rate from cervical cancer, awareness should develop among women to perform cervical smear test in certain intervals.

Key Words : Bethesda system; Cervical lesion; Paps smear.

Introduction

Carcinoma of cervix is one of the leading cause of death in women worldwide. It comprises 12% of all cancers in women globally. This is the most common gynaecological malignancy and one of the leading causes of death in developing countries. Bangladesh has the highest incidence and mortality rates due to carcinoma of cervix among the women. Every year about 12000 new cases of cervical cancer detected and 6000 women die of the diseases.¹ The presenting symptoms of carcinoma of cervix are abnormal uterine bleeding especially post-coital

bleeding, pain and discharge.² About 4 lacs new cases of carcinoma of cervix are diagnosed per year in worldwide and 80% of the patients in the developing countries. About 5-13 million women have precancerous lesions of cervix in developing countries. Carcinoma of cervix is a preventable disease, by early detection and appropriate management of its precursor lesions. The sensitivity of cervical smear in the diagnosis of High-Grade Intraepithelial lesion (HSIL) is 70-80%.³ The Human Papilloma Virus (HPV) plays an important role in carcinoma of cervix and the HPV DNA testing is associated with pap smear that increases the sensitivity of cancer screening. Pap smear test is very simple, more convenient, relatively inexpensive and more reliable test for early detection of the cervical lesion. The most widely used system to evaluate Pap smear result is The Bethesda System (TBS). The present study was conducted to determine the cervical intraepithelial lesions by applying the latest Bethesda system.

The invasive cervical cancer usually preceded by intraepithelial lesion that is sometimes difficult to manage. If we can detect the intraepithelial lesion by conventional Pap smear easier to treat the patient successfully and thereby save the patient life. The role of Pap smear as a screening

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test of carcinoma of cervix has been evaluated by several studies in the last 50 years.⁴ By applying the method has been reduced the incidence and mortality rates of carcinoma of cervix in the developed countries.⁵ The success of Pap smear cytology in America and Europe has been achieved as a results of organized Pap smear screening programs. Cervical smear screening programs were introduced in different countries and they performed the efficacy of cytology screening programs. The International Agency for Research on Cancer (IARC) has assessed the results of cervical smear and found that overall reduced the incidence of cervical cancer. The mortality rate of carcinoma of cervix has significantly reduced if a women is screened regularly above the age of 40 yrs.⁶

Materials and methods

This is the prospective study that was carried out at Combined Military Hospital (CMH) Chattogram Cantonment. Specimen were also received from different hospitals of Chattogram city during the period from Jan 2020 up to December 2021. Total 550 patients were selected and screened for cervical lesions. The age of patients were in the range of 20-70 years, with the complaints of vaginal discharge, bleeding per vagina or post coital bleeding. Patients' history with sign, symptoms and parity were recorded. Sample were collected by trained nurses by using Ayres wooden spatula from both ectocervix and endocervix. Smears were prepared, labeled, immediately fixed in 95% ethyl alcohol in a coplin jar. Smears were stained by Papanicolaou stain. After staining, slides were screened by cytopathologist and reported by using the 2014 Bethesda system. The objective of the study was to screen the abnormal cervical lesions of patients having clinical sign and symptoms. This study was approved from ethical committee of hospital authority. Data was analyzed statistically in conventional SPSS software version 14.0.

Results

Total 550 cervical smear samples were assessed during the period of study. The patients age were from 21-70+ yrs and mean age was 38 yrs. Twenty (3.64%) patients smears were found unsatisfactory due to inadequate samples. Rest 530 patients smear were evaluated for cervical lesions.

Table I The distribution of patients age

Age group	Number of patients (n=530)	Percentage
20-39	134	25.28%
40-59	316	59.62%
61-70+	80	15.10%
Total	530	100%

In Table I shows most of the patients (59.62%) were in the age group of 40-59 yrs followed by 25.28% in 20-39 yrs and 15.10% over 60 yrs of age.

Table II The common symptoms of patient

Symptoms	No of patients (n= 530) (100%)
Per vaginal discharge	212 (40%)
Lower abdominal pain	36 (6.8%)
Low backache	28 (5.28%)
Post coital bleeding	46 (8.68%)
Post-menopausal bleeding	30 (5.66%)
Routine screening	178 (33.58%)
Total	530 (100%)

Table II shows in present study the common symptoms were per vaginal discharge (40%) followed by post coital bleeding (8.68%). The routine screening of cervical smears were done in 33.58% cases.

Table III Relation of age with various cervical intraepithelial lesions (n= 530)

Age group (years)	21-40	41-60	61-70+	Total (n=530)(%)
NILM	72	38	30	140 (26.41%)
Inflammatory	112	80	38	230 (43.40%)
Atrophic changes	-	06	18	24 (4.53%)
Radiation changes	01	02	03	06 (1.13%)
ASCUS	06	14	08	28 (5.28%)
AGUS	02	05	05	12 (2.26%)
LSIL	08	30	18	56 (10.56%)
HSIL	02	06	12	20 (3.77%)
SCC	01	04	07	12 (2.26%)
Others*	-	01	01	02 (0.4%)
Total	178	224	128	530 (100%)

*Others-Adenocarcinoma.

In Table-III, Most of the cases were inflammatory lesion (43.40%) followed by NILM (26.41%). The inflammatory lesions included bacterial vaginosis, candidiasis, trichomoniasis, herpes simplex virus infection and reactive cellular changes. The cytological examination of the smears showed 43.40% (n=230) inflammatory smears, 26.41% (n=140) normal smears including atrophic changes, 4.53% (n=24) cases show features of atrophic smear, ASCUS 5.28% (n=28) LSIL 10.5% (n=56), HSIL 3.77% (n=20) and SCC 2.26% (n=12) and 0.37% (n=02) cases were adenocarcinoma. Radiation changes were seen in 1.13%(n=06) cases. Of all the smears studied 3.6% (n=20) cases were inadequate that excluded from results. The most common findings are Inflammatory smears in 20-40 years age group where as epithelial cell abnormalities were common in > 60 yrs followed by between 41-60 years (Table-II). Other than inflammatory lesion and NILM, Cytologically positive cases of ASCUS, AGUS, NILM, HSIL, SCC and other cancers need special attention to confirm the diagnosis and further follow up. Total 80 cases sent to do colposcopic examination followed by biopsy and histopathological examination.

Table IV Correlation of Paps smear and histopathological diagnosis

Pap Smear	Total n=80	Histopathological diagnosis					
		Chronic cervicitis	CIN1	CINII	CINIII	SCC	Adeno-carcinoma
Chronic cervicitis	20	16	04	-	-	-	-
ASCUS	22	06	08	06	02	-	-
LSIL	16	04	10	02			-
HSIL	12	00	00	02	06	04	-
SCC	08	00	00	00	02	06	-
AGUS	02	00	-	-	-	-	02
Total	80	26	22	10	10	10	02

*p value<0.001.

This Table IV shows histopathological correlation of patients with Pap smear findings. Here 22 patients were diagnosed as ASCUS and its histopathological findings were 06 cases chronic cervicitis, 08 cases CIN1, 06 cases CINII and 02 cases were CINIII. LSIL were 16 cases, among them 04 were chronic cervicitis, 10 cases CIN1 & 02 cases CINII and 12 cases were HSIL. Histopathological findings were almost coinciding with CINIII except 02 cases were CINII. In cytologically suggests SCC were 08 cases but histology was 06 cases invasive SCC and 02 cases were CINIII. Overall sensitivity and specificity were 50.22% to 98.37% and 82.53% to 99.03% respectively.

Table V Statistical values of Pap smear with histopathological findings for different abnormal epithelial lesions

Parameters	Chronic cervicitis	ASCUS	LSIL	HSIL	SCC
Sensitivity	50.22	50.78	58.39	86.46	98.37
Specificity	82.53	85.19	94.06	98.12	99.03
PPV	40.18	48.03	52.62	84.23	92.11
NPV	59.74	68.44	77.09	79.54	93.78
Diagnostic accuracy	60.83	69.16	76.09	81.71	92.40

Table V show in sensitivity, specificity, PPV, NPV and diagnostic accuracy was lower in low grade lesions (LSIL) than high grade lesions (HSIL & SCC). Here sensitivity 58.39%, specificity 94.06% and diagnostic accuracy 76.09% in LSIL where as in HSIL, it was 86.46%, 98.12% and 81.71% respectively. Overall sensitivity and specificity were 50.22% to 98.37% and 82.53% to 99.03% respectively. Diagnostic accuracy was 60.83% to 92.40%.

Discussion

Carcinoma of cervix is widely screened cancer in all over the world. Cervical carcinoma has reduced its incidence and mortality rate up to 80% in developing countries in last 5 decades by pap smear screening programme in every 3–4 years.⁷ This study was based on “The Bethesda System” which was introduced in the year 1988 under national cancer Institute.⁸ Under the leadership of Dr. Ritu Nayar and Dr. David C. Wilbur, a significant number of

updates occurred in 2001 and in 2014 TBS revision, which is continued till to date by following the system.⁹ This study was designed by following updated The Bethesda System 2014.

The most common presenting symptoms that indicated for Pap smear cytology was vaginal discharge (40%) followed by post coital bleedings (8.78%) almost similar to other studies.¹⁰⁻¹² Inflammatory changes were the highest number (43.30%) of patients that was close to (42.66%) Sachan, et al A large number of Low Grade Squamous Intraepithelial Lesion (LSIL) in female may be missed if the inflammatory lesions are not evaluated further by pap smear.¹³ In the present study, most abnormal cytology was detected in patients in the age group of 60+ years. Here Low Grade Squamous Intraepithelial Lesion (LSIL) and High Grade Squamous Intraepithelial Lesion (HSIL) were found in 10.56% and 3.77 % respectively of the women in various age groups. Vaghela et al reported that LSIL was the common intraepithelial lesion that was found in 12.4% of cases, followed by HSIL in 5% cases that was higher than our study.¹⁰ Our study shows that ASCUS was 5.28 % while Padmini et al showed 8% of ASCUS.¹⁴ The diagnosis of ASCUS is important because it may progresses to HSIL and squamous cell carcinoma. This study shows 60% of all abnormal intraepithelial lesions in women over 40 years. With the advancement of age, the incidence of high-grade epithelial lesions also increases proportionately. In a study by Ranabhat SK et al 70% of abnormal intraepithelial lesions were found over 40 years of age. Most of the carcinoma of cervix like squamous cell carcinoma may developed after the age of 40 years, therefore women above 40 years should checked cervical smear for a periodic interval.¹⁵ Present study 72% cancer was found over 40 yrs that match with above studies.

In our study, diagnostic accuracy of Pap smear for low grade and high grade intraepithelial lesions were upto 92.40%. Cervical biopsy was done in 80 patients, the overall sensitivity and specificity of Pap smear for low grade and high grade intraepithelial lesions was 50%-98% and 92%-99 % respectively with a predictive value of 40-92%. Pap smears overestimated the low grade and high grade intraepithelial lesions in 15% of cases and 4% of the cases was not detected. Sankaranarayanan et al., reported the sensitivity of conventional cytology between 37.8–81.3% at ASCUS, 28.9–76.9% at LSIL and 24.4–72.3% at HSIL.¹⁶

According to the American Cancer Society, the Pap smear test is a routine screening method for preinvasive and invasive cervical cancer that should be done every 3 years interval and Pap smear along with HPV DNA test is highly recommended as a screening method every 5 years.¹⁷

Conclusions

The Bethesda System (TBS) is an effective tool for evaluation of cervical smear in women over the age of 30. It evaluates cytologic-histologic correlation and also helps in research activity of epidemiological and pathology of cervical diseases. It also provides reproducible and reliable data for statistical analysis comparisons. Paps smear is least invasive, low cost and very simple procedure for screening methods for detection of malignancy, low grade and high grade intraepithelial lesions and also inflammatory lesions of cervix. It is established that routine screening of pap smear procedure reduces the treatment burden, early morbidity and mortality of patient. Therefore, still it is considered as gold standard methods of cervical screening test. The women should be educated properly about the Pap smear test through widespread media and educational programs.

Disclosure

All the authors declared no competing interests.

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Evaluation of Posterior Capsular Opacification: Phacoemulsification Versus Small Incision Cataract Surgery

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ABSTRACT

Background: Posterior Capsular Opacification (PCO) is the most common late complication of uncomplicated cataract surgery, occurring in upto 20-25% of patients by two years postoperatively. PCO is caused by lens epithelial cells that remain in the capsular bag after cataract surgery. They migrate, proliferate and transform to produce Elsching's pearls and capsular fibrosis. When PCO encroaches on to the visual axis, it produces light scattering and visual deterioration. Visually significant PCO is usually managed by creating an opening within the opaque posterior capsule using the Neodymium: Yttrium Aluminum Garnet (Nd: YAG) laser. With modern techniques and IOLs, the expected rate and subsequent Nd: YAG laser posterior capsulotomy rate is decreasing to less than 10%. The aim of this study was to compare the rate of PCO in Small Incision Cataract Surgery (SICS) and phacoemulsification.

Materials and methods: It was a prospective randomized study conducted on three hundred patients (300 eyes) at CMH Chattogram from December 2020 to December 2022. Three hundred patients were divided into two groups. Group A consists of 150 patients (150 eyes) for SICS. Group B consists of 150 patients (150 eyes) for phacoemulsification. On postoperative follow up development of posterior capsular opacification and Nd: YAG laser capsulotomy rate was evaluated.

Results: Study shows that after 2nd month postoperatively no patient of either group developed PCO. In Group A (SICS) after 3rd month follow up 9(6%) patients had PCO and after 6th month follow up 28(18.66%) had PCO. In Group B (Phaco) after 3rd month follow up 3(2%) patients had PCO and after 6th month follow up 17(11.33%) had PCO. Comparing the both groups by SPSS version 16. The difference was statistically significant ($p < 0.02$).

Conclusion: PCO after cataract operation is more in SICS than phacoemulsification.

Key words: Elsching's pearls; Neodymium: Yttrium Aluminum Garnet (Nd: YAG) laser; Phacoemulsification; Posterior capsular opacification, Small Incision Cataract Surgery (SICS).

Introduction

Any opacification of lens substance or its capsule at any age is called cataract. It is the most common cause of visual impairment and blindness throughout the world. There are wide variety of causes for development of cataract but cataract due to aging process is the most common.¹ Other frequently associated risk factors are ocular trauma, certain eye diseases (eg. Uveitis, high myopia, retinitis pigmentosa etc.) some drugs (eg. Steroid, gold), diabetes, ultraviolet radiation and smoking.³ Here lenticular opacification blocks transmission of light resulting in visual impairment, difficulty in colour appreciation and changes in contrast and glare from bright lights.³

It causes reversible blindness in more than 18 million people all over the world, representing almost the leading cause among all causes of blindness due to ocular diseases globally.³ However, surgical treatment is the only treatment option for improvement of the visual acuity due to cataract.

There are two main surgical techniques for removal of cataractous lens by Extra Capsular Cataract Extraction (ECCE): Small Incision Cataract Surgery (SICS) and Phacoemulsification. In SICS, after opening anterior lens capsule, nucleus and cortical matter of the lens are removed, leaving the posterior lens capsule intact to place the artificial Intra Ocular Lens (IOL) within it. This can be done through a small incision, where suture is not required.⁴ Phacoemulsification is a modified and modern version of ECCE for removal of cataractous lens. Here, Ultrasound is used for emulsification of cataractous lens then aspirated while leaving posterior lens capsule intact to hold IOL in place. In phacoemulsification a smaller incision is required than that in SICS, so faster healing and early rehabilitation occur in this procedure.⁵

The most common late complication of modern cataract surgery by means of SICS or phacoemulsification is posterior capsular opacification. The prevalence of occurring

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is upto 50% of patients by two years postoperatively.⁵ Capsular opacification results from continued proliferation of viable remaining epithelial cells after removal of the nucleus and cortical matter. These cells proliferate in several patterns eg, Elsching's pearls, fibrous metaplasia and capsular fibrosis.⁶ When PCO encroaches on to the visual axis, it causes scattering of light rays resulting in visual impairment. It is usually managed by creating a circular or cruciate opening into posterior capsule by using the Neodymium: Yttrium Aluminum Garnet (Nd: YAG) laser. The expected rate of posterior capsular opacifications and subsequent Nd: YAG laser posterior capsulotomy rate is decreasing to less than 10% by using modern surgical techniques and IOLs.^{7,8}

Materials and methods

It was a prospective study conducted on three hundred patients (300 eyes) at Combined Military Hospital (CMH) Chattogram during the period from December 2020 to December 2022. Three hundred patients were divided into two groups. Group A consists of 150 patients (150 eyes) for SICS. Group B consists of 150 patients (150 eyes) for phacoemulsification. Randomization was done on the desire of the patients after explaining them the two methods of surgery, benefits and cost of either method. Patients opted for SICS (Group A) mainly due to financial reason as it is cheap. Some patients were also placed in Group A by the surgeon as they were not indicated for phacoemulsification because of too hard cataract. Patients having no financial crisis and with not too hard cataract were placed for Phacoemulsification (Group B). All the included patients were age related cataract patients and age of the patients were more than 50 years. Patients with complicated cataract, previous history of intra-ocular surgery, posterior capsular tear, vitreo-retinal diseases, prior laser treatment, uveitis, ocular trauma etc. were excluded from the study groups.

Patients to be studied were well explained in detail about the disease process, methods and risks of techniques and then informed written consent were taken before conducting the study maintaining the principles of Helsinki declaration. On postoperative follow up, development of posterior capsular opacification and Nd: YAG laser capsulotomy rate were evaluated. Every patient was followed up on 1st, 7th, 15th and 30th post-operative day. In each follow up visual acuity, anterior and posterior segment examination was done. Then every patient was evaluated at one, two, three and six months interval after surgery for the development of PCO. Eyes which lose 2 or more lines of visual acuity with a clinically significant opaque posterior capsule evaluated by slit lamp biomicroscopy were labeled as clinically significant PCO and were treated with Nd: YAG laser capsulotomy. Data were recorded in a pre-designed data collection sheet and were analyzed by computer based software SPSS. Data was compared by Z test. p value of equal or less than 0.05 was considered as significant.

Results

Out of 150 patients in Group A, 73 (48.66%) were male and 77 (51.33%) were female. In Group B, 72 (48%) were male and 78 (52%) were female. In both group age of the patients were within 50-70 years.

In Group A, after 1 month follow up 9(6%) had Visual Acuity (VA) <6/60, 39(26%) had VA 6/60 to 6/18, 102 (68%) had VA 6/12 to 6/6. After 2 months follow up 6(4%) patients had VA <6/60, 27(18%) had VA 6/60 to 6/18, 117(78%) had VA 6/12 to 6/6. After 3 months follow up 5(3.33%) patients had VA <6/60, 30(20%) had VA 6/60 to 6/18, 115(76.66%) had VA 6/12 to 6/6. After 6 months follow up 2(1.33%) patients had VA <6/60, 39(26%) had VA 6/60 to 6/18, 109(72.66%) had VA 6/12 to 6/6 (Table-I).

In Group B, after 1 month follow up 6 (4%) had Visual Acuity (VA) <6/60, 30 (20%) had VA 6/60 to 6/18, 114 (76%) had VA 6/18 to 6/6. After 2 months follow up 3 (2%) patients had VA <6/60, 21 (14%) had VA 6/60 to 6/18, 126 (84%) had VA 6/18 to 6/6, After 3 months follow up 3 (2%) patients had VA <6/60, 23 (15.33%) had VA 6/60 to 6/18, 124 (82.66%) had VA 6/18 to 6/6. After 6 months follow up 2 (1.33%) patients had VA <6/60, 16 (10.66%) had VA 6/60 to 6/18, 132 (88%) had VA 6/18 to 6/6 (Table II).

In Group A (SICS) after 1 month and 2 months follow up no patient had PCO. After 3 months follow up 9 (6%) patients had PCO. After 6 months follow up 28 (18.66%) had PCO (Table-III). In Group B (Phaco) after 1 month and 2 months follow up no patient had PCO. After 3 months follow up 2 (1.33%) patients had PCO. After 6 months follow up 11 (7.33%) had PCO (Table IV).

Comparing the rate of development of PCO among the patients under study in both group, we found that no patient developed PCO after 1 month and 2 months follow up. In Group A (SICS) after 3 months follow up 9 (6%) patients had PCO and after 6 months follow up 28 (18.66%) had PCO. In Group B (Phaco) after 3 months follow up 2 (1.33%) patients had PCO and after 6 months follow up 11 (7.33%) had PCO (Table V).

We assessed that number of patients gone through the procedure (Nd: YAG laser capsulotomy) in both the groups. In Group A (SICS), after 3 months follow up 3 (2%) patients had gone through this procedure. After 6 months follow up 25 (16.66%) had gone through this procedure. In Group B (Phaco), after 3 months follow up 2 (1.33%) patients had gone through this procedure. After 6 months follow up 10 (6.66%) had gone through this procedure (Table-VI).

Table I Visual acuity of Group A (SICS) in postoperative follow up

Follow up □	Number of eyes □	Visual acuity (Aided) □	Number of eyes (%)
1 month □	150 □	<6/60 □	9(6)
□	□	6/60 to 6/18 □	39(26)
□	□	6/12 to 6/6 □	102(68)
2 months □	150 □	<6/60 □	6(4)
□	□	6/60 to 6/18 □	27(18)
□	□	6/12 to 6/6 □	117(78)
3 months □	150 □	<6/60 □	5(3.33)
□	□	6/60 to 6/18 □	30(20)
□	□	6/12 to 6/6 □	115(76.67)
6 months □	150 □	<6/60 □	2(1.33)
□	□	6/60 to 6/18 □	39(26)
□	□	6/12 to 6/6 □	109(72.67)

Table II Visual acuity of Group B (Phaco) in postoperative follow up

Follow up □	Number of eyes □	Visual acuity (Aided) □	Number of eyes (%)
1 month □	150 □	<6/60 □	6(4)
□	□	6/60 to 6/18 □	30(20)
□	□	6/12 to 6/6 □	114(76)
2 months □	150 □	<6/60 □	3(2)
□	□	6/60 to 6/18 □	21(14)
□	□	6/12 to 6/6 □	126(84)
3 months □	150 □	<6/60 □	3(2)
□	□	6/60 to 6/18 □	23(15.33)
□	□	6/12 to 6/6 □	124(82.67)
6 months □	150 □	<6/60 □	2(1.33)
□	□	6/60 to 6/18 □	16(10.67)
□	□	6/12 to 6/6 □	132(88)

Table III PCO present in number of eyes in Group A (SICS) in postoperative follow up

Follow up □	Number of eyes □	PCO present in number of eyes (%)
1 month □	150 □	nil
2 months □	150 □	nil
3 months □	150 □	9(6)
6 months □	150 □	28(18.66)

Table IV PCO present in number of eyes in Group B (Phaco) in postoperative follow up

Follow up □	Number of eyes □	PCO present in number of eyes (%)
1 month □	150 □	nil
2 months □	150 □	nil
3 months □	150 □	2(1.33)
6 months □	150 □	11(7.33)

Table V Comparison of PCO between Group A (SICS) and Group B (Phaco)

Group □	Number of PCO after 3 months □	Number of PCO after 6 months □
A (SICS) □	9(6) □	28(18.66)
B (Phaco) □	2(1.33) □	11(7.33)

Table VI Number of Nd: YAG laser capsulotomies done in PCO in Group A (SICS) and Group B (Phaco)

Group □	Follow up □	Number of eyes □	Number of Nd: YAG laser capsulotomies
A (SICS) □	3 months □	150 □	3(2)
□	6 months □	150 □	25(16.66)
B (Phaco) □	3 months □	150 □	2(1.33)
□	6 months □	150 □	10(6.66)

Discussion

In a study, within the first five years after surgery, visually significant PCO develops in more than 25% of patients had undergone SICS with PC IOL implantation.⁹ Some studies correlate that a larger incision causes more blood-aqueous barrier damage resulting in increase risk of PCO.¹⁰ Cortical separation by hydro dissection from nucleus followed by its rotation during SICS and Phacoemulsification, causes removal of maximum lens fibers and epithelial cells at the equator of the capsular bag, thereby reducing the chance of developing PCO.¹¹

Migration of equatorial epithelial cells across the visual axis, creating PCO is not significantly influenced by the haptic fixation pattern. It is much more dependent on the quality and thoroughness of surgical cortical cleanup.¹² For using bimanual irrigation and aspiration technique used in phacoemulsification, PCO rate in phacoemulsification was marginally less than in SICS. It enables a surgeon to remove equatorial lens cells and fibres there by reducing the incidence of PCO formation. This is shown in our study. In 30% cases of non-phaco cataract surgery in bag IOLs fixation could not be achieved. In some cases one or both haptics are not placed in the capsular bag and a potential space is created allowing cells to grow posteriorly towards the visual axis. With modern foldable lens implantation, in-the-bag fixation has increased to over 90% which creates a barrier effect of IOL preventing the migration of equatorial lens epithelial cells over posterior capsule.¹³ Continuous curvilinear capsulorrhexis of moderate diameter by a shrink wrap" effect creates a barrier effect for formation of PCO.¹⁴

Some authors have reported a PCO rate of 11.1% two years after phacoemulsification and acrylic IOL implantation, which is comparable with our study showing PCO rate of 9.1% at six months.¹⁵ In some studies visual acuity after 6 months follow up was better in Group B (Phaco) from Group A (SICS). In Group A (SICS) after 6

months follow up 25(16.66%) had gone through Nd: YAG laser capsulotomies. In Group B (Phaco) after 6 months follow up 10(6.66%) had gone through this procedure, p value >0.002. It is not significant. The limitation of the present study is the short term follow up of the patients. The researchers acknowledge the need for longer follow up of the patients.

Conclusion

The findings of the present study indicates that PCO is one of the complications cataract surgery which can be minimized by the technique of phacoemulsification rather than SICS. This is probably due to three important steps being followed in phacoemulsification less cortical matter remaining and capsular bag polishing. Moreover visual outcome is also better in phacoemulsification (p value <0.002).

Disclosure

All the authors declared no competing interests.

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Positive Effect of Social-Media on Residential Medical Students of Bangladesh

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ABSTRACT

Background: Medical students, especially those compulsorily residing in the dormitory of restricted areas like cantonment and bound to follow some basic customs and etiquette with very limited opportunity to remain outside the camps without prior permission, are likely to be more prone to spend time with social media. But regular motivation, strict surveillance, creating awareness about the negative effect of social media along with providing education to responsibly use it for academic purposes can encourage positive use of social media. In short, meticulous use of social media and education can support one another. The objective of this study was to find out the relationship between academic performance and use of social media.

Materials and methods: This cross sectional study was conducted by providing structured questionnaire to the students to assess the positive impact of social media in their medical education and also the addiction or fascination to social media which is reflected in their academic outcome. Out of 250 medical students of each Army Medical College, 100 students were randomly selected from 1st to 5th year of four medical colleges except Army Medical College, Chattogram (AMCC). From AMCC, 224 medical students were selected. Among the total 624 participants, we assessed both the negative and positive impacts of social media.

Results: We found that, although almost all of the medical students of study population are attached with social media specially Facebook (100%), 95.6% students strongly agreed or agreed that positive use can be helpful in medical education and 48% of medical students brilliantly used it for academic purposes. Routine motivation and implementation of authorized punishment by the college administration for violation of rules have little impact. Despite having significant knowledge of the risks associated with online social media (78%) and its addiction, medical students are still unable to take control. The present study suggests that lion share of medical students realize or at least have understanding that injudicious use of social media can divert or harm their study. They also have the understanding that calculative use can be helpful in educating medical students. Repeated motivation and awareness program by the college administration can be effective.

Conclusion: Most students had positive thoughts towards using social media. Most of the time students were using social media for nonprofessional reasons despite knowing well its positive use. So, there is need to build up widespread awareness to use social media by medical students for professionalism.

Key words : Medical students; Social media; Websites.

Introduction

A network of websites and programs known as social media make it possible for people to communicate with one another.¹ Additionally, it enables users to create, access, share and interact with the online content that is available.² The influence of social media on education is growing in

today's environment of connected learning. The globe is getting smaller, and because of technology like social media, the way we impart knowledge is evolving. Students' access to new educational opportunities is also rapidly expanding. There are many beneficial effects of social media on schooling. However, the same has certain drawbacks. If social media is used properly, education and social media may support one another.³ The introduction of smartphones has dramatically increased social media and internet usage.⁴ Different outcome has been observed in different studies. The outcome depends on many social, cultural, religious and educational factors. Environment of the students specially those compulsorily residing in the dormitory in restricted areas like cantonment where everyone is bound to follow basic customs and etiquette are likely to be more prone to spend time for social media.

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The Advantages of Social Media on Education Include:

i) *Encourage online education*: Students are inspired and encouraged to learn through the usage of social media platforms in the classroom. Major factors that contribute to educational progress include simple access to e-books, online notes, and learning through video conversations.

ii) *Enhance the creative element*: Students' creative abilities are enhanced by social media since it enables them to learn and then apply what they have learned.

iii) *Improve academic results and career choosing*: Social-media also significantly improve students' academic performance and understanding through data and information gathering. When students are given some projects to complete at school, they use a variety of internet resources to gather knowledge and find solutions⁵.

Negative Impact of Social Media on Education:

i) *Draws attention away*: social media can be a disturbing element that acts as a mental barrier to education. Nowadays, social media attracts by very easy access to different porn picture and videos. Without very strong determination it is very difficult to restrain the young generation. Students often find it difficult to focus on their studies and prefer to browse social media. All of these indicate time wastage and deterioration of moral character.

ii) *Decreases capability for learning and research*: Due to the widespread usage of social media, students' reading habits and their creative abilities to study and conduct research are deteriorating because of simplified and inaccurate online information.

Impact on Health:

Use of social media sites might have negative mental and physical health repercussions. Students often alter normal biological clock, skip meals, don't get enough sleep, sleep pattern is also changed and their eyes can suffer from spending too much time staring at a phone or laptop. Students that engage in such behavior become unmotivated and lethargic to study or go out of social manner.⁵

Materials and methods

This was a cross-sectional type of descriptive study. The study was conducted during the period of July 2022 to November 2022. One hundred (100) medical students were randomly selected from 1st to 5th year from each of five Army Medical Colleges except AMCC. 225 students were selected from AMCC in similar way. But, one student's information was incomplete and so not included in this study.

Pretested structured questionnaire was distributed among all the enrolled students. No administrative or social pressure were executed among the students during data collection. Students were asked to fill the preferred box without biasness.

After being collected, the questionnaire was carefully examined, manually coded, and processed and analyzed using SPSS software in accordance with the goal. These coded data were subsequently used to provide outcomes that directly addressed the study topic.

Results

The total number of participants was 624 students from five Army Medical Colleges in different districts of Bangladesh. In the present study, there were 223 (35.7%) males and 401 (64.3%) females. The average age of participants was 21.6 years.

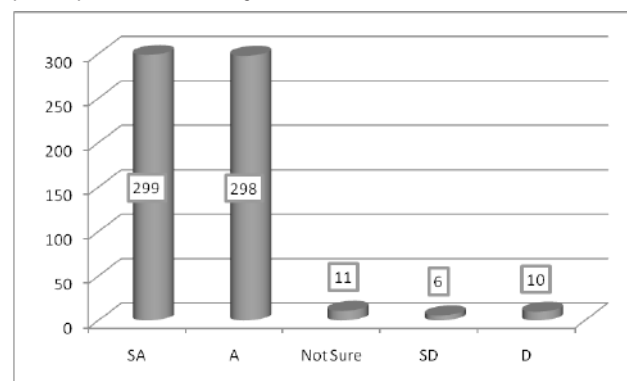


Figure 1 Social media became an essential part in modern educational life

SA = Strongly Agreed, A = Agreed, SD = Strongly Disagreed, D = Disagreed.

Of the total participants, 95.6% opined in the form of "strongly agreed" or "agreed" that social media has become an essential part in modern educational life. Only 2.5% students disagreed with this statement.

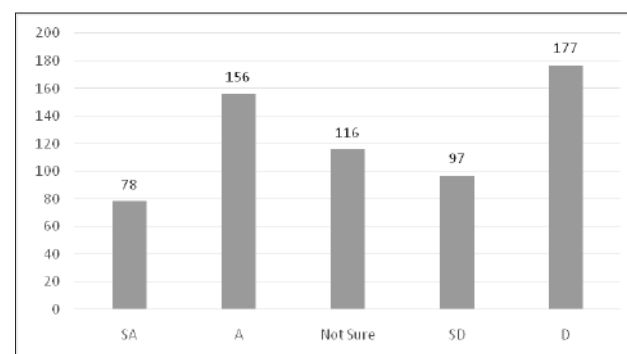


Figure 2 Social media influences the medical students on anti-social activity

SA = Strongly Agreed, A = Agreed, SD = Strongly Disagreed, D = Disagreed.

37.5% students strongly agreed or agreed that social media influence the medical students in anti-social activities. On the other hand, 43.9% students disagreed with this statement.

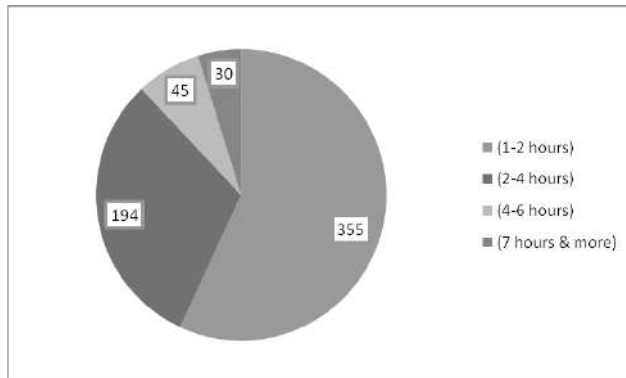


Figure 3 Spending time with social media for academic purpose

87.9 % students opined that spending time with social media for academic purpose is between 1 to 4 hours daily. On the other hand, only 12% students spend more than 4 hours in social media for academic propose.

Discussion

Over the past ten to twelve years or so social media, websites and its applications, as well as the number of students utilizing them, have seen a sharp rise and have become an essential part of students' everyday lives. The study was conducted after the end of the academic year of five Army Medical Colleges. Furthermore, the study did not include responses that were incomplete.

All of the students participated in this study are the regular user of Facebook and the majority of them (39.4%) also use Facebook Messenger. This result is consistent with the fact that Facebook has the most users world wide and highlights the growing popularity of Facebook and its messenger among students.⁶

In another study 61.5% of male students and 54% of female students at Baghdad and Mustansiriya Universities in Iraq reported that Facebook was their preferred social media site followed by Twitter and YouTube⁷.

Most of the students choose to visit social media from evening to late at night usually from 7:00 pm to 4:00 am. Almost 88% students of the present study spend on average 1 to 4 hours on social media. In another study, two thirds of the students were found to spend on average more than three hours and one-third two hours or less daily on social media⁸.

As per present study, among the students, almost 95 % use social media for their academic purposes and only 5 % for non-academic purposes. Which is similar to the study performed by Sivakumar which found that 80% of students used social media for their academic purposes.⁹

The above-mentioned findings are completely opposite to the other studies. In the study of Talaue et al, only 27% use social media for their academic purposes and 73% for non-academic purposes.¹⁰ The results of other studies are much higher than the current study where 82% to 94% of students use social media for non-academic purposes and the rest are engaged in academic instances.¹¹

Conclusion

The results show that social media has become integral part of students' life and consume the majority of their free time. Time spent on social media by the respondents emphasized that it had a detrimental effect on their academic achievement. Therefore, the social media, also known as social networks or the web, choose students as possible victims. Mobile phones and various computer technologies have greatly widened the reach of both good and bad influences on the spiritual and intellectual growth of the younger generation. So, there is need to build up widespread awareness to use social media by medical students for professionalism.

Disclosure

All the authors declared no competing interests.

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Thrombo-Prophylaxis Guideline in a Specialized Urology Center and Its validation: A Prospective Observational Study

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ABSTRACT

Background: Venous Thrombo-Embolic (VTE) is a known complication of major surgeries specially pelvic and lymphatic surgeries, common in urology. The risk of peri-operative bleeding is the obstacle to assimilate thrombo-prophylaxis. The aim of this study is to implement a guideline and test its safety and effectiveness in reducing the mortality and morbidity of VTE and balancing the chance of peri-operative bleeding in our urology center.

Materials and methods: A hospital based prospective study over 12 months (From January 2022 to December 2022) was carried out at Urology Centre of CMH, Dhaka. A VTE risk assessment guideline was formulated by Caprini risk assessment tool. All moderate and high risk cases were included and prophylactic measures according to the guideline was incorporated. We studied the post-operativethrombo-embolic and perioperative bleeding events, analyzed and compared them with published data to validate our guideline.

Results: In our study, 40 patients (Mean age of 58.30 years) 36 (90%) male and 4 (10%) female were included. Among them 29 (72.5%) was in high risk group (Caprini score ≥ 5) and 11(27.5%) in moderate risk group (Caprini score 3-4). All patients, (n=40) were managed with general measures, mechanical preventive measures and pharmacological prophylaxis as per our guideline. First post-operative dose was delayed for 12- 24 hours, in 15 (37.5%) cases, where there was anticipated high risk of post-operative bleeding. In two cases (5%) of high Caprini score 10, half dose of anticoagulant was started at 6 hours after surgery. One patient (2.5%) developed Deep Vein Thrombosis (DVT). Two patient (5%) developed post-operative minor bleeding events. There was no incident of Pulmonary Embolism (PE).

Conclusion: Incorporation of our guideline has proven to be effective in reducing the VTE and safe in regards of peri-operative bleeding events as per our study findings.

Key word: Caprini score; Deep vein thrombosis; Embolism; Thrombosis; Thrombo prophylaxis; Venous thrombo-embolism.

Introduction

Venous Thrombo-Embolic (VTE) is a well-known postoperative complication in any surgical patient and its sequel, such as and Deep Vein Thrombosis (DVT) and Pulmonary Embolism (PE) are preventable if adequate measures are taken¹. PE is a major cause of death in post-surgical patient and DVT may cause morbidity and prolong hospitalization.^{1,2} VTE is a well-established complication in many urological surgeries.^{1,3} About 1% to 5% of urological surgeries may become complicated with clinically overt VTE. PE is commonest cause of postoperative death in urological patients.^{4,5} Many risk factors in such patients, such as advanced age, malignancy, intraoperative lithotomy position, and pelvic surgery with or without lymph node dissection contribute in the pathogenesis of VTE.¹

Caprini et al validated a retrospective Venous Thrombo Embolism (VTE) risk scoring method in the University of Michigan Health System.⁶ An updated version of Caprini scoring was published on 2013 and many recent centers and groups have incorporated this scoring method to assess their patient's risk of developing VTE.⁷ Kahn SR incorporated this scoring system in their publication, with validated risk stratification and confounded percentage of developing VTE if no prophylaxis is taken.⁸ We studied them in details and found their scoring and risk stratification system complements each other. Many surgical societies and renowned centers have formulated VTE guidelines on the basis of these guidelines.

Under such constraints, it is imperative to practice a well-tested VTE prevention guideline in every center. Urology centers and departments are always vulnerable due to their frequent maneuvers in pelvis, elderly patients, frail patients, malignancy cases and lymph node dissection. In lieu of other groups and centers, we also wanted to have a practice guideline for VTE prophylaxis, but needed to validate them before practicing them and the first step is to carry out a well-designed study to systematically test the safety and effectiveness. At our center, no such guideline was being practiced. Even many surgeons were unwilling to incorporate VTE prophylaxis, especially anticoagulants,

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in suspicion of peri-operative bleeding risk. Thus we formulated a guideline to prevent VTE, based on Caprini risk scoring system and the aim of this study is to observe the efficacy of the formulated guideline in our urology center.

Materials and methods

A prospective hospital based observational study was planned and carried out in Urology Centre of Combined Military Hospital (CMH) Dhaka, from January 2022 to December 2022.

A venous Thrombo-embolism prophylaxis guideline was formulated as shown at the end of this chapter, in accordance with Caprini scoring of VTE risk assessment tools and risk categorization into very low, low, moderate and high group. According to group the preventive measures were assigned as general measures, mechanical prevention and pharmacological prophylaxis.

Very low category and Low category patients were excluded from this study. Moderate (Caprini score 3-4) and high risk group (Caprini score ≥ 5) were included in this study. Both the group of patient was advised general measures, mechanical prevention and pharmacological prophylaxis as shown in the guideline. Pharmacological prophylaxis in our center was practiced by prescribing Low Molecular Weight Heparin (LMWH) / Enoxaparin (Trade name Clexane) 1mg/kg/dose, Sub cutaneous, starting 2 hours before surgery followed by once daily, until 3rd post-operative day or patient is ambulatory or discharged.

In some cases, where excessive bleeding were encountered at surgery, the first postoperative dose delayed 12-24 hours after surgery but mechanical prevention was started prior to surgery. And cases where caprini score was more than 8, a half-dose of anticoagulation 6 hours after surgery was started.

Purposive sampling was done and following inclusion and exclusion criterias were set for this study.

Inclusion criteria

- Any patient with Caprini VTE risk score 3 or more
- Any patient undergoing pelvic urologic surgery
- Any patient undergoing extensive lymph node dissection (Pelvic and retroperitoneal)
- All open; prolonged surgery i.e. 4 hours or more duration.

Exclusion criteria

- Any patient with Caprini VTE risk score below 3.
- All endoscopic urologic surgery
- Non abdominal urologic surgeries
- All emergency urologic surgeries

Assessment started on 8th hour of postoperatively, reviewed again on daily basis up to 5th post-operative day. If any positive clinical findings, such as calf muscle pain, leg swelling, dyspnea, chest pain or tightness, alteration of consciousness level noticed, they were again evaluated with Doppler study of leg veins or ileo-femoral veins, as

suggestive on clinical examination, chest X-ray and D-dimer (Fibrin Degradation Product). After discharge from hospital, patient was followed up to 06 weeks and evaluated for any sign or symptom of VTE. All data were collected in a preformed data collection sheet and summarized in IBM SPSS version 25. Statistical analysis and significance or p-value was calculated by non-parametric tests, shown in table having null hypothesis of equal occurrence among variables sub-category. Mean with standard deviation and ranges were calculated by aforementioned software.

FIRST STEP: VTE Risk Scoring

Each of the following risk factors is assigned 1 points

- Age 41-60 years
- Minor surgery < 30 minutes
- History of major surgery within 1 month
- Pregnancy or postpartum within 1 month
- Varicose veins
- Inflammatory bowel disease
- Swelling of legs
- Obesity (BMI >25 kg/m²)
- Oral contraceptives, patch or hormone replacement therapy

Each of the following risk factors is assigned 2 points

- Age older than 60- 74 years
- Malignancy or current chemotherapy or radiation therapy
- Major surgery (>45 min)
- Laparoscopic surgery (>45 min)
- Confined to bed longer than 72 hours
- Immobilizing cast shorter than 1 month
- Central venous access for less than 1 month
- Tourniquet time longer than 45 minutes.

The following risk factors are assigned 3 points each

- Age older than 75 years
- History of DVT or PE
- Stroke within 1 month
- Family history of thrombosis
- Factor V Leiden/activated protein C resistance
- Medical patient with risk factors of myocardial infarction, Congestive heart failure or COPD

The following risk factors are assigned 5 points each

- Elective lower extremity arthroplasty, TKR, THR
- Hip, pelvis, or leg fracture within 1 month
- Multiple trauma within 1 month
- Acute spinal cord injury with paralysis within 1 month
- Congenital or acquired thrombophilia

Total Score-

1. General measures to prevent VTE
 - Adequate hydration
 - Analgesia
 - Ambulate patient ASAP
 - Bed ridden patient- Passive leg and foot movement
 - Leg elevation

SECOND STEP: VTE Risk Scores And Categories

VTE Risk Category	Caprini Score	Baseline Risk of VTE Without Prophylaxis, %
Very low	0	< 0.5
Low	1-2	1.5
Moderate	3-4	3
High	5	6
Very Low	1.General measures to prevent VTE only.	
Low	1+2. Mechanical prevention- Knee-length Compression stockings (Color- White) or Intermittent pneumatic compression devices are recommended, from day before the surgery till adequate ambulation or discharge	
Moderate & High	1+2+3. Pharmacological Prophylaxis.	

Special Concerns

1. Patients with a high risk of bleeding should have the first postoperative dose delayed 12-24 hours after surgery but mechanical prevention should be started prior to surgery.
2. Starting a half-dose of anticoagulation 6 hours after surgery may deliver more effective prophylaxis without a significant increase in bleeding risk.
3. None of LMWH and LDUH, was found superior to other in preventing VTE.
4. Graduated compression stockings in comparison with no prophylaxis, Clearly demonstrates its superiority in preventing VTE.
5. In elderly patients with renal failure, LDUH may be used or weight-adjusted dosing of LMWH.

A. Low Molecular Weight Heparin (LMWH) / Enoxaparin

Doses- (1 mg/kg/dose)40- 60 mg S/C, starting 2 hours before surgery followed by once daily, until patient is ambulatory or discharged. Pre-operative dose can be omitted if there is high chance of per-operative bleeding. Contraindication- IM Administration is contraindicated. Side effect- Haemorrhage, specially GI bleeding Pregnancy Cat- Not available Local formulations- Clexane (40/0.4 ml), Alexa (40/0.4 ml), Clotinx (40/0.4 ml).

B. Low Dose Unfractionated Heparin (LDUH)

Doses- 5000 U S/C, starting 2 hours before surgery followed by 5000 U- 8 hourly, daily until patient is ambulatory or discharged. Pre-operative dose can be omitted if there is high chance of per-operative bleeding Contraindication- IM Administration is contraindicated Side effect- Thrombocytopenia. Needs platelet monitoring. Pregnancy Cat- Not available Local formulations- Diaperin (5000 IU/5ml), Heparon (5000 IU/5ml) , G Heparin (5000 IU/5ml)

C. Rivaroxaban- 10 mg Once daily. Can be started 06 hours after surgery. Pre-operative dose can be omitted if there is high chance of per-operative bleeding. USFDA approved for Orthopedic surgery.

THIRD STEP: Preventive Measures According To Risk Category

Results

Table 1 Distribution of variables, Caprini score and Baseline Risk of VTE without Prophylaxis (%) (n=40)

Variable	Frequency	Percentage	p-value
Age (In years)	58.30 ±8.52		0.798
Mean±Std Dev			
Range	36- 72		(One sample chi-square test)
Sex			
Male	36	90%	
Female	04	10%	0.00
			(One sample Bi-nominal test)
Surgery performed			
ORP + BPLND	20	50.0%	0.00
RCIC + BPLND	10	25.0%	(One sample chi-square test)
RPLND	2	5.0%	
RadicalNephrectomy	3	7.5%	
Partial Nephrectomy	5	12.5%	
Total	40	100%	
Caprini Score			
Mean±Std Dev	5.68 ±1.88		0.166*
Range	3 - 10		(One sample Kolmogorov-Simirnov test)
Baseline Risk of VTE Without Prophylaxis, (%)			
Mean±Std Dev	5.18 ±1.35		0.00
3%			(One sample Kolmogorov-Simirnov test)
6%	11	27.5%	
Total	29	72.5%	
	40	100%	

Asymptotic significances are displayed. The significance level is 0.05. * Lilliefors corrected. This is a lower bound of the true significance. p-value was calculated by Non-parametric tests, shown in table having null hypothesis of equal occurrence among variables sub-category. ORP- Open Radical Prostatectomy, BPLND- Bilateral Pelvic Lymph Node Dissection, RCIC- Radical Cystectomy with Ileal Conduit.

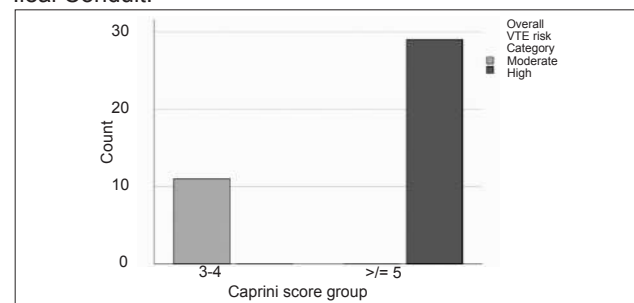


Figure 1 Distribution of cases according to Caprini Score group and Venous Thrombo embolism risk category (n=40)

In this study, 29 (72.5%) patient were in high risk group with Caprini score ≥ 5 and 11(27.5%) patient were in Moderate risk group with Caprini score 3-4.

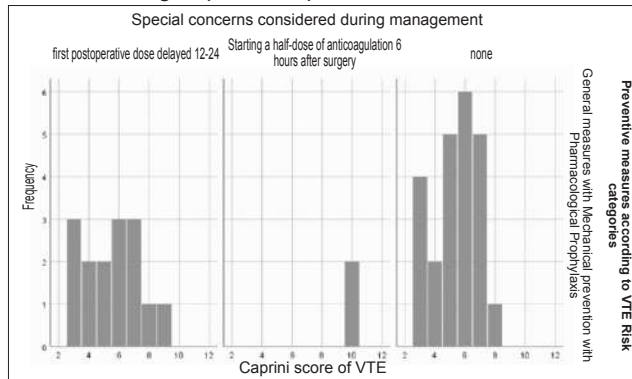


Figure 2 Distribution of cases with special concern according to the guideline based on the Caprini score and per-operative findings of bleeding risk (n=40)

According to the formulated guideline, all patients in our study were among moderate and high risk group of VTE and all of them i.e. 40 (100%) were managed with general measures, mechanical preventive measures and pharmacological prophylaxis.

First post-operative dose was delayed for 12- 24 hours, in 15 (37.5%) selected cases according to surgeons discretion, where there was anticipated high risk of post-operative bleeding according to operative findings. On two cases (5%) of high Caprini score i.e. 10; half dose of anticoagulant was started at 6 hours after surgery. In 23 cases (57.5%) normal schedule of anti-coagulant was used as there was no special concern, who's Caprini score ranges from 3 to 8.

Table II Distribution of complications arising due to thrombo-embolism, anti-coagulant measures and surgical procedures (n=40)

Variable	Frequency	Percentage	p-value
Thrombo embolic complication at			0.00
Post-operative period			(One sample Bi-nominal test)
No Complication	39	97.5%	
DVT	01	2.5%	
Adverse effect of			0.00
Anti-coagulation measures			(One sample Bi-nominal test)
No adverse event	38	95%	
Minor post-operative bleeding	02	05%	
Major post-operative bleeding	00	00%	
Thrombocytopenia	00	00%	
Non-Thrombo Embolic Surgical Complication			0.00
No complication	34	85%	chi-square test)
Superficial wound infection	02	05%	
Burst abdomen	01	2.5%	
Anastomotic leakage	01	2.5%	
Urinary incontinence	01	2.5%	
Total	40	100%	

Asymptotic significances are displayed. The significance level is 0.05.

p-value was calculated by Non-parametric tests, shown in table having null hypothesis of equal occurrence among variables sub-category.

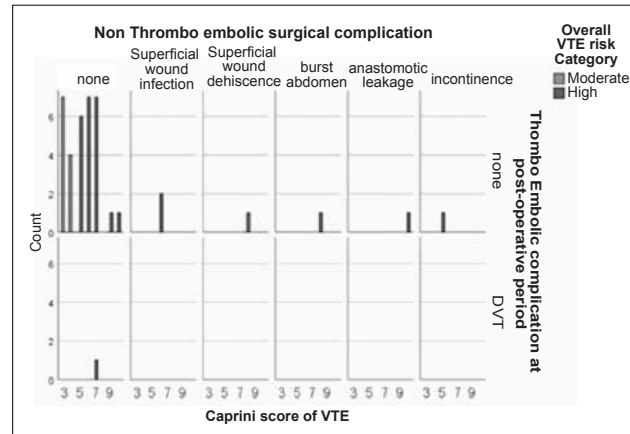


Figure 3 Correlation distribution of thrombo-embolic complication and surgical complication with Caprini score (n=40)

In our study one patient (2.5%) developed DVT on 3rd post-operative day. Non Thrombo-embolic surgical infections were found to happen among patients with higher Caprini score but no significant correlation could be seen statistically (p value 0.00, phi value 1.33 and Cramer's V value 0.597 whereas Pearson correlation value was insignificant due to small number of cases).

Discussion

The Caprini VTE Risk Score has been evaluated and validated in many studies of various model, in many centers and facilities worldwide. Approximately 5,00,00,00 patients and in more than 250 clinical trials were based on this time tested VTE risk scoring tool and have proven itself effective.^{6,11-15} The incidence of VTE usually within 30 days of surgery is 1.4% in their study by Bahl V and without any prophylaxis, the probability of acquiring VTE also raises.⁶ Patients with Caprini scores 5-6, demonstrates the incidence of VTE about 1.3%, for scores of 7-8 the incidence raises to 2.6% and for Caprini score over 8, this incidence rate climbs up to 6.5%.⁶

In our study, 40 patients, with mean age of 58.30 years, ranging from 36 to 72 years, candidates of various urological surgeries were included. Among them 36 (90%) were male. ORP and BPLND were performed on 20 (50%) cases and RCIC with BPLND was performed on 10 (25%) patient. It was also found that, elderly males form the vast majority of urological problems and prostatic Carcinoma is the most frequently encountered disease requiring surgery, followed by urinary bladder carcinoma surgery if within operable stage.^{16,17}

Mean Caprini score of our study population was 5.68 with a standard deviation 1.88. Range of Caprini score was from 3 to 10. Here we should mention our inclusion criteria to include only the cases with Caprini score 3 or more. Median Caprini score in the study of Chen Q was 4.75 in overall patient and score 3 in his non-VTE group and 6 in the group of patients who developed VTE.¹⁸ One patient (2.5%) in our study developed DVT whose Caprini score

was 7. It has been found that higher Caprini score is likely to be associated with higher incidences of VTE, as shown in other published studies.^{1,6,19}

Kahn SR had reviewed in details in their study and concluded that the baseline risk of VTE increases with increasing Caprini score and have associated the grouping based on such association.⁸ We included their findings in our guideline and demarcation of individual patient's baseline risk of VTE was assessed in this study. As we included all cases of 3 or more on Caprini scoring, all our cases were in moderate and high risk group, who was having the baseline risk of VTE without prophylaxis 3% and 6% respectively. In this study, 29 (72.5%) patients were in high risk group with Caprini score ≥ 5 and 11 (27.5%) patients were in Moderate risk group with Caprini score 3-4 (Table I, Figure 1). Two (05%) of our study population was found to have the highest Caprini score 10 (Figure-2). In both this case, we started half of the post-operative anti-coagulant prophylaxis, approximately 06 hours after surgery, balancing the risk of adverse bleeding event and very high risk of VTE and none of this patient had any thrombo-embolic incident. Among total 40 patients, 15 (37.5%) cases were anticipated of having high risk of post-operative bleeding by the operating surgeons and for them, the first dose of anti-coagulant were omitted for 12 to 24 hours, as shown in our guideline. The single patient (2.5%) was among this group. In their study of Chen Q incidence of VTE was 10% for Caprini score 5 or more in VTE cases.¹⁸ Where we can conclude our guideline of thromboprophylaxis was effective to prevent VTE sufficiently.

Two patients (5%) of our study population noticed post-operative minor bleeding tendencies, among them one was anticipated to have some bleeding event during surgery, but the other one was not anticipated of any bleeding risk after surgery (Table II). In both cases the bleeding was minor and withdrawing the anticoagulant, improved the condition. None of them required any other pharmacological or surgical intervention. In all cases we used Low Molecular Weight Heparin (LMWH) at 1 mg/kg/dose. Both Low Dose Unfractionated Heparin (LDUH) and LMWH are well efficacious in urologic surgery.^{1,20,21} Moreover, the use of perioperative LDUH or LMWH may increase the risk for bleeding.²² Pharmacological prophylaxis and mechanical preventive measures were found highly suitable for prevention of VTE. In cases with bleeding incidents, discontinuation of anticoagulant may be needed but mechanical measures were found to be well accepted and complementing the anticoagulation.²³ General measures discussed in our center guideline such as early postoperative mobilization is probably the only intervention warranted in routine, endoscopic and other low-risk urologic surgery. Mechanical measures and routine prophylaxis with LDUH and LMWH is recommended for more extensive open procedures such as radical prostatectomy, cystectomy, or nephrectomy.²³ Our guideline adequately covers all type of urological procedures and adherence to this guideline is likely to be beneficial to patients as available published data also reflects the same.^{1,19-23}

In Figure-3, we distributed correlation of thrombo-embolic complication and surgical complication with Caprini score in our study population. Most of the urological patients are elderly and have multiple comorbidities. The patients that we included in our study along with our inclusion criteria are mostly malignancy cases, had prolonged operation time, many received pre-operative chemotherapy or radiotherapy and all these factors contributed in their higher Caprini score. Probably this is the reason, why higher Caprini score seems to be related with surgical complications. Statistically no significant relationship could be established on analysis. □

□ Patients, who undergo surgery for cancer, are usually prone to 29% increased incidence of DVT, compared with 19% in those surgeries without cancer.¹ Thromboprophylaxis is, therefore, an effective strategy to reduce the morbidity and mortality arising from VTE in surgical candidates. Even after such evidences, thromboprophylaxis is underused in many setups of clinical practice. Still today, many surgeons tend to bypass thromboprophylactic measures believing that the risk of bleeding at their operation outweighs the benefit of thromboprophylaxis.²⁴

We established the guideline at our center and this study aims to improve VTE prophylaxis and observe our outcomes. We may conclude at this point that, thromboprophylactic measures that we incorporated with our peri-operative management protocol clearly outweighs the demerits of bleeding events at surgery. Thus practicing such a guideline is beneficial to patients and reduces the morbidity and mortality significantly.

Limitation

Our study population is small and randomization of sampling could not be followed due to our study design. It is a single center study. There is lack of published studies and evidences based on center specific thromboprophylaxis guidelines and their validation. Few available center specific guidelines are based on their resources and protocols and not comparable with international evidences. Direct comparison could not be established with those guidelines in this study. Apart from such limitations, our study could clearly demonstrate the benefits of VTE prophylaxis as far as we can evaluate and compare with published resources.

Conclusion

We conclude in our study that, the Caprini risk assessment tool is well established and an efficacious method for pre-operative assessment of VTE risk in all urological patients. Stratification of all patients with this tool and following the formulated guideline of our center has proved to be a satisfactory tool for prevention of VTE and its sequel. Morbidity and mortality related to VTE can be well prevented, if we can stick to this guideline and prepare our urological surgical plan along with this guideline.

Recommendation

There is always a space of further study in a large scale with more acceptable study design, but our study shows promising results.

Disclosure

All the authors declared no competing interests.

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Elevation of Leukocytes in Pregnancy: A Physiological Phenomenon

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ABSTRACT

Background: Sometimes pregnancy become complicated by a wide range of viral and bacterial infections. Many of these effect directly the outcome of pregnancy. Hence in antenatal checkups, complete blood count is advised by physicians. The total leucocyte count is found elevated in pregnancy. So the reference interval between pregnant and non pregnant range of total leucocyte is probably very narrow and there is still probably no reference range of total and differential counts of leucocytes in gestation. The aim of the study is to predict a range of elevation in total and differential leucocyte count in the Laboratory of CMH, Chattogram.

Materials and methods: The study is a retrospective study, carried out in laboratory of Combined Military Hospital, Chattogram from 1st December 2022 and 31st March 2023 by convenient sampling, who had a full blood count taken at least once in pregnancy.

Results: Among 50 cases of the study, in 1st trimester mean total leucocyte count was 9790±967, in 2nd trimester 10000±450 and in 3rd trimester 12000±548. Mean neutrophils (%) in 1st, 2nd and 3rd trimester was 70.83±3.6%, 72±2.58% and 73±2.6% respectively. Mean Lymphocytes (%) was 30±3.27%, 30±2.2% and 30±1.91%. Mean monocytes (%) in 1st, 2nd and 3rd trimester was 7±1.71%, 10±1.5% and 11±1.39%.

Conclusion: The elevation in leucocyte count is a physiological phenomenon in pregnancy which is caused mostly by immunological adaptation. It is significant to categorize the pathological cause of leucocytes elevation in pregnancy.

Key words: Gestation; Leucocytes; Neutrophils; Pregnancy.

Introduction

Infections are primary cause of maternal deaths worldwide, so it is essential for physicians to interpret haematological investigations for suspected infection in gravid women. Leucocyte count indicates infection or inflammation and most are requested and interpreted by clinicians. It is reported that the total leucocyte count is elevated in pregnancy and even further during labour and the puerperium. So the non-pregnant Reference Interval (RI) is not reliable indicator, where there is marked changes in maternal haematological parameters in pregnancy.¹ C-reactive Protein (CRP) another commonly used inflammatory marker, is also raised in pregnancy, with an upper reference limit almost three times higher than the non-gravid value. However, using this pregnancy-specific threshold elevates the diagnostic accuracy for infections in

pregnancy. This prompted us to consider how clinicians and obstetricians should use leucocyte count and its subsets to improve the safety of pregnant women.¹

The primary objective of this study was to define pregnancy specific SD for total leucocyte count and its constituent cell subtypes (Neutrophils, lymphocytes, eosinophils and monocytes) in three trimesters of pregnancy.

Leucocyte count increases significantly in healthy gravid women mostly due to neutrophil leucocytosis. Typical reference intervals during pregnancy are 6–16×10⁹/L. Leucocyte count increases markedly during normal delivery with mean counts of 10–16×10⁹/L, and an upper level of 29×10⁹/L.²

The administration of steroids to assist fetal lung maturity results in an increase in neutrophil count of about 35% and decrease in lymphocyte count by 45%, the total leucocyte rising to a mean of 13.5×10⁹/L, with maximum values for leucocytes usually being less than 20×10⁹/L. Typically, neutrophil leucocytosis peaks 24 hour after steroid administration, though elevation may last at least 5 days.² Neutrophils which rises from first trimester in pregnant women exhibit a retrograde transport of metabolic enzymes to centrosomes, which suggest active prevention of metabolic upregulation. There is reduced phagocytosis of neutrophils in pregnancy along with increased expression of the human neutrophil antigen-2a (HNA2a) in pregnancy.³

Serial changes take place in endocrine system, metabolic processes and genital system during pregnancy. Therefore,

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leucocytes increase because they respond to stimulatory signals as pregnancy progresses.

Monocytes are increased in 1st trimester as a result to prevent allograft rejection against fetus. There is elevated IL-12 and TNF production by monocytes in gravid women throughout all three trimesters. There are also increased levels of activation markers CD11a, CD11b, CD14, and CD64 and higher ROS production by monocytes in gravid women. Monocytes in gravid women are anti-inflammatory and show phenotypic signs of endotoxin tolerance. That is why monocytosis is prevalent during pregnancy.⁴

Eosinophils do not show any significant changes in number during pregnancy.

The aim of the study is to predict a range of elevation in total and differential leucocyte count in the Laboratory of CMH, Chattogram.

Materials and methods

We performed a retrospective study on 50 gravid women irrespective of status of para in CMH Chattogram. Participants were identified by searching data in hospital data server for women who reported to laboratory of the hospital as a part of ante natal visits. Gravid women who delivered between 1st December 2022 and 31st March 2023, who had a full blood count taken at least once in pregnancy. To make the data collection easier, participants were excluded for whom there was an increased likelihood of any maternal or fetal disease, which might increase suspicion of infection or other factors affecting leucocyte counts. Exclusion criteria were, maternal age < 18 years, PIH, pre eclampsia, eclampsia, GDM and any thyroid hormone abnormality. Women who had blood tests measured on more than seven occasions were excluded due to the possible suspicion of that these were taken to follow up any abnormality.

Results of CBC were retrieved from hospital server records, with the corresponding gestational age in weeks. Samples collected between 04 to 36 weeks of gestation, with complete data on the total WBC, neutrophils, lymphocytes, eosinophils and monocytes. Venous blood samples were collected as part of routine lab investigations, drawn into 4.5 mL potassium EDTA tubes, and were analyzed using the Sysmex XT1000i analyzer (Lower detectable value is $0.1 \times 10^9/L$).

Results

CBC was analyzed in 1st trimester of 18 gravid women between 4 to 12 weeks, in 2nd trimester between 14 to 24 weeks of 15 gravid women and in 3rd trimester between 25 to 36 weeks of 17 gravid women during regular antenatal checkups. Table I summarizes the gestational age of the patients.

The mean of total leucocytes counts in 1st trimester is 9790 ± 967 , in 2nd trimester 10000 ± 450 and in 3rd trimester is 12000 ± 548 .

Table I summarizes the differential counts of leucocytes in three trimesters respectively

Parameters	1 st trimester (n=18) Mean±SD	2 nd trimester (n=15) Mean±SD	3 rd trimester (n=17) Mean±SD
Neutrophils (%)	70.83±3.6%	72±2.58%	73±2.6%
Lymphocytes (%)	30±3.27%	30±2.2%	30±1.91%
Monocytes (%)	7±1.71%	10±1.5%	11±1.39%
Eosinophils (%)	3±1.28%	3±1.34%	3±1.06%

The total leucocyte count increases with gestational age. It has been observed among the study groups. In terms of differential counts, neutrophils and monocytes show significant elevations. Eosinophils remain static or show no significant change. Lymphocytes are rather depressed as gestational age progresses.

The Neutrophil to Leucocytes Ratio (NLR) in all three trimesters 1st trimester is 2.36, in 2nd trimester is 2.40 and in 3rd trimester is 2.43.

The Neutrophil Lymphocyte Ratio (NLR) was higher among women with preeclampsia when compared to healthy pregnant women even at early gestation. NLR at a cutoff value of >3.35 showed a significant diagnostic accuracy between the controls and mild preeclamptic women.

Discussions

Studies have shown that gestational leukocytosis results from release of leucocytes from marginal. Leukocytosis begins in the first trimester and remains high throughout pregnancy, delivery and puerperium.⁴

Some studies opined that neutrophil count was an independent risk factor for development of GDM, regardless of the history of GDM. There was a significant linear association between GDM incidence and the continuous neutrophil count when it was $>5.03 \times 10^9/L$. This work suggested that the first-trimester neutrophil count is intimately associated with the development of GDM and adverse pregnancy outcomes.⁵

A review by Okpokam et al. found that lymphocytes increases during pregnancy probably due to bacterial infections. However, Elado et al. observed lymphocyte suppression with progression of gestational age. Chandra et al. observed decrease in lymphocyte count during the first and second trimester and an increase in the third trimester. The observed lymphopenia during pregnancy may be due to monocytosis which helps prevent fetal allograft rejection during the first trimester. The above dysregulation among and within different immune system components is central in maternal adaptation to pregnancy.⁶

In this study the total leucocytes count shows an increase from 1st to 3rd trimester gradually. This is a feature of the study which coincides with study done by Surabhi Chandra et al. and Saad Bakrim et al. and almost all other studies in reference.^{7,8}

The predominant increase of neutrophils is responsible for leukocytosis. As this study found neutrophils percentage in 1st trimester is 70.83±3.6%, 2nd trimester 72±2.58% and in 3rd trimester 73±2.6%.

This is the phenomenon of our study which is similar in studies performed by other studies, like Surabhi Chandra et al. Lyrad K. Riley et al and Saad Bakrim et al.^{7,8}

Various etiology has been suggested for the elevation of neutrophils in gestation. But there is no definite upper limit reference of neutrophils percentage. Possibly it is the clinicians decision whether it is physiological or pathological.

In the study it is observed that lymphocytes show a depression as the gestational age progresses at a very tiny rate. From 1st trimester to 3rd trimester lymphocyte percentage is 30±3.27%, 30±2.2% and 30±1.91%. It has also been found in other studies like David Nzioka Mutua et al. ,F. Gary Cunningham et al. Adamu Jibril Bamaiyi et al.^{9,10,4,6} Probably lymphocytes decreases or remains static due to increase in monocytes.

The monocyte count also show an elevation in our study. It is found in this study that monocytes are 7±1.71%, 10±1.5% and 11±1.39% respectively in 1st to 3rd trimesters.

The study done by Yonggang Zhang et al and Somendra Kumar Dhariwal et al. also found elevation of monocytes with gestational age.^{11,12} The study also observed high neutrophils count is associated with possible GDM and adverse outcome of pregnancy.

The study carried out by Bernard J. Canzoneri et al. opined that neutrophil accounts for leukocytosis in pregnancy and is associated with development of preeclampsia. Moreover the study observed that neutrophil counts were further increased 48 hours after delivery in patients with preclampsia: 8.048 ± 4.011 at admission, compared with 12.907 ± 5.087 at 8 hours postpartum, 11.112 ± 4.423 at 24 hours postpartum, and 11.298 ± 3.809 at 48 hours postpartum (p < 0.001) respectively.¹³

The study of Marijke M. Faas et al. observed that many factors are involved in further activation of monocytes in preeclampsia. Factors are thought to be derived from the stressed placenta, such as anti-angiogenic factors, placental microparticles or ATP which are released at increased amounts from the preeclamptic placenta. Cumulative effects of these factors may activate the monocytes. There is also upregulation of various pro-inflammatory cytokines, like TNF α , IL-1 β , IL-18 in the placenta of preeclamptic women has been observed. On the other side, reduction in levels of the anti-inflammatory cytokine, like IL-10 have been observed in the placenta of preeclamptic women.¹⁴

Geetanjali Purohit et al. carried out a study in Western India where they had observed an absolute monocytosis during pregnancy, especially in the first trimester, but decreases as gestation advances, which is a clear contrary to our study.¹⁵

The study conducted by Monalisa Biswas, Vijetha Shenoy Belle and Nihaal Maripini et al. found that Neutrophil to Lymphocyte Ratio (NLR) is a strong predictive value for maternal gestational diseases and neonatal outcomes. This review focuses on the role of NLR in adverse pregnancy outcomes, like preeclampsia, Gestational Diabetes Mellitus (GDM) and also ectopic pregnancy.¹⁶ NLR at a cutoff value of >3.35 showed a significant diagnostic value between the uneventful gestations and mild preeclamptic patients.¹⁶ The Neutrophil to Leucocytes Ratio (NLR) in the study in all three trimesters 1st trimester is 2.36, in 2nd trimester is 2.40 and in 3rd trimester is 2.43.

Limitations

The study is performed in a single center with 50 cases. So it is not logical to state any reference limit. As certain clinical conditions have been excluded from the study population, so the study is unable to predict any adverse outcome of pregnancy. The study may not be a reflection of the large population of area, ethnicity and country.

Conclusion

This study shows the substantial changes in WBC in the antenatal periods, with marked differences between cell subtypes. The changes indicate highly dynamic co-operative interactions between the maternal and fetal immune system, rather than a broad maternal immune suppression. The hematological parameters may be the potential predictors of high risk pregnancy before the expressions of symptoms. It may provide a new strategy for obstetrician to manage high risk pregnant women timely.

Recommendations

A large prospective longitudinal study is required to elucidate maternal adaptation by immunological mechanism. Hence we shall be able to establish a reference interval of leucocytes and its subtypes.

Disclosure

All the authors declared no competing interests.

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Prevalence and Management of Anorectal Diseases in Pregnant and Postpartum Women: Insights from a Colorectal Outpatient Clinic

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ABSTRACT

Background: Anorectal diseases such as hemorrhoids, anal fissures and constipation are very common and under-diagnosed in pregnant, postpartum women worldwide with severe implications on quality of life. The aim of the study to explore the prevalence of anorectal diseases in pregnant and postpartum women attending in colorectal OPD and discuss their management strategies both conservative and surgery.

Materials and methods: This descriptive observational study was conducted on 122 patients attending in the Colorectal Out-Patient Department (OPD) of CMH, Chattogram between January and December 2022. They were assessed using a questionnaire and colorectal evaluations, which includes digital rectal examination and proctoscopy. Treatment options were then offered based on the severity of symptoms and their impact on the patient's quality of life.

Results: A total of 10, 16, and 22 women had symptomatic hemorrhoids with or without perianal complications in the second, third trimester of pregnancy and postpartum, respectively. Mean while, 54, 50, and 58 women complained about constipation in the second, third trimester of pregnancy and postpartum, respectively. Only 8(6.6%) patients experienced painful hemorrhoids. The overall morbidity rate was 18% (22 cases). We Found a statistically significant relationship between hemorrhoids/perianal complications and gestation-induced constipation through logistic regression analysis ($p < 0.001$).

Conclusion: A number of risk factors and biological explanations exist for the high frequency hemorrhoids during pregnancy. Anorectal symptoms during pregnancy and after childbirth is highly sensitive. Surgical treatment may be delayed in the absence of acute conditions. Various conservative measures such as adequate pain relief, sitz bath, oral and topical flavonoid preparations can effectively manage conditions like thrombosed internal hemorrhoids and perianal hematoma. Timely diagnosis and appropriate management can prevent further complications and improve the quality of life of affected women.

Key words: Anorectal diseases in pregnancy; Anorectal symptoms evaluation; Digital rectal examination; proctoscopy.

Introduction

Anorectal diseases refer to a range of conditions that affect the anus and rectum. These conditions can occur in pregnant and postpartum women and may be caused by a variety of factors, including significant physiological changes, hormonal changes, constipation and trauma during delivery. Pregnancy-related changes can reactivate chronic diseases and cause new ones. This can lead to

significant discomfort and negatively impact the quality of life of affected women.¹ Some of the common anorectal diseases that may affect pregnant and postpartum women includes- hemorrhoids, constipation, anal fissures, anal abscesses, anal fistulas and rectal prolapse. Hemorrhoids are classified as either external or internal and manifest with symptoms such as bleeding, prolapse, or vascular space thrombosis.²⁻⁵ External hemorrhoids are vascular spaces below the dentate line, covered by anoderm.³⁻¹¹ Enlargement and/or clinical symptoms occurring in anal cushions above dentate line are called internal hemorrhoids. They are covered by columnar epithelium and are weakly innervated.^{3, 4, 10, 11} So internal hemorrhoids are usually painless, even if they become prolapse or bleed.¹² Only strangulated and thrombosed internal hemorrhoids are intensely painful. External hemorrhoids are sensitive on palpation.¹¹ Often both external and internal hemorrhoids occur together called externo-internal hemorrhoid.^{10, 13} An anal fissure is a tear in the lining of the anus that can cause pain and bleeding during bowel movements. An anal abscess is a collection of pus near the anus, while an anal fistula is an abnormal communication

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that connects the anal gland to the skin near the anus covered with unhealthy tissues. These conditions can cause pain, swelling and discharge. Rectal prolapse occurs when the rectum protrudes out of the anus. It may cause pain, bleeding and difficulty with bowel movements.

Proper diagnosis and management of anorectal diseases in pregnant and postpartum women are essential to alleviate symptoms and improve their quality of life.⁶⁻⁸ In this study, we aim to explore the prevalence of anorectal diseases in pregnant and postpartum women attending in colorectal OPD and discuss their management strategies both conservative and surgery.

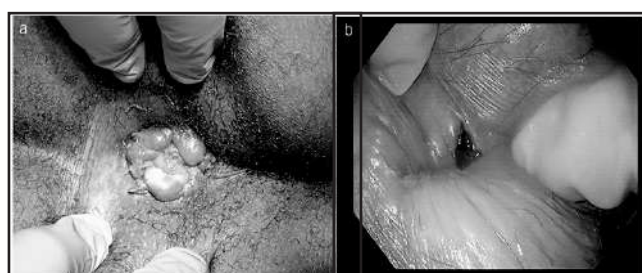


Figure 1 Haemorrhoid

Figure 2 Anal fissure

Materials and methods

This descriptive observational study includes 122 pregnant women with singleton pregnancies and no history of perianal diseases or systemic disorders that may predispose to hemorrhoids/anal fissures, such as immune/inflammatory ammatory diseases, diabetes mellitus, gastrointestinal tract problems and related surgical interventions. Patients were examined and completed a questionnaire including demographic, social, medical and perianal disease data in first trimester prior to their prenatal screening tests. Patients were re-examined and questioned in relation to anorectal disease occurrence twice more in second, third trimester of pregnancy and postpartum such as mucous discharge, itching, burning, pain, dyschezia, protrusion, and bleeding were evaluated. Constipation was defined according to Rome IV criteria.

All patients were interviewed and examined by the same surgeon which includes digital rectal examination and proctoscopy. The informed written consent forms were signed by all patients at the beginning of the study. Surgical treatment for anorectal diseases were delayed in the absence of acute conditions, various conservative measures such as adequate pain relief, sitz bath, oraland topical flavonoid preparations could effectively manage conditions like thrombosed internal hemorrhoids and perianal hematoma. Statistical analyses were performed using the Statistical Package for the Social Sciences for Windows 23 (SPSS, Inc, Chicago, IL).

Results

The mean age of the patients was 28 years (Range: 17–40). A total of 10(8.2%), 16(13.1%) and 22(18%) patient had symptomatic hemorrhoids with or without perianal complications in the second, third trimester of pregnancy

and postpartum, respectively (Table I). The overall morbidity rate was 18% (22 cases). Table I shows the frequency of perianal symptoms as well as external and thrombosed hemorrhoids in different gestational age. Multivariate logistic regression analysis could not demonstrate any statistically significant relationship between hemorrhoids/perianal complications and maternalage, gestational week at delivery and birth weight of the neonate.

Constipation was present in 4 (44.3%), 50 (41%), and 58 (47.5%) women in the second, third trimester of pregnancy and postpartum, respectively (Table II). In our study, we found a statistically significant relationship between hemorrhoids/perianal complications and gestation-induced constipation using logistic regression analysis ($p < 0.001$).

Table I Frequency of perianal symptoms in the second, third trimester of pregnancy and postpartum with enlarged and swollen hemorrhoids (n=122)

Symptom	Second trimester pregnancy n (%)	Third trimester of pregnancy n (%)	Postpartum period n (%)
Discomfort, mucous discharge, itching, burning	8(6.56%)	14(11.48%)	14(11.48%)
Pain, dyschesia, protrusion	2(1.64%)	-	4(3.28%)
Anal bleeding	-	2(1.64%)	4(3.28%)
Anal ssure	-	-	-
Total	10(8.2%)	16(13.1%)	22(18%)

Table II Constipation at second, third trimester of pregnancy and postpartum

Constipation	n=122
Second trimester pregnancy	54(44.3%)
Third trimester of pregnancy	50(41%)
Postpartum period	58(47.5%)

Discussion

The mechanism of development of hemorrhoids is not clearly understood but several factors causing this disease have been identified. During pregnancy, some mechanical factors increase the development of hemorrhoids. The growing of uterus during pregnancy results in increased abdominal pressure in addition to mechanical pressure to the upper part of rectum, inferior vena cava and portal vein which leads to development of venous stasis, especially in the second trimester of the pregnancy.^{4, 14-17} As a result, blood circulation to the internal anal sphincter reduces.⁴ In addition, during pregnancy, the total circulatory blood volume increased by 25–40%.^{3,12,15} These factors lead to vascular dilation and venous stasis in pelvis. Hormonal factor- increased progesterone also play an important role in

the development of hemorrhoid as it relaxes the walls of rectal veins, making them more prone to swelling.³⁻⁵The most common and proven risk factors are constipation, diarrhea, pregnancy, and childbirth. Pregnancy, childbirth and the postpartum period definitely increase the risk of hemorrhoids.^{4,5,18} Natural childbirth is also a risk factor for pelvic floor dysfunctions.¹⁹ Constipation (Due to less fluid intake and insufficient amount of taking fiber diet), difficult defecation, venous stasis due to increased abdominal pressure (With growing uterus) increased volume of circulating blood, hormonal factors (Progesterone), obesity and sedentary lifestyle contribute to the development of hemorrhoids during pregnancy.^{3-5,14,15,18, 20-23} Symptoms of anorectal diseases most commonly occur in the second and third trimester of pregnancy and after the childbirth.^{4,8,12,24-27} Risk of developing hemorrhoids directly related with number of pregnancies and deliveries. 70% of women diagnosed with hemorrhoids had at least one previous pregnancy.^{21,28,18} After the first pregnancy, hemorrhoids occur in 37.9% percent of women and after other pregnancies this number increases (After two pregnancies, 38.4%, after three or more pregnancies, 40%).²⁸ In addition, hemorrhoids occur in 85% of non primiparous women.^{29,30} Childbirth increases the risk of hemorrhoids almost eight times.³¹ There is an ongoing debate regarding the method of delivery and pelvic floor dysfunction. Some studies suggest that women who experience vaginal delivery have a higher risk of developing pelvic floor dysfunction than women who undergo cesarean section, while others failed to demonstrate any benefit with cesarean section.³² The method of delivery can cause hemorrhoids- women who give birth naturally (Normal delivery) and in whom instrumental delivery is used are more likely to develop hemorrhoids as compared to women that undergo cesarean section. A study in which a three-dimensional perineal ultrasound scanning of the anal sphincter complex was performed found that the delivery method has a certain influence on the shape of the anal sphincter complex. The thickness of the internal and external anal sphincter of primiparous women in a certain direction is significantly smaller than that by caesarean section.³³ However; patients with a cesarean section history should be encouraged to give vaginal birth. Although the second stage of labor is usually extended, the incidence of third- and fourth-degree perineal lacerations is not increased.³⁴ Other risk factors related to the previous deliveries are prolonged birth (More than 12 hrs), prolonged second stage of labor and straining duration, high weight of the newborn (4,000g and more), spontaneous childbirth and prolonged pregnancy (More than 40 weeks of pregnancy).^{35,4} The relation between constipation and hemorrhoids is established. Constipation during pregnancy definitely increases the risk of development of perianal diseases during pregnancy and up to six fold after childbirth.³¹ Upto 40% of women experience constipation

during pregnancy. Increased Body Mass Index (BMI) is a risk factor for hemorrhoids and perianal diseases during pregnancy and postpartum period. Constipation and hemorrhoids have strong negative effect on the physical and emotional well-being of women's health and deteriorate quality of life after childbirth. Most common acute perianal condition during pregnancy and after childbirth is perianal thrombosis and thrombosed internal topically hemorrhoids. Both diseases are characterized by a severe, sudden onset of pain forcing the seeking of medical help quickly. It is most commonly recommended to treat patients conservatively by prescribing adequate pain relief, oral, and topical avonoid preparations. Warm sitz baths are recommended, which improve blood circulation in the anal tissue and reduce pain by reducing the internal anal sphincter tonus. Although most pregnant women experience resolution of their symptoms with the conservative methods mentioned above, some women will need surgical treatment. In cases of large symptomatic perianal thrombosis, thrombectomy may be performed, ideally under local anesthesia. Also, surgical interventions in the presence of internal hemorrhoid thrombosis are not recommended, because of increased anal sphincter damage, and the increased risk of anal stenosis.

Conclusion

Hemorrhoids and perianal complications occur in about 40% of pregnant women and after child birth, usually in the third trimester of pregnancy and after giving birth. Constipation during pregnancy, perianal diseases during previous pregnancy and childbirth, instrumental delivery, straining duration of more than 20 minutes and newborn weight of more than 3,800g are associated with hemorrhoids and perianal complications. Perianal diseases reduce the quality of life of women. In the absence of acute conditions, surgical treatment of hemorrhoids is delayed after pregnancy, childbirth, and lactation. Thrombosed internal hemorrhoids and perianal thrombosis are to be treated conservatively in most instances by prescribing adequate pain relief, oral, and topical flavonoid preparations.

Disclosure

All the authors declared no competing interests.

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Association of Maternal Anemia with Perinatal Outcome

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ABSTRACT

Background: Maternal anaemia is an important global health problem that affects about 500 million women of reproductive age. Much is known about the consequences of anaemia during pregnancy, including the increased risks of low birthweight, preterm birth, perinatal mortality and neonatal mortality. The aim of the study to find out the relationship between maternal anaemia and perinatal morbidity and mortality.

Materials and Methods: It was a cross sectional study conducted on 100 patients at CMH Chattogram, during six months extending from December 2021 to May 2022. Detailed information was obtained in each cases according to protocol. Complete history was taken either from patient or accompanying attendants. Thorough clinical examination was done. Relevant investigation reports were collected. All the information was recorded according to fixed protocol. Collected data were classified, edited, coded and entered into the computer for statistical analysis by using SPSS version 23.

Results: In this study the prevalence of anaemia was 33.7% and majority 32(32.0%) patients belonged to age group 21-25 years with mean age was 27.5±6.2 years. Regarding causes of anaemia, majority 72(72.0%) patients had iron deficiency followed by 15(15.0%) had folate deficiency, 7(7.0%) had thalassemia. Most of the patients had moderate anaemia (45.0%), 37(37.0%) had mild and 18(18.0%) had severe anaemia. There was no significant association between parity and anaemia ($p=0.938$). FGR was significantly higher in severe anaemia patients than moderate anaemia patients (22.2% vs 8.9%). Preterm labour was significantly higher in severe anaemia patients than moderate anaemia and mild anaemia (55.6%, 24.4% and 10.8%). Other obstetric complications were not significantly associated with anaemia. Mode of delivery was not significantly associated with anaemia. Prematurity was significantly higher in severe anaemia patients than moderate anaemia and mild anaemia (33.3%, 15.6% and 5.4%). Low birth weight was significantly higher in severe anaemia patients than moderate anaemia and mild anaemia (61.1%, 26.7% and 16.2%).

Conclusion: In conclusion, the prevalence of anaemia was 33.7%. This study clarified that anaemia is prevalent among pregnant women particularly moderate anaemia. FGR and preterm labour were significantly higher in severe anaemia patients. Other obstetric complications were not significantly associated with anaemia. Prematurity, low birth weight, IUGR, low APGAR score were significantly higher in severe anaemia patients.

Key words: Maternal anaemia; Perinatal outcome; Pregnant women.

Introduction

Anemia is a serious health issue, especially for the underprivileged people in developing nations like Bangladesh. The World Health Organization (WHO) states that anaemia during pregnancy is indicated by hemoglobin levels below 11 gm/dl.¹ Anaemia during pregnancy is varies among countries. According to a study, anaemia affects 50% to 59% of pregnant women in Bangladesh.² During pregnancy, by 6 weeks, plasma volume begins to increase and it became plateaus at 30 weeks of gestation.

The rate of increase is nearly proportional to that of blood volume, although the maximum is reached when total plasma volume rises by 1.25 liters, or 50%. RBC mass is raised up to 20-30%. So The total volume is increased about 350ml.³ As plasma and RBC volume increase disproportionately, it produces a state of haemodilution (Fall of haematocrit) during gestation. Hence, RBC and hemoglobin concentration fall in pregnancy.³ It is believed that deficiency of iron is the main factor of anaemia in pregnancy. In a study, it has been shown that 87% anaemia is due to iron deficiency.^{4,5} Other factors are folate deficiency, thalassemia, menorrhagia, parasitic infection, chronic disease and bleeding during pregnancy.^{6,7,8}

In pregnancy, the placenta is significantly affected by anemia. It is believed that the placental surface area allowed for the transplacental exchange of respiratory gases and nutrients determines how well the fetus can develop inside the uterus.⁹ In a study, Levy et al. has found that maternal anaemia has been linked to an increased risk of maternal and fetal morbidity and mortality.¹⁰ It is also associated with increased rate of maternal preterm labour, PROM, postpartum hemorrhage and maternal infection. It

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also contributes to an increase in fetal preterm birth, low birth weight and prenatal mortality. Reports from India indicate that 16% of all maternal deaths are attributable to anaemia.¹¹ Maternal mortality due to anaemia in Bangladesh was reported 4% in 1991. It causes direct as well as indirect death of mother due to cardiac failure, haemorrhage infection and pre-eclampsia.¹² A study of "Effect of maternal anaemia on neonatal outcome" done in a specialized hospital in Bangladesh has shown that maternal anaemia has significant effect on neonatal birth weight and APGAR score.¹¹ The aim of the study to find out the relationship between maternal anaemia and perinatal morbidity and mortality.

Materials and methods

It was a Cross sectional study conducted on 100 patients at CMH Chattogram, during six months extending from December 2021 to May 2022. Our study included all patients with anaemia (Anaemia confirmed by Hb% <11 g/dl) in pregnancy admitted into Antenatal Ward, Department of Obstetrics and Gynecology, CMH Chattogram during the study period. Data was collected under guideline and supervision of the supervisor through a standard questionnaire, as information was collected after informed written consent from admitted patient through history taking physical examination and necessary laboratory reports and operative findings and follow up in puerperal period. Statistical analysis was carried out by using the Statistical Package for Social Sciences version 23.0 for Windows (SPSS Inc., Chicago, Illinois, USA). Frequency and percentage was calculated for categorical variables. The mean values were calculated for continuous variables. The quantitative observations were indicated by frequencies and percentages. Chi-Square test was used to analyze the categorical variables, shown with cross tabulation. 'p' values <0.05 was considered as statistically significant.

Results

Total 297 pregnant women were admitted in the Department of Obstetrics and Gynecology, CMH Chattogram during 6 months. Among them 100 pregnant women had anaemia as my study subjects and the prevalence rate was 33.7%. Majority 32(32.0%) patients belonged to age group 21-25 years with mean age was 27.5±6.2 years. Most of the patients completed primary education level (45.0%). Majority 92(92.0%) patients were house wife and 57(57.0%) patients came from urban area. Majority 90(90.0%) patients came from lower-middle income group family and 59(59.0%) patients were normal BMI. 84(84.0%) patients were primigravid and 16(16.0%) were multigravid.

Majority 72(72.0%) patients had iron deficiency followed by 15(15.0%) had folate deficiency, 7(7.0%) had thalassemia, 3(3.0%) had blood loss during pregnancy.

Table I Diagnosis and causes of anaemia during pregnancy (n=100)

Diagnosis and causes of Anaemia	Frequency	Percentage (%)
Iron deficiency (Serum ferritin levels <12µg/L)	72	72.0
Folate deficiency (Low serum folate level <1.4ng/mL)	15	15.0
Thalassemia (Measured by Hb electrophoresis)	7	7.0
Blood loss during pregnancy	3	3.0
Intestinal parasitic infection	2	2.0
Malaria	1	1.0

Among them more than half (52.0%) patients had irregular antenatal check up, 37(37.0%) had regular and 11(11.0%) were no antenatal check up.

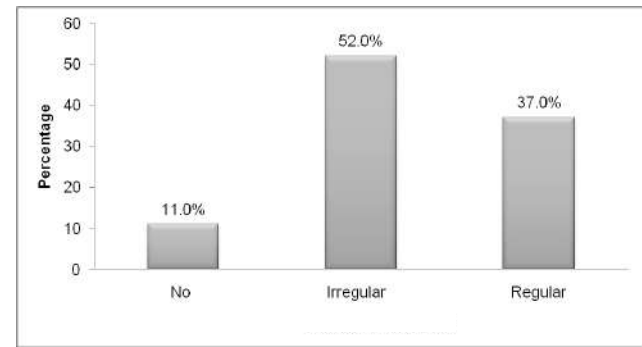


Figure 1 Antenatal check up

Regarding obstetrics complications, 25(25.0%) patients had preterm labour, 17(17.0%) had PROM, 8(8.0%) had preeclampsia, 8(8.0%) had FGR, 5(5.0%) had eclampsia, 3(3.0%) had UTI and PPH respectively. Other results are depicted in the table.

Table II Distribution of the study patients according to obstetric complications (n=100)

Obstetric complications	Number of patients	Percentage
Eclampsia	5	5.0
Preeclampsia	8	8.0
PROM	17	17.0
FGR	8	8.0
UTI	3	3.0
PPH	3	3.0
Preterm labour	25	25.0

Table III Association between types of anaemia with mode of delivery (n=100)

Mode of delivery	Mild anaemia (n=37)		Moderate anaemia (n=45)		Severe anaemia (n=18)		p value
	n	%	n	%	n	%	
Normal vaginal delivery	29	78.4	33	73.3	14	77.8	0.851 ^{ns}
Caesarean section	8	21.6	12	26.7	4	22.2	

s= significant, ns= not significant
p value reached from chi square test.

Table IV Distribution of the study patients according to fetal outcome(n=100)

Fetal outcome	Number of patients	Percentage (%)
Prematurity	15	15.0
Low birth weight	29	29.0
IUFD	3	3.0
Neonatal death	2	2.0
APGAR score at 1 min		
< 7	14	14.0
≥ 7	86	86.0
Morbidity		
Meconium aspiration syndrome	8	8.0
Respiratory distress	6	6.0
Hyaline membrane disease	2	2.0
Jaundice	1	1.0
Pulmonary hypoplasia	1	1.0

Discussions

In this current study it was observed that most of the patients had moderate anaemia (45.0%), 37(37.0%) had mild and 18(18.0%) had severe anaemia. Azharet al had observed that the prevalence of the severity of anaemia was 28.3% mild, 36.9% moderate and 3.4% severe.¹³ Singalet al reported that out of 200 cases of anaemia, 70% were moderately anaemic (Hb 7-9.9 gm/dl) and 30% were severely anaemic (Hb<7gm/dl).¹⁴ Khatana and Yadav described that the prevalence of anaemia varied in the patients.¹⁵ In the study 475 patients were found to have mild anaemia (Hb 9-11%) which accounted for 47.5% of the total cases observed. 22.5% had moderate anaemia (Hb7-8.9%). Severe anaemia (Hb<7 gm%) was observed in 10% of cases. So overall prevalence of anaemia in pregnancy was 80%. Savaliya et al demonstrated moderate anaemia was 44.28% and severe anaemia was 55.71%.¹⁶ Youssry et al reported a total of 2654 pregnant women fulfilled the inclusion criteria, 42% were anemic and they were sub-classified into mild group 83.3% (929/1115) that represents the majority of patients and moderate to severe group 16.7% (186/1115) of total anemic women.¹⁷ Another study done by Upadhyay and Upadhyay showed moderate anaemia observed in almost 53.0% cases followed by mild (29.5%) and severe (17.5%) respectively.¹⁸ The above mentioned studies finding were almost similar in this study. Regarding obstetric complications in this study observed that 25(25.0%) patients had preterm labour, 17(17.0%) had PROM, 8(8.0%) had preeclampsia, 8(8.0%) had FGR, 5(5.0%) had eclampsia, 3(3.0%) had UTI and PPH respectively. Savaliya et al reported that preterm labour was 40.0%, preeclampsia 15.71%, placenta previa 5.71%, PPH 18.5%.¹⁶ Preterm labour was experienced by 40% of women. It is comparable from the data of Devietal in which 44.68% had preterm labour.¹⁹

Present study showed FGR was significantly higher in severe anaemia patients than moderate anaemia patients (22.2% vs 8.9%). Preterm labour was significantly higher in severe anaemia patients than moderate anaemia and mild anaemia (55.6%, 24.4% and 10.8%). Other obstetric complications were not significantly associated with anaemia. Suryan araryana et al reported 80% of participants who had abortions, 40% of obstructed labor, 86% of Post Partum Hemorrhage (PPH), 71.4% of preeclampsia and all the women with prolonged labor were anemic.²⁰ There was a significant statistical association between anaemia and complications during pregnancy in the present study, which is similar to the study conducted by Youssry et al described that preterm labor was significantly higher moderate/severe anemic group than mild group (12.9% and 9.0%).¹⁷ Preeclampsia was found 6.1% in mild and 7.5% in moderate/severe anemic group. Post partum hemorrhage was significantly higher in moderate/severe anemic group than mild group (5.4% vs 2.9%). IUGR was 7.0% and 10.8% in mild and moderate/severe group respectively. PPH is one of the most serious complications in anemic pregnant women, our data revealed 3.3% among all anemic women (2.9% in mild cases and 5.4% in moderate and severe cases) this is in agreement with previous studies concluded that anaemia during pregnancy is associated with increased risk of PPH. In a recent study observed a 17-fold increased risk of PPH among pregnant women with moderate-severe anaemia, that these study was comparable to my study.²¹ Regarding fetal outcome in this study observed that 29(29.0%) babies had low birth weight, 15(15.0%) had prematurity, 3(3.0%) had IUFD and 2(2.0%) had neonatal death. At 1 minute APGAR score ≥ 7 was found 83(86.0%). Majority 8(8.0%) patients had meconium aspiration syndrome, 6(6.0%) had respiratory distress, 2(2.0%) had hyaline membrane disease. Prematurity was significantly higher in severe anaemia patients than moderate anaemia and mild anaemia (33.3%, 15.6% and 5.4%). Low birth weight was significantly higher in severe anaemia patients than moderate anaemia and mild anaemia (61.1%, 26.7% and 16.2%). IUFD was found in 3 babies and all of them were severe anaemia patients, that was significant. At 1 minute APGAR score <7 was significantly higher in severe anaemia patients than moderate anaemia and mild anaemia (33.3%, 13.3% and 5.4%). Neonatal death, meconium aspiration syndrome, respiratory distress, jaundice and pulmonary hypoplasia were not significantly associated with anaemia. In a study conducted by Suryan araryana et al.²⁸ reported that around 25% of women delivered low birth babies, 57% of Low Birth Weight (LBW) babies, 69% of abortions/stillbirths, and all the newborn with birth asphyxia occurred in mothers who were anemic.²⁰ Upadhyay and Upadhyay demonstrated that high incidence of adverse fetal outcome in the form of preterm (20%), IUGR (28%) and IUFD (3%).¹⁸ Singal et al described that adverse foetal outcome in the

form of preterm birth (17%), still birth (3.5%), low birth weight babies (27.5%), neonatal morbidity (23.3%) was more in the anaemic group than non anaemic controls.¹⁴ 95% of babies in the nonanaemic group had normal Apgar score at birth. Thus, anaemia in pregnancy is associated with lower Apgar score at birth. Khatana and Yadav found perinatal mortality was also very high in cases of severe anaemia 42%.¹⁵

In a study done by Savaliya et al had observed that 35.71% had PTB, 37.14% were LBW, 8.57% had IUFD, 15.71% had low APGAR at one minute, 14.28% had low APGAR at five minutes, 7.14% had birth asphyxia, 8.57% had Meconium Aspiration Syndrome (MAS) 17.14% had Respiratory Distress Syndrome (RDS), mostly with severe anaemia.¹⁶ Fetal morbidity following the same pattern was more with severe anaemia (53.84%). Youssry et al reported prematurity (12.9% vs 9.0%) was significantly higher in moderate/severe anemic group than mild group.¹⁷ Low Apgar score, preterm labor, and low birth weight babies were significantly higher in group II (Moderate/severe) compared to group I (Mild) (11.8%, 12.9%, 11.3% Vs 8.7%, 9.0%, 7.4%, p = 0.034, 0.046, 0.032). Lone et al studied 626 pregnant women and found that preterm delivery was 4.1 times more common in anemic pregnant women compared to non anemic.²¹ As regard Apgar score, we reported 9.2% low one minute Apgar score in anemic women and neonatal mortality was 0.7%, which is consistent with Lone et al. reported that neonates of anemic women had 1.8 times increased risk having low Apgar scores at 1 minute.²¹ The above mentioned studies finding were almost similar in this study.

Conclusion

In conclusion, the prevalence of anaemia was 33.7%. This study clarified that anaemia is prevalent among pregnant women particularly moderate anaemia. FGR and preterm labour were significantly higher in severe anaemia patients. Other obstetric complications were not significantly associated with anaemia. Prematurity, low birth weight, IUFD, low APGAR score were significantly higher in severe anaemia patients.

Disclosure

All the authors declared no competing interests.

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A Study on Knowledge, Attitude and Practice of Family Planning Methods among Women of Reproductive Age in Rural Area

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ABSTRACT

Background: Despite recent improvements in the use of Family Planning Methods (FPM) among married women in Bangladesh, the utilization rates are still far low. Therefore, there is a need to assess the level of knowledge and attitudes towards Family Planning (FP) and associated factors among reproductive-age women in rural area.

Materials and methods: This cross-sectional descriptive study was conducted from October 2022 to December 2022 among women of reproductive age residing in some selected villages in Chandina. Sample size was 147. Data was collected using a self-administered, semi-structured questionnaire with face to face interview.

Results: In this study, 87.8% of pregnant women were aware of FPM, among which 77.6% use FPM and most of them use oral pill (54.4%). Most respondents obtained information from health professionals (52.4%). About 35% of the respondents agreed that contraception was beneficial and that is to regulate the intervals between pregnancies (34.7%). Regarding knowledge on side effects of FPM more than 40% told about vertigo. The most prevalent reason for not wanting to use contraception in the future was their husbands wish (39.4%).

Conclusion: Primary health care providers play a major role in improving women's knowledge of FP. To support the success of FP, the government should emphasize on FP education. To ensure that women of reproductive age use effective FP methods, the education levels and socioeconomic status of women must be improved.

Key words: Attitude; Family planning method; Knowledge; Practice.

Introduction

The global population today stands at 7.7 billion and is expected to reach 9 billion by the year 2045.¹ Bangladesh is one of the most densely populated countries in the world.² Rapid population growth has been identified as the greatest problem of the present time, particularly in developing countries where this growth has a significant impact on human life.^{3,4} Government of Bangladesh viewed rapid population growth as a high priority problem, and decided to launch the national FP program in the mid-1970s. Since then, it has attempted to strengthen the FP program through increased resource allocation, multi-sectoral collaboration, mass media campaigns, employing field-staff to provide domiciliary FP services, and involving voluntary and private agencies. The government has been successful, to some extent, even in the context of a Muslim-majority country characterized by higher poverty, a lower literacy rate, and a lower level of women's autonomy.⁵ FP allows people to attain their desired number of children and determine the spacing of pregnancies.^{6,7} FP deals with reproductive health of the mother, having adequate

birth spacing, avoiding undesired pregnancies and abortions, preventing sexually transmitted diseases, and improving the quality of life of mother, fetus, and family as a whole. A woman can get pregnant if one of man's sperm reaches her egg (Ovum). Contraception tries to stop this either by stopping egg production or by keeping the egg and the sperm apart or by stopping the implantation of the fertilized egg into the uterus.⁸⁻¹⁰ Most of reproductive age women know little or incorrect information about FPM. These women have negative attitude about FP, while some have heard false and misleading information.^{11,12} The practice of FP helps in reducing the rates of unintended pregnancies, of maternal and child mortality and of induced abortions. In addition, using contraceptives has been shown to promote a woman's sense of autonomy and increase her ability to make decisions in other areas of her life.¹³⁻¹⁶ However, social inequality, religious/cultural barriers, weak coordination across sectors, inadequate quality assurance actions and misconceptions about modern contraceptives were reported as the challenges for FP implementation.¹⁷

The aims of this study were to explore the level of knowledge about FPM among rural women of reproductive age, the prevalence of use, preferences and reasons for using family planning methods and their attitudes towards family planning.

Materials and methods

This cross-sectional descriptive study was conducted from October 2022 to December 2022 among women of reproductive

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age residing in some selected villages in Chandina. Sample size was 147. Data was collected using a self-administered semi-structured questionnaire with face to face interview. The data obtained was edited manually, and then analyzed using the Statistical Package for the Social Sciences (SPSS) version 26.

Results

Table I Characteristic of the study population (n=147)

Variables	Categories	Frequency (Percentage)
Age Group (Years)	15-24	54(36.7)
	25-35	51(34.7)
	35-45	42(28.6)
Religion	Muslim	138(93.9)
	Christian	3(2.0)
	Hindu	6(4.1)
Educational qualifications	Illiterate	23(15.6)
	Primary	29(19.7)
	Secondary	65(44.2)
	Higher secondary Honours and above	20(13.6) 10(6.8)
Husband Education	Illiterate	14(9.5)
	Primary	32(21.8)
	Secondary	56(38.1)
	Higher secondary Honour and above	26(17.7) 19(12.9)
Occupation	Service	7(4.8)
	House wife	130(88.4)
	Worker	5(3.4)
	Others	5(3.4)
Husband occupation	Labour	30(20.4)
	Business	23(15.6)
	Service	35(23.8)
	Living abroad Others	24(16.3) 35(23.8)
Monthly family income (BDT)	5000-10000	39(26.5)
	10000-20000	62(42.2)
	20000-40000	24(16.3)
	40000-60000	14(9.5)
	>60000	8(5.4)
Duration of marriage	1-10 year	47(32.0)
	10-20 year	63(42.9)
	20-30	23(15.6)
	More than 30	13 (8.9)
Number of family member	1-3	29(19.7)
	4-6	84(57.1)
	7 and more	34(23.2)
Number of child	0	13(8.8)
	1	37(25.2)
	2	48(32.7)
	3	42(28.6)
	4 and more	7(4.8)

Table II Distribution of the respondent according to their knowledge on family planning, source of knowledge and use of family planning methods (n=147)

Variables	Categories	Frequency	Percentage
Knowledge on family planning	Yes	129	87.8
	No	18	12.2
Source of knowledge on family planning	Radio, television (Media)	30	20.4
	Health worker	77	52.4
	Husband	16	10.9
	Neighbor	17	11.6
	Others	7	4.7
Use of family planning methods	Yes	114	77.6
	No	33	22.4

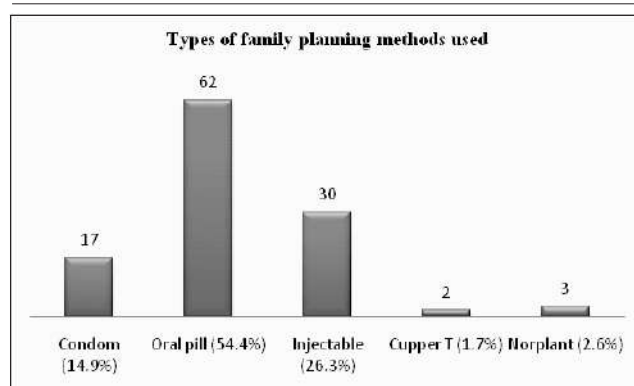


Figure 1 Types of family planning methods used (n=114)

Table III Distribution of the respondent according to their best types, starting time, benefit, side effects, cause of not using of family planning methods and visit in family planning center (n=114)

Variables	Categories	Frequency	Percentage
Knowledge about best family planning methods	Condom	20	17.5
	Oral pill	59	51.8
	Injectable	26	22.8
	Copper T	8	7.0
	Norplant	1	0.9
Starting of family planning methods	After marriage	16	14.1
	After one year of marriage	7	6.1
	After 1 st child	69	60.5
	After 2 nd child	12	10.5
	After 3 rd child	10	8.8
Knowledge on benefit of family planning methods	To determine the number of children in the family	29	19.7
	To regulate the intervals between pregnancies	51	34.7
	To avoid unwanted births	36	24.5
	To bring about wanted births	5	3.4
	Don't know	8	5.4

Variables	Categories	Frequency	Percentage
Knowledge on side effects of family planning methods	Bleeding	23	20.2
	Lower abdominal pain	10	8.8
	Vertigo	47	41.2
	Weight gain	12	10.5
	Infertility	22	19.3
Cause of not using of family planning methods	Husband wish	13	39.4
	For male baby	3	9.1
	Fear about side effect	8	24.2
	Religious cause	3	9.1
	Others	6	18.2
Visit in family planning center	Regularly	28	24.6
	Irregularly	64	56.1
	Never	22	19.3

Discussion

In the present study, most of the women (36.7%) belong to the age group of 15-24 years. A study conducted by Kumari L et al, observed that most of the women fall in the age group of 21-30 years.¹⁸ According to their religion most of the respondents were muslim 138(93.9), followed by hindu 6(4.1%). About forty five percent respondents and 38.1% husbands studied up to secondary level and only 23(15.6%) were illiterate. This figure is comparable to study conducted by Ullah I et al, and Tuladhar H et al, where most of the respondents were literate.^{19, 20} In concern of occupation of the respondents, most of the respondents were housewife 130(88.4%) then followed by service holder 7(4.8%). Most of the respondent's monthly family income were 10,000-20,000 62(42.2%), followed by 5000-10000 39(26.5%), 20,000-40,000 24(16.3%), 40,000-60,000 14(9.5%) and > 60,000 8(5.4%). In our study the duration of marriage life was 10-20 year in 42.9% study population and the mean duration of marriage was 10.3±8.14 years found by Inal ZO et al.²¹ Number of family member was observed 4-6 in 57.1% study population and 32.7% study population had at least 2 children. Almost ninety percent of the respondents in this study knew about FP. Similar findings were reported in a national survey in Nigeria by Duze C in 2013 where contraceptive knowledge was reported to be 85.2%.²² Another similar finding was reported in Nigeria BY Johnson O among women of child bearing age in 2015 where contraceptive knowledge was reported to be 88.5%.²³ The concept of FP was well known to respondents. 760 (94%) female and 795 (98%) male respondents was found by Tilahun T et al in Ethiopia.²⁴ But dissimilar finding was found by Bekele et al. in Ethiopia that less than half, 1254 (43.4%) of the participants had good knowledge and 1511 (52.3%) had favorable attitude towards FP.²⁵ The source of participants' knowledge regarding family planning in our study showed that health workers were the most recorded source of information, followed by Radio, television (Media), neighbor, husband and others were the least important sources. This finding is similar to other studies conducted in different regions of

Indonesia that health professionals (63.30%) was the major source of information.²⁶ Al musa, et al. found family members were the most common source of information (51.8%) in Kingdom of Saudi Arabia.²⁷ A total of 77.6% of the women in our study were using FPM, similar findings were reported in by Calikoglu E.O. et al. that 77.7% (n=487) used some kind of FPM.²⁸ But the current use of FPM was just 27% as found by Mosunmola F Tunde-Ayinmode in Nigeria in 2013 and similar finding was found by K A Obisesan in Nigeria that is 10% using withdrawal, 8.1% using oral contraceptives, 5.2% using IUDs, and 4.7% using condoms.^{29,30} In case of types of FPM used, our study showed that oral pill was the most known type of contraception, followed by injectable and male condoms, which agrees with other studies previously conducted in Saudi Arabia by Mubashar H, Al-Musa HM, Al Sheeha M.³¹⁻³³ Similarly, a study conducted in Qatar by Arbab AA, reported that the most commonly known methods were OCPs (90.0%) and IUDs (89.1%), which was consistent with our findings.³⁴ Oral pill was found most commonly in other studies by Alsharif S S, J C Konje, SM Hanifi and Arun Kumar Joshi.³⁵⁻³⁸ In concern to time of starting of FPM more than 60% started after 1st child was born, K L Austin found 43% begun FPM in between 17 and 25 years of age.³⁹ To regulate the intervals between pregnancies is the benefit of FPM 34.7% of our study participants. The acquired freedom to choose easily the number of children they wish to have, was found the benefits of FP by G Benagiano.⁴⁰ A study was carried out in patients attending OPD (Outpatient Department) of Obstetrics and Gynecology at ASCOMS, Jammu, Jammu and Kashmir, India by Mahvish Qazi told FPM are meant for limitations of birth (43%) and 36% meant for spacing of birth.⁴¹ In our study, the common side effects of FPM was vertigo (30.6%) followed by bleeding (20.2%), infertility (19.3%), weight gain (10.5%). Irregular bleeding was found common side effects of FPM by K Fox and S Kumar.^{42,43} Husbands wish (39.4%) is the most common reasons for not using FPM were found in our study. The most common reasons for not using FPM among men and women were fear of side effects and desire of a male child (58%) by Sultan S and Azad MAK.^{44,45} Main reason for non-utilization of FPM as found by Nayak AK was desire of child (42%), fear of side effects (17%), and husband and in-laws opposition (16%).⁴⁶

Limitation

- The study was conducted among the married women of reproductive group in selected area. So the study findings may not represents the whole population of the country.
- In this study, sample size was not adequate to represent the real results about family planning methods used by the reproductive aged women.
- In this study financial resources was inadequate.
- Furthermore, many of the studies reported on data were from 2019 or earlier which may not give an accurate view of the situation in Bangladesh in 2021.

Conclusion

Primary health care providers play a major role in improving women's knowledge of FP. To support the success of FP, the government should emphasize on FP education. To ensure that women of reproductive age use effective FPM, the education levels and socioeconomic status of women must be improved.

Recommendation

- It is needed to launch the family planning programed or reproductive health programed to increase the knowledge, attitude and practice of birth control methods.
- The study was conducted among the child bearing women age 15-49 years attending at Center for Women and Children (CWC) Cumilla Cantonment, but there is a scope to conduct this study among the child bearing women of slum, rural or urban areas.
- Health care providers need to counsele the couple on method use, option, and accurate information of its risk to allay health concerns.
- Studies on large sample size may be taken for more accurate description of the problem.

Disclosure

All the authors declared no competing interests.

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▣ Bibliometric Approach to Understanding the Role of C-Reactive Protein in Predicting Sepsis Outcome

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ABSTRACT

Background: Over the years, numerous studies have explored the utility of C-Reactive Protein (CRP) as a potential biomarker for assessing sepsis prognosis. This bibliometric study aims to provide a comprehensive analysis of the existing literature on the role of CRP in predicting sepsis outcome.

Materials and methods: This bibliometric analysis investigated the publications that were produced from 1987 to 2022 and indexed in Scopus data base. The data base was inspected for all documents related to C-reactive protein. About 390 documents were found and examined in data base. They Biblioshiny and VOS viewer software were used to imagine the co-occurrence arrangement.

Results: The analysis found greatest publications resulted out from the 'China' (n=313), 'Italy' (n=286), and 'USA' (n=272). Additionally, the results found that, most of the publications are journal article (n=300) where 'Plos One' journal supplied the majority of documents (n=11), 'Frontiers in Immunology' (n=10), and 'Critical Care' supplied total 7 journal articles. Almost all documents were produced in the last decade (2011-2021). The study found most relevant affiliations where the Medical University of Innsbruck ranked first (n=22), University of Lubeck ranked 2nd (n=21) and Johns Hopkins University School of Medicine ranked 3rd (n=20). The study found LI J (n=4), Chen Y (n=3) and Donnelly JP (n=3) as the most productive author in the field. The co-occurrence scrutiny confirmed that the study formed five clusters. The study found that 'Sepsis', 'C-reactive Protein', 'human/s', 'procalcitonin', 'treatment outcome', and 'mortality' are the most useful co-occurrence keyword plus on the topic.

Conclusion: This bibliometric analysis has provided a comprehensive overview of the research landscape surrounding the role of C-Reactive Protein (CRP) in predicting sepsis outcome. Through systematic evaluation of a large collection of scholarly articles, this study has shed light on publication trends, key contributors, and research themes in this field.

Key words: Bibliometric analysis; C-Reactive Protein (CRP); Prognosis; Sepsis; Scopus database.

Introduction

The word sepsis originated from the old Greek word.¹ Sepsis remains a significant global health challenge, with high mortality rates and substantial healthcare costs. It is a complex condition characterized by a dysregulated systemic response to infection, leading to organ dysfunction and failure. Timely and accurate identification of sepsis, as well as the prediction of patient outcomes, are crucial for effective management and improved survival rates.

In recent years, there has been growing interest in the role of biomarkers as diagnostic and prognostic tools in sepsis. C-Reactive Protein (CRP) an acute-phase reactant synthesized by the liver in response to inflammation, has emerged as a potential indicator for assessing sepsis outcomes.

CRP levels have been associated with disease severity, organ dysfunction, and mortality in septic patients. Its ease of measurement, relatively low cost, and widespread availability make it an attractive candidate for clinical use. C-Reactive Protein (CRP) levels have recently been linked to severe pneumonia, according to certain research, and can be used to diagnose pneumonia early.²

It is helpful to assess CRP on a daily basis in ICU patients to track the progression of sepsis that has been verified by a microbiological test and to determine whether treatment has been effective.³

Vaezi et al. studied to identify the efficacy of synbiotic supplementation on clinical and paraclinical outcomes of hospitalized COVID-19 patients. They revealed that the levels of ESR (p = 0.935) and CRP (p = 0.952) had a higher reduction trend in the synbiotic group relative to the placebo, with no significant between-group differences.⁴

Bibliometric analysis is an arithmetical process which could quantitative analysis the intellectual research papers concerned about one particular topic via statistical ways.⁵ Bibliometric is one kind of quantitative method that adopts different processes like co-authorship and co-occurrence analysis to evaluate research outputs and research

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trends.⁶ Co-occurrence and co-authorship study is the most scientific system of scientometric analysis that is applied in the assorted area to recognize the sub fields, interactions among the sub-fields, and therefore the improvement and variations in the area of computer programs in biomedicine, hypertension clinical guidelines and other area of medicine.⁷

Numerous techniques have appeared to scrutinize huge amount of publications on both macroscopic and microscopic levels.⁸ Bibliometrics is one of them, which is used to perform the statistical and mathematical analysis study publication. The existence of bibliometrics in medicine and health research enables the researchers to scrutinize lots of researcher outputs and their document patterns on macroscopic and infinitesimal stages.⁹ These types of analysis are an ever more key element of a broader "toolbox" of assessment technique accessible to policymakers to hold up administrative power.¹⁰ Basically bibliometric approach have been used in discovering the invention of science for inspection, as was done in a study to find out rising tendency and knowledge formation of CRP.¹¹

While individual studies have investigated the relationship between CRP and sepsis outcome, a comprehensive overview of the research landscape is lacking. A bibliometric analysis offers a valuable approach to systematically evaluate the existing literature, identify research trends, and highlight key contributions in a specific field. By quantifying publication patterns, authorship networks, citation analysis, and co-occurrence of keywords, a bibliometric study can provide a holistic understanding of the role of CRP in predicting sepsis outcome.

Therefore, this study aims to conduct a bibliometric analysis of the literature related to CRP as an indicator for determining sepsis outcome. By synthesizing and analyzing a vast collection of scholarly articles, this study seeks to uncover publication trends, identify influential authors and institutions, and map the key research themes in this domain. Furthermore, citation analysis and co-occurrence of keywords will shed light on seminal studies and the broader context of CRP's role in sepsis prognosis.

Materials and methods

Using bibliometric techniques, a systematic search was conducted in Scopus scientific databases, resulting in a collection of relevant articles published up to the year 2022. Various bibliometric indicators, including publication trends, authorship patterns, the most cited publications, productive authors, country, prolific journal, and co-occurrence analysis, were employed to identify key research themes and highlight significant contributions in this area. The research applied a bibliometric technique to examine the production in the area of CRP. The research searched the databases first and identified the best study's requirements. Entitled studies were chosen from Scopus data base from 1987 to January 2022.

Table I Main information about data retrieved from Scopus database (1987-2022)

Timespan□	1987:2022
Sources (Journals, Books, etc)□	300
Documents□	390
Annual Growth Rate %□	11.42
Document Average Age□	7.54
Average citations per doc□	28.12
References□	17065
DOCUMENT CONTENTS□	
Keywords Plus (ID)□	4919
Author's Keywords (DE)□	942
AUTHORS□	
Authors□	2830
Authors of single-authored docs□	10
AUTHORS COLLABORATION□	
Single-authored docs□	10
Co-Authors per Doc□	7.48
International co-authorships %□	15.13
DOCUMENT TYPES□	
Article□	298
Book chapter□	2
Conference paper□	5
Editorial□	1
Note□	3
Review□	80
Short survey□	1

In the study, the researchers restricted the early search to documents that integrated 'C-Reactive Protein' and 'Predicting Sepsis Outcome' in the "Title". In the preliminary search total 390 publications were scrutinized. Annual growth rate was 11.42%, average citations per doc were 28.12 and references were 17065. In the type of document content, keywords plus were 4919 and author's keywords were 942. There were single-authored docs 10, co-authors per doc 7.48 and international co-authorships 15.13%. Among the documents, 298(74%) were 'Journal Article', 80(1.00%) were 'review article', 5(5.03%) were 'conference paper', 3 (2.68%) were 'note', 2 (3.35%) were 'book chapter' (1.67%) were 'editorial' (Table I).

In Fig 1, the large amount of publications was produced during the period of 2011 and 2021 years and the least numbers of documents were produced in between 1987 to 2000. The increasing prototype on role of CRP studies between 2011 and 2021 and the sequential circulation revealed three stages in the producing tendency (Fig. 1). Biblioshiny and VOS viewer (version 1.6.17) software was applied for imagination of the research networks.¹² Strategic maps are built using Biblioshiny program that was established by Aria and Cuccurullo.¹³

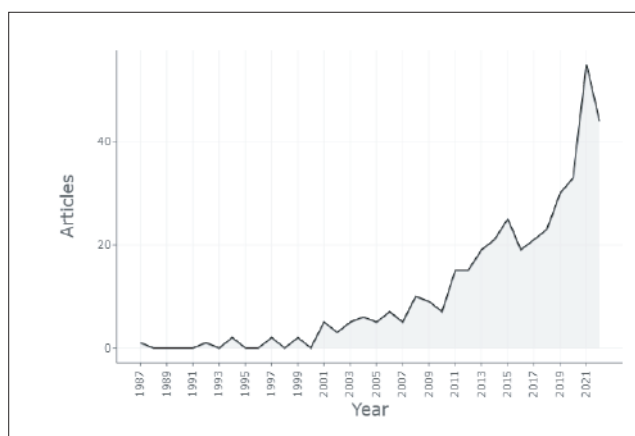


Figure 1 Annual Scientific Production on C-Reactive Protein (CRP)

Results

The most frequently fractionalized papers included as Hannan NJ (n=10, AF = 1.22) Tong S(n=10, AF =1.22) Kaitu'u-Lino TJ (n=9, AF=1.13) Huppertz B (N=7, AF=3.72) and Rana S (n=7, AF=1.02) respectively. Table II shows the top 10 most cited papers along with details of the published articles in the research area, where the article 'Effect of interleukin-1β inhibition with canakinumab on incident lung cancer in patients with atherosclerosis: exploratory results from a randomised, double-blind, placebo-controlled trial' by Ridker PM et al. is appeared as the most cited (TC: 762) paper in the area.

Table II The top 10 recent and top cited papers in C-reactive Protein (CRP) in Scopus database

SN	Author	Title	Journal	DOI	Total Citation
1.	Ridker PM et al. (2017) ¹⁴	Effect of interleukin-1β inhibition with canakinumab on incident lung cancer in patients with atherosclerosis: Exploratory results from a randomised, double-blind, placebo-controlled trial	Lancet	10.1016/S0140-6736(17)32247-X	762
2.	Fowler AA, et al. (2019) ¹⁵	Effect of Vitamin C Infusion on Organ Failure and Biomarkers of Inflammation and Vascular Injury in Patients With Sepsis and Severe Acute Respiratory Failure	JAMA	10.1001/jama.2019.11825	472
3.	Rau B. (1997), ¹⁶	The potential role of procalcitonin and interleukin 8 in the prediction of infected necrosis in acute pancreatitis	Gut	doi: 10.1136/gut.41.6.832	341
4.	Ammori, B.J. et al (1999) ¹⁷	Early increase in intestinal permeability in patients with severe acute pancreatitis: Correlation with endotoxemia, organ failure, and mortality. J Gastrointest Surg 3, 252–262	Journal of Gastrointestinal Surgery	doi.org/10.1016/S1091-255X(99)80067-5	272
5.	De Conno et al. (2009) ¹⁸	Anesthetic-induced improvement of the inflammatory response to one-lung ventilation	Anesthesiology	10.1097/ALN.0b013e3181a10731	216
6.	Steppan J, (2011) ¹⁹	Sepsis and Major Abdominal Surgery Lead to Flaking of the Endothelial Glycocalyx	Journal of Surgical Research	10.1016/j.jss.2009.04.034	196
7.	Waydhas C. et al. (1992) ²⁰	Inflammatory mediators, infection, sepsis, and multiple organ failure after severe trauma	Arch Surg	10.1001/archsurg.1992.01420040106019	172
8.	Zhao M. (2020) ²¹	Cytokine storm and immunomodulatory therapy in COVID-19: Role of chloroquine and anti- IL-6 monoclonal antibodies	Int J Antimicrob Agents	10.1016/j.ijantimicag.2020.105982	168
9.	Sakr Y., Sponholz, C., Tuche, F. et al. (2008) ²²	The Role of Procalcitonin in Febrile Neutropenic Patients: Review of the Literature	Infection	doi.org/10.1007/s15010-008-7374-y	149
10.	Sponholz, C. (2006) ²³	Diagnostic value and prognostic implications of serum procalcitonin after cardiac surgery: A systematic review of the literature	Critical Care	doi.org/10.1186/cc5067	145

The Top most Prolific Authors, Affiliations, Journals Sources, Andcountry

Table III demonstrated the top 10 productive authors, affiliations, sources and countries, with the most research article. The Top 5 scholars publishing articles were LI J (TA=04), Chen Y (TA=03), Nelly JP (TA=3), Lin X (TA=3) and Moldawer LL (TA=3). The 'Medical University of Innsbruck 'with 22 total studies; 'University of Lubeck' with 21 total studies and ' Johns Hopkins University School of Medicine' with 20 total studies and 'Universite De Bourgogne' with 20 total studies are the most dominant institutions/affiliations correspondingly. 'Plos One' is the most prolific resource journal, with the 11 total documents. The 'Frontiers in Immunology', with 10 total studies, 'Critical Care', with 7 total studies, 'Clinical Chemistry and Laboratory Medicine' with 5 total studies and 'Journal of Clinical Medicine' with 5 total studies absorbed th esucceeding publications. The 'China' is the top most productive country in producing the topic related research, with the 313 total studies. 'Italy', with 286 total studies, 'USA', with 272 total studies, 'Germany', with 228 total studies and 'United Kingdom', with 119 total studies place the subsequent countries.

Table III Top 20 Prolific Authors, Affiliations, Journals and Countries in the field

A. Author	Article	B. Affiliation	Article	C. Journals	Article	D. Countries	Article
LI J	4	Medical University of Innsbruck	22	Plos One	11	China	313
CHEN Y	3	University of Lubeck	21	Frontiers in Immunology	10	Italy	286
NELLY JP	3	Johns Hopkins University School of Medicine	20	Critical Care	7	USA	272
LIN X	3	Universite De Bourgogne Franche-Comte (UBFC)	20	Clinical Chemistry and Laboratory Medicine	5	Germany	228
MOLDAWER LL	3	University Hospital	20	Journal of Clinical Medicine	5	UK	119
REINHART K	3	Medical University of Graz	19	World Journal of Clinical Cases	4	India	109
TREML B	3	Prague	19	Antibiotics	3	Turkey	103
WANG HE	3	Chang Gung University	17	Clinical Nutrition Espen	3	France	74
AGRAWAL A	2	University of Genoa	17	Critical Care Medicine	3	Egypt	70
ARMAGANIDIS A	2	University of Health Science	17	Journal of Clinical Apheresis	3	Australia	64

Co-word Network Analysis

Figure 2 and Table 4visualizes co-occurrence keyword plus of the words used by scholars,who produced CRP related documents. Examination of keywords is one o fthe outstanding justifications of bibliometric era. A scan be demonstrated in figure-3 and table IV, a total of 51 keywords were recorded into 4 clusters.

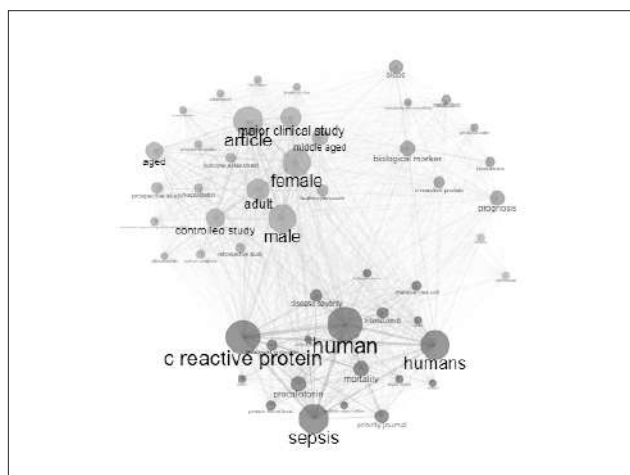


Figure 2 Co-occurrence keywordplus

Table IV The analysis of co-occurrence keywordplus

Node	Cluster	Betweenness	Closeness	PageRank
Sepsis	1	1.323887699	0.020408163	0.043901263
C reactive protein	1	1.812786604	0.020408163	0.052081271
Human	1	1.982628823	0.020408163	0.053774468
Humans	1	1.152470404	0.020408163	0.043128063
Procalcitonin	1	0.259610535	0.020408163	0.021736461
Treatment outcome	1	0.1031066	0.020408163	0.015677379
Mortality	1	0.19341553	0.020408163	0.022385655
Priority journal	1	0.24884426	0.020408163	0.019399605
Interleukin 6	1	0.2067195	0.020408163	0.0170576
Inflammation	1	0.083501619	0.020408163	0.013233456
Disease severity	1	0.147799652	0.020408163	0.018178658
Intensive care unit	1	0.067502372	0.020408163	0.014771634
Protein blood level	1	0.074858424	0.020408163	0.014691564
Critical illness	1	0.030299997	0.020408163	0.009148275
Septic shock	1	0.059594643	0.020408163	0.011934531
Infant	1	0.021841908	0.019607843	0.009104175
Multiple organ failure	1	0.031160898	0.020408163	0.009327739
Child	1	0.013663403	0.019607843	0.008642309
Fever	1	0.031321886	0.02	0.009625019
Female	2	0.683152066	0.020408163	0.042257548
Male	2	0.672689447	0.020408163	0.041636148
Article	2	0.660654866	0.020408163	0.044086963

Node	Cluster	Betweenness	Closeness	PageRank
Adult	2	0.230388	0.020408163	0.031963266
Aged	2	0.050648605	0.019230769	0.025151423
Middle aged	2	0.075441955	0.02	0.023720442
Major clinical study	2	0.168661541	0.019607843	0.030301364
Controlled study	2	0.224390452	0.020408163	0.027336429
Leukocyte count	2	0.092062934	0.020408163	0.016651568
Hospitalization	2	0.052441	0.020408163	0.014012759
Prospective study	2	0.041600859	0.02	0.0169054
Outcome assessment	2	0.107607961	0.020408163	0.015470703
Retrospective study	2	0.05573624	0.020408163	0.014568818
Cohort analysis	2	0.045650822	0.020408163	0.01369812
Adolescent	2	0.025885564	0.020408163	0.009118735
Clinical article	2	0.030798249	0.019607843	0.011515827
Pneumonia	2	0.047465893	0.020408163	0.011380892
Length of stay	2	0.019919047	0.02	0.010736577
Receiver operating characteristic	2	0.026428032	0.020408163	0.01377674
Prospective studies	2	0.017630839	0.02	0.012639858
Risk factor	2	0.030416845	0.020408163	0.0107442
Review	3	0.02599405	0.018518519	0.010789913
Nonhuman	3	0.023064114	0.019607843	0.009458095
Prognosis	4	0.19396381	0.020408163	0.021681944
Biological marker	4	0.187067879	0.020408163	0.022213373
Blood	4	0.09435315	0.020408163	0.019416656
C-reactive protein	4	0.072853145	0.020408163	0.016526833
Metabolism	4	0.060021193	0.020408163	0.014240789
Biomarkers	4	0.051660238	0.020408163	0.015563478
Sensitivity and specificity	4	0.044195349	0.02	0.012753422
Predictive value	4	0.042141096	0.020408163	0.01188259

The leading keywords from 4 clusters are 'Sepsis, C-reactive Protein', 'human' from cluster 1, 'Female', 'Male' and 'Article' from cluster 2, 'review' and 'nonhuman' from cluster 3 and 'prognosis', 'biological marker' and 'blood' from cluster 4 are the most useful co-occurrence keyword plus on the study topic.

Discussion

The analysis revealed a growing interest in the role of CRP in predicting sepsis outcome, with a substantial increase in publications observed in recent years. The results further identified key authors, institutions, and countries that have made significant contributions to this field. Moreover, citation analysis revealed seminal articles that have had a substantial impact on subsequent research.

Co-occurrence analysis of keywords provided insights into the broader context of CRP's role in sepsis outcome prediction, highlighting associations with other relevant biomarkers, diagnostic tools and therapeutic interventions. This analysis facilitates a better understanding of the multidimensional aspects of sepsis and the intricate relationships between CRP and other factors involved in sepsis prognosis.

By employing a bibliometric approach, this study offers a comprehensive overview of the research landscape surrounding CRP as an indicator for determining sepsis outcome. The findings provide researchers, clinicians, and policymakers with valuable insights into the current state of knowledge in this area, identify research gaps, and suggest potential avenues for further investigation. Ultimately, this bibliometric analysis contributes to the advancement of sepsis research and facilitates evidence-based decision-making for improved patient care and outcomes.

The study exposed the top 10 most cited papers along with details of the published articles in the research area, where the article 'Effect of interleukin-1 β inhibition with canakinumab on incident lung cancer in patients with atherosclerosis: exploratory results from a randomised, double-blind, placebo-controlled trial' by Ridker PM et al. is appeared as the most cited (TC: 762) paper in the area.

The study revealed the top 10 productive authors, affiliations, sources and countries, with the most research article. Among the top 10 scholars, LI J ranked 1st with total 4 articles, Chen Y ranked 2nd with 03 articles, Nelly JP ranked 3rd with 3 articles, Lin X ranked 4th with 3 article and Moldawer LL ranked 5th with 3 articles. Our paper, however, revealed the top 10 affiliations, The 'Medical University of Innsbruck' ranked 1st with 22 articles, 'University of Lubeck' ranked 2nd with 21 studies and 'Johns Hopkins University School of Medicine' ranked 3rd with 20 research papers and 'Universite De Bourgogne' ranked 4th with 20 documents are the most dominant institutions/affiliations correspondingly. Among the top journal source 'Plos One' is the most prolific journal with the 11 documents. The 'Frontiers in Immunology', ranked 2nd with 10 studies, 'Critical Care' ranked 3rd with 7 documents, 'Clinical Chemistry and Laboratory Medicine' ranked 4th with 5 studies and the 'Journal of Clinical Medicine' ranked with 5 studies absorbed the succeeding publications. Moreover, Among the top productive countries, 'China' is the top most productive country with the 313 total studies. 'Italy' ranked 2nd with 286 studies, 'USA' ranked 3rd with 272 studies, 'Germany' ranked 4th with 228 studies and 'United Kingdom' placed 5th with 119 studies. Likewise, the scrutiny of co-occurrence of keyword plus exposed four clusters. The leading keywords from 4 clusters are 'Sepsis, C-reactive Protein', 'human' from cluster 1, 'Female', 'Male' and 'Article' from cluster 2, 'review' and 'nonhuman' from cluster 3 and 'prognosis', 'biological marker' and 'blood' from cluster 4 are the most useful co-occurrence keyword plus on the study topic.

The findings of this study will contribute to a deeper understanding of the current state of knowledge regarding CRP in sepsis outcome prediction. It will not only provide researchers with valuable insights into the research landscape but also help guide future investigations, identify research gaps, and support evidence-based decision-

making in clinical practice. Ultimately, the aim is to improve sepsis management, enhance patient outcomes, and reduce the burden of this devastating condition.

Limitations

Despite the fact that our paper presents an inclusive review of the placenta induced hypertension production during the period of 1987 to 2022, it has some confines. Initially, our research area is confined with only Scopusasa media. In spite of the distinguished dataset, it holds a tiny part of the whole medical related publications obtainable. Hence, the prototype and measures shaped in the study might not be expanded towards C-reactive Protein related publications. We merely examine the annual scientific production, productive authors, affiliations, journal source, countries and co-occurrence keyword plus, others can work on co-citation, social structure, network, citation networks.

Conclusion

The investigation demonstrated the study tendency, effect as well as group efforts amid of scholars in the area of C-reactive Protein (CRP) from 1987 to 2022. The study stated the progress of research movement in this field which emphasizes the CRP research trend. This study shows the demand to amplify research aid and research outputs in CRP in the globe. Study will enhance the understanding of the protein issues and may discover local and racial dissimilarity in medical and health environment.

Recommendation

The study utilized the VOSviewer and Biblioshiny; further analyses adopting further scientometric media can be used and broaden the investigative results.

Disclosure

The author declared no competing interests.

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