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Pregnancy and Glaucoma: Management Overview

*Kamal N

Introduction

Glaucoma primarily affects individuals over the age of 40; however, it can occasionally present in women of reproductive age. In many cases, these women have pre-existing glaucoma conditions from childhood, such as congenital glaucoma or anterior segment dysgenesis, or they may develop glaucoma secondary to conditions like uveitis or diabetes. Managing glaucoma during pregnancy presents a unique challenge, as it requires balancing the preservation of maternal vision with the potential risks to fetal and neonatal health.

This review focuses on the management of glaucoma before, during, and after pregnancy. Special emphasis will be placed on pre-conception planning, pregnancy, and the lactation period. Additionally, the risks associated with both medical and surgical interventions for glaucoma will be explored, alongside alternative treatment strategies and necessary modifications to standard care protocols.

Glaucoma prevalence

Glaucoma is the second most common cause of blindness worldwide, affecting over 6.7 million people, following cataracts, which impact approximately 19.3 million individuals.[1] Because glaucoma-related vision loss is irreversible through both medical and surgical means, it presents a significant challenge for global blindness prevention initiatives. Early detection is crucial, as delayed diagnosis can result in poor visual outcomes.[2] Even when identified, effective treatment remains complex due to individual patient needs and social factors.

Limited data exist on glaucoma prevalence in individuals under 40, particularly among women of reproductive age. A Japanese study identified the prevalence of open-angle glaucoma—characterized by visual field defects and optic nerve abnormalities—at 0.48%, 0.42%, and 0.73% in women aged 15-24, 25-34, and 35-44, respectively.[3] Moreover, women of childbearing age may develop glaucoma due to congenital conditions (e.g. congenital glaucoma, anterior segment dysgenesis) or secondary causes such as uveitis or diabetes, often following cataract development.

Intraocular pressure (IOP) changes and disease progression

During pregnancy, IOP generally decreases. A study examining pregnant women found that IOP was, on average, 2 mmHg higher in the first trimester compared to the third trimester.[4] Several mechanisms may contribute to this reduction, including hormonal fluctuations that enhance aqueous outflow, decreased episcleral venous pressure due to reduced upper limb venous pressure, and metabolic acidosis related to pregnancy.[5,6] Increased levels of progesterone and relaxin may also contribute to lower IOP and greater aqueous outflow efficiency.

However, the extent to which these changes affect women with pre-existing glaucoma remains uncertain. A small study of 15 women found no IOP or visual field progression in 57% of cases, 18% showed worsening visual field loss, and another 18% experienced elevated IOP without visual field progression. Among those with IOP increases, the mean rise was 10 mmHg (ranging from 1.3 mmHg to 22.5 mmHg). Some of these patients required additional medication to control IOP.[7] Due to these variations, pregnant glaucoma patients should undergo monitoring at least once per trimester.

Medical treatment

The FDA classifies medications used during pregnancy based on available human and animal research.

- Category A: Demonstrates safety in human studies.
- Category B: Mixed or inconclusive findings in human and animal studies.
- Category C: Adverse effects observed in animals, or insufficient data available.
- Category D: Evidence suggests a risk to the fetus in human studies.
- Category X: Strong evidence links the drug to birth defects

No glaucoma medications currently fall under Category A, meaning all available treatments pose some level of risk during pregnancy. Patients should be fully informed of potential medication risks, and treatment should be coordinated with an obstetrician and neonatologist. Additionally, newer medications such as netarsudil and latanoprostene bunod lack an assigned FDA category due to insufficient research.[8]

Treatment plan by pregnancy stage

In pre-conception period, Ideally, glaucoma management discussions should occur before pregnancy. This allows for modifications to medication regimens to minimize fetal risk, particularly in the first trimester when organogenesis occurs. Alternative treatments, including surgical options, should also be considered before conception. Women who are planning a pregnancy or suspect they may be pregnant should notify their physician promptly.
In first trimester, since critical organ development occurs within the first eight weeks, early consultation is essential to assess medication risks and determine the safest treatment strategy. This includes evaluating drug concentrations, systemic absorption reduction methods, and potential medication discontinuation. Brimonidine, classified as Category B, may be the safest option. Other drugs, such as beta-blockers, prostaglandins, and carbonic anhydrase inhibitors, should be avoided due to potential teratogenic effects or risks of miscarriage. If surgery is required, delaying it beyond the first trimester is advisable to reduce the likelihood of congenital abnormalities or pregnancy loss.

In second trimester, brimonidine remains a preferred treatment option. Beta-blockers may also be used, but regular fetal heart rate and growth monitoring are necessary. If prostaglandins are prescribed, patients should be educated on the signs of premature labor and instructed to discontinue the medication if symptoms appear. Carbonic anhydrase inhibitors, if used, require careful monitoring of fetal development.

Finally, in third trimester,caution should be exercised with brimonidine, beta-blockers, and topical carbonic anhydrase inhibitors. Avoiding prostaglandins can help prevent preterm labor, particularly early in the trimester. Brimonidine should be discontinued in the final weeks due to its potential to cause central nervous system depression in newborns. Beta-blockers require close monitoring for fetal growth and heart rate, while carbonic anhydrase inhibitors necessitate acidosis assessments.[9] Newer agents like netarsudil and latanoprostene bunod should be avoided near delivery due to theoretical risks of delayed labor.[9]

Surgical interventions may be performed cautiously in the second and third trimesters if

absolutely necessary. However, anesthesia, sedatives, and antimetabolites still pose fetal risks. Uterine displacement techniques should be used to prevent maternal hypotension, which could result in fetal asphyxia. Laser trabeculoplasty (ALT or SLT) offers a safer alternative across all trimesters, providing temporary IOP control until postpartum.

During labor and delivery, although there are concerns regarding labor-related Valsalva maneuvers increasing maternal IOP, normal vaginal delivery does not appear to significantly impact IOP in healthy women.8 Standard obstetric protocols should be followed, and cesarean delivery is not generally required for glaucoma patients unless they have recently undergone glaucoma tube surgery or trabeculectomy, in which case cesarean delivery may be considered.

In postpartum considerations, beta-blockers and carbonic anhydrase inhibitors are approved for use during breastfeeding, though the lowest effective doses should be utilized. Brimonidine, however, is contraindicated due to its potential to cause central nervous system depression in infants.

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Original Article

Parenting Pattern of Students of Bangla and English Medium School of a Selected Area of Dhaka City.

***Khan ST[1], Hossain MD[2]**

Abstract

Background: *Parenting plays an immense role on almost all domains of life of the child(ren). Out of total 160 million people of Bangladesh almost 52 million are child and adolescent. However, fewer attempts have been identified in Bangladesh exploring parenting type and impact on the children.* ***Objectives:*** *To assess the parenting pattern of students of Bangla and English medium school of a selected area of Dhaka city.* ***Materials & Methods:*** *A cross-sectional study was carried out in the purposively selected schools of Dhaka city. 151 responses were collected from the parents by convenient sampling technique. Data were collected by using semi-structured instrument comprised of a sociodemographic part and Bangla Parenting Style and Dimension Questionnaire (PSDQ-Bangla) after taking informed written consent from the parents.* ***Results:*** *The mean (±SD) age of the parents was 40.76 (±5.83) years ranging from 30 to 58 years. About two-thirds (63.58%) of the parents had child in Bangla medium school, and more than two-third (68.87%) were mother. About 97% of parents had an authoritative parenting style, followed by permissive and authoritarian. The analysis revealed that mothers were significantly more authoritative than fathers (p=.001). No other associations between parenting style and sex of the child, medium of education, and family structure were noted.* ***Conclusions:*** *This study assessed parenting style in Bangla and English medium schools of Dhaka city and revealed a high proportion of authoritative parenting which may need cautious interpretation while generalizing the study result. Further studies are necessitated to generalize the study findings.*

Keywords: Parenting style, Bangladesh, Bangla medium, English medium, School.

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Introduction

Parenting is the process of promoting and supporting the physical, emotional, social and intellectual development of a child from infancy to adulthood. Parenting pattern indicates a general child rearing model that characterizes parents' attitudes toward their child.[1] It has been defined as a universal construct reflecting the overall emotional tone of the parent-child relationship.[2] Baumrind (1966) identified three different parenting patterns namely authoritarian, authoritative and permissive.[3] Maccoby and Martin (1983), mentioned that parenting styles arise from the crossing of two different dimensions i.e. demandingness/control and responsiveness/warmth.[4,5] Categorizing parents according to whether they are high or low on parental demandingness and responsiveness creates a typology of four parenting styles namely authoritative, authoritarian, indulgent, and uninvolved.[5]

Authoritative parents are both demanding and responsive; warm and nurturing toward adolescent.[4] They want that their children to be assertive as well as socially responsible and self-regulated as well as cooperative.[1,6] Authoritarian parents are highly demanding and directive, but not responsive.[4] The authoritarian parents place firm limits and control on adolescents and allows little verbal exchange, results in socially incompetent behavior, they are high in control and low in responsiveness. They connect love with success and are not as nurturing as the other two styles of parenting.[7] Permissive parents (also referred to as indulgent parents or nondirective) are more responsive than demanding. They give high level of freedom to their children and do not restrict their behavior unless it physically harms them.[8] The uninvolved or neglecting parent can be categorized by not displaying the following qualities: warmth, confrontational, supervisory, consistency in disciplining or clear communicator style.[9] These

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parents are low in both responsiveness and demandingness.

Researchers have assumed parents to have critical influences on children's behavioral, emotional, personality, and cognitive development for over a century.[10] Inadequate parenting based on harsh punishment and very little positive reinforcement (authoritarian parenting) has been linked with behavioral and conduct disorders, negative social adjustment with physical aggression.[8] Adolescents with authoritative parents tend to achieve higher grades, be more self-reliant, less anxious, less likely to engage in delinquent behaviors, and more likely to adopt positive coping strategies than are adolescents with parents using other rearing styles.[3,11,12]

Among the parenting styles, authoritative parenting is believed to be an adequate parenting style, because it supports a balanced use of warmth and control. All other parenting styles, such as authoritarian, permissive-indulgent, and neglectful-uninvolved, are tagged as inadequate, because they either lack warmth but with too much control, as with the authoritarian style; or they lack control yet with excessive warmth, or they lack both warmth and control, as with the neglectful-uninvolved style.[8] Parenting behavior is deeply influenced by culture which decides the limits of behavior that to be controlled and praised.[13]

Bangladesh is graduated from least developed country to developing country and education sector is also improving surprisingly, but parenting style have received little attention and research interest. Out of total 160 million people of Bangladesh almost 52 million are child and adolescent as they will be the leading part of our country that they need special attention while nurturing with acceptable pattern of interaction between parents and children.[14] Therefore, it's becoming essential for our parents to be aware about parenting pattern. Moreover, 50% adult psychiatric disorder start at childhood and inadequate parenting style may be the one of the risk factors. Different streams of education system, nowadays Bangla and English medium are two major prevailing education system in Bangladesh.[15] In view of these two groups there may have socio-economical and educational differences. Therefore, we aimed to assess the parenting pattern of students of Bangla and English medium school of a selected area of Dhaka city.

Materials and Methods

This was a cross-sectional study carried out in the purposively selected two schools of Dhaka city and study conducted at National Institute of Mental Health and Hospital (NIMH), Sher-e-Bangla Nagar, Dhaka from 2021 and 2022. We selected two schools i.e. Willes Little Flower School and College and Kids Tutorial School. First one is Bangla and English medium school and later one is English medium school. Total 151 responses were collected from the parents having children of 6-16 years by convenient sampling technique. Data were collected by using semi-structured instrument comprised of a sociodemographic part and Bangla Parenting Style and Dimension Questionnaire (PSDQ-Bangla) after taking informed written consent from the parents.[15] Principal from each school was explained about the purpose and procedure of the study. After taking consent from Principals, necessary and relevant information was taken. Then the questionnaire was distributed among the parents with a prospective collection date. Finally on the assigned day the responses were collected. Data analysis was done by the Statistical Package for Social Sciences (SPSS) version 24.0 using appropriate statistical tests. Ethical approval was taken from Institutional Review Board (IRB) of National Institute of Mental Health and Hospital (NIMH) before starting the data collection. Data were kept anonymous and confidential.

Results

A total of 151 parents was interviewed by PSDQ Bangla. The mean (±SD) age of the parents was 40.76 (±5.83) years ranging from 30 to 58 years. Most of the parents was in the range of 40-44

years (31.13%), followed by 35-39 years (29.80%) (Table I). About two-third of the parents (75.50%) were under 45 years of age (Table I). Among the 151 parents, the majority (n=147) has Muslim background followed by Hinduism (2.65%). Among the 151 parents, about 65% (n=98) of them had educational attainment up to Masters and above. About 5% of the parents had educational attainment below SSC, and about 10% had educational attainment up to SSC (Table I). Among the respondents, 21.85% were housewife, followed by teacher (21%), service holder (20%), and physician (13%). About one-sixth (17.22%) of the parents didn't mention their occupations. About 11% of respondent didn't mention their monthly expense (income) variable. Among the 151 participants, about two-third of them were living in nuclear family and rest of them were living in joint family. The responded parents indicate similar number of boys and girls as their index child for this study. The 151 parents mentioned 75 boys and 76 girls. The collected responses indicate that about two-third (63.58%) of the parents had child attending Bangla medium school and the rest (36.42%) had attended the English medium school. Among the 151 parents, more than two-third (68.87%) were mother and the rest (31.13%) were fathers.

Socio-demography

Table I: Distribution of sociodemographic variables (N=151)

Variable	Frequency (n)	Percent (%)
Age in years		
30-34	22	14.57
35-39	45	29.80
40-44	47	31.13
45-49	20	13.25
50 and above	17	11.26
Religion		
Islam	147	97.35
Hindu	4	2.65
Occupation		
Banker	2	1.32
Barber	1	0.66
Business	7	4.64
Doctor	19	12.58
Housewife	33	21.85
Nurse	2	1.32
Service	30	19.86
Teacher	31	20.52
Missing	26	17.22
Education		
Below SSC	8	5.30
SSC	14	9.27
HSC	12	7.95
Honors	19	12.58
Masters	98	64.90
Medium of School		
Bangla	96	63.58
English	55	36.42
Family Type		
Joint	36	23.84
Nuclear	114	75.50
Sex of the child		
Boy	75	49.67
Girl	76	50.33
Respondent		
Father	47	31.13
Mother	104	68.87
Total	***151***	***100***

Parenting Style and Variations

Table II: Frequency of Parenting style of the parents (n=151)

Domain	Observation	Mean	Std. Dev.	Frequency	Percent
Authoritative	151	4.22	0.53	146	96.69
Authoritarian	151	2.02	0.42	2	1.32
Permissive	151	1.92	0.52	3	1.99
Total				151	100

Based on the analysis, about 97% of parents had authoritative parenting style, followed by permissive and authoritarian (Table II). The mean (±SD) score was 4.22 (±.53) in authoritative domain, 2.02 (±.42) in authoritarian domain, and 1.92 (±.52) in permissive domain.

Table III depict the association of parenting style and socio-demographic variables assessed by independent t-test. The analysis revealed that mothers were significantly authoritative than fathers (p=.001), Muslim parents were more permissive than Hindu parents (p=.048). No other associations between parenting style and sex of the child, medium of education, and family structure were noted from the responses (Table III).

Discussion

Parenting pattern reflects the parent and child's normative interaction which influence the child's cognitive, intellectual and psychosocial development. Therefore, the current study intended to assess the parenting pattern of students of Bangla and English medium school of a selected area of Dhaka city. It was a descriptive cross-sectional type of study conducted among 151 parents with child studying in Bangla and English medium school. Data were collected from either of parents with children from 6-16 years of age by PSDQ Bangla questionnaire. A similar distribution of demographic variables was noted in the PSDQ validation study done in Bangladesh where the sample size was 349 parents.15 Another study assessed parenting style among 83 nursing students. All the studies explained the justification of taking the sample size and they used statistical justification for the calculation of it.

In the current study, the responded parents indicate similar number of boys (75) and girls (76) as their index child for this study. However, more than two-third (68.87%) was mother and the rest (31.13%) was fathers. Similar distribution of parents was noted in previous studies in Bangladesh as well as in the western countries. Similar maternal predominance was also noted in other studies in different culture. A study in Turkey found that among 511 parents 383 (74.95%) were mothers and 128 (25.05%) were fathers.[16]

The collected responses indicate that about two-third (63.58%) of the parents had child

Table III: Association of parenting style with sociodemographic variables (n=151)

		Authoritative		Authoritarian		Permissive	
Variable	**n (%)**	**Mean (±SD)**	***p* value**	**Mean (±SD)**	***p* value**	**Mean (±SD)**	***p* value**
Total	151 (100)	4.22 (±.53)		2.01 (±.42)		1.92 (± 52)	
Respondent							
Father	47 (31.13)	4.04 (±.66)	0.001	1.94 (±.34)	0.060	1.99 (±.46)	0.13
Mother	104 (68.87)	4.3 (±.44)		2.05 (±.44)		1.89 (±.54)	
Children							
Boy	75 (49.67)	4.18 (±.55)	0.16	2.02 (±.47)	0.41	1.92 (±.52)	0.49
Girl	76 (50.33)	4.26 (±.50)		2.01 (±.35)		1.92 (±.50)	
Medium							
Bangla	96 (63.58)	4.19 (±.56)	0.20	2.04 (±.38)	0.13	1.93 (±.53)	0.30
English	55 (36.42)	4.27 (±.47)		1.96 (±.46)		1.89 (±.48)	
Religion							
Hindu	4 (2.65)	4.32 (±.31)	0.35	2 (±.16)	0.46	1.5 (±.27)	0.048
Islam	147 (97.35)	4.22 (±.53)		2.02 (±.42)		1.93 (±.52)	
Family							
Joint	36 (23.84)	4.25 (±.58)	0.35	2.05 (±.43)	0.26	1.93 (±.52)	0.48
Nuclear	114 (75.5)	4.21 (±.51)		2 (±.41)		1.92 (±.52)	

p = <0.05 is considered as level of significance.

attending Bangla medium school and the rest (n=55, 36.42%) had attended the English medium school. The study revealed that about 97% of parents had authoritative parenting style, followed by permissive and authoritarian. The mean (±SD) score was 4.22(±.53) in authoritative domain, 2.02(±.42) in authoritarian domain, and 1.92(±.52) in permissive domain. No other associations between parenting style and sex of the child, medium of education, and family structure were noted from the responses. The association between parenting style and age of the parents was assessed by Chi Square test that revealed no relationship with age of the parents and parenting style (p=0.77). Similar high authoritative dominance was also noted in the study conducted among the nurses where mean ±SD of authoritative domain was 4.50(±0.89), authoritarian domain was 1.93(±0.86) and the permissive domain was 1.70(±0.98). Mothers had a significantly higher score in authoritarian domain score than the fathers (p=0.008). Parents who completed higher secondary school certificate (HSC) and above had significantly lower authoritarian domain score than those who were up to secondary school certificate (SSC) (p<0.001). The parents of students studying in Bangla medium had a significantly higher authoritative score than those of who were studying in English medium (p=0.002). Parents of students from Academia (English medium School) had significantly lower authoritative domain score and higher authoritarian domain score than that of other schools (p=0.003 and p=0.027, respectively).[15]

The study revealed a huge difference among the parenting styles when compared to the other studies based on the practicing pattern of predominant parenting style. The authoritative style has been predominantly identified in the Western countries. Thus, findings of this study contradict the notion that Asian parents are more authoritarian than Western parents.[2,17] The authoritarian parenting style was predominantly noted in Kenya where physical punishment has been considered for controlling children.[18] The study also revealed another contradicting finding that, mothers were more authoritarian than father as previous studies from China revealed strict father and kind mothers.[19] Studies from India also revealed strict fathers and supportive mothers while interacting with children.[13] It was also difficult to explain as Bangladesh had a patriarchal family culture where males worked outside, play the controlling roles for the children whilst mothers were busy child rearing and caring. We speculated that; social desirability effect could affect the parents while responding the questions. Further studies were recommended to address the gaps. Additionally, perception of parenting from the children and variations of parenting between the parents, and variations of interactions between male and female children should be explored in the country to depict a complex scenario as perceptions varies across the persons such as children, self, partner.[12]

The findings may indicate several possibilities. Firstly, there may have a high selection bias as the data were collected conveniently and schools were chosen purposively. Hence, the parents those were conscious about parenting could respond that resulting in a disproportionately higher authoritative parenting style. It could be avoided by random sampling that was not possible in the current study due to school closures for the COVID-19 pandemic. Secondly, the responses from parents may indicate social desirability aspect while responding. The parents may think about standard parenting norms instead of their real-life practice that revealed a disproportionately higher authoritative parenting style. This can be avoided by applying a different instrument to the children of respective parents to check the variations and/or similarities between the responses. In that case further validation of the PSDQ Bangla could be attempted in different population. Thirdly, responses may justify the educational and

social background of parents living in the capital city. There is a possibility to have such high authoritative style due to the educational and socioeconomic status of parents.

Conflict of interest

The authors have no conflict of interest to declare.

Conclusion

This study assessed parenting style in Bangla and English medium schools of Dhaka city identifying an unusually high proportion of authoritative parenting about 97% of parents , which may warrant cautious interpretation while generalizing the study result. The study also revealed that mothers were significantly authoritative than fathers. There were no significant variations in parenting style among parents of Bangla and English medium schools. Further studies are warranted involving the children and head-to-head by other means and/or instruments to generalize the study findings. Additionally, random sampling should be considered. The checking can be performed by taking responses from both parents indicating the parenting practices of partner.

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Original Article

Nutritional Status of Periurban Secondary School Children in Bangladesh

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Abstract

Background: *School age represents a crucial phase characterized by both physical growth and mental development in children. Extensive research underscores the profound impact of nutritional inadequacies on the health of secondary school-age children, manifesting in widespread issues such as low school enrollment, high absenteeism, premature dropout, and suboptimal classroom performance.* ***Objective:*** *The primary objectives include measuring the nutritional status with associated factors and identifying prevalent nutritional disorders among the target population.* ***Materials & Methods:*** *It was a cross-sectional study carried out in the department of community medicine of ASWMC, Jashore during the month of January 2020 among periurban secondary school students (n=440) in Bangladesh. Data were collected by structured questionnaire and data processing and statistical analysis by SPSS version 25.* ***Results:*** *The study encompassed 440 respondents, with a mean age of 13 years, spanning a range from 10 to 17 years. Of these, 208 (47.30%) were male, and 232 (52.70%) were female. The mean weight was 43.74 kg, ranging from 20 to 81 kg, while the mean height was 152 cm, ranging from 120 to 180 cm. indicating that 54.5% were underweight (BMI < 18.5), 40.7% had a normal weight (BMI 18.5-24.99), and only 4.8% were overweight (BMI > 25).* ***Conclusion:*** *The high prevalence of undernourishment, highlight the need for proactive measures to address nutritional gaps and promote the overall health and well-being of this age group.*

Keywords: Nutritional status, School children, Bangladesh.

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Introduction

Nutritional status is an integral component of the overall health of an individual.[1] Worldwide, an estimated 852 million people were undernourished in 2000–2002, with most (815 million) living in developing countries[2] and Worldwide, malnutrition is one of the leading causes of morbidity and mortality in childhood.[3] School age is the active growing phase of childhood.[4] Health problems due to miserable nutritional status in primary school-age children are among the most common causes of low school enrolment, high absenteeism, early dropout and unsatisfactory classroom performance.[5] Nutritional status is the best indicator of the global well-being of children. One of the major global health problems faced by the developing countries, today is malnutrition.[6] Malnutrition is one of the principle public health problems, affects large numbers of children in developing countries. Despite the economic growth observed in developing countries, malnutrition and particularly under nutrition is still highly prevalent. School age is a dynamic period of physical growth as well as of mental development of the child. The school is an opportune setting to provide health and nutrition services to disadvantaged children.[1] Since 1972, the United Nations Educational Scientific and Cultural Organization (UNESCO) consider 12-17 years as secondary school age for statistical purposes[7] and Secondary education in Bangladesh is embedded with three phases: junior secondary (grades VI-VIII), secondary (grades IX and X), and higher secondary (grades XI and XII).[8] Nutritional status was measured with BMI-for-weight for height. BMI is a simple index of weight-for-height that is commonly used to classify underweight, overweight and obesity in adults. It is defined as

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the weight in kilograms divided by the square of the height in meters (kg/m2). Normal (18.5-24.99), Underweight (<18.5), Overweight (>25).[9] Nutritional status during school age is a major determinant of nutritional and health status in adult life. Globally, including Bangladesh, health hazards associated with under-nutrition and micronutrient deficiencies remain major public health problems. Therefore comprehensive health care of this section will fulfils the health need of these vulnerable populations.[10] Nutrition is one of the most important factors influencing the quality of human life. Nutritional status is also an important health indicator to assess a country's health status and morbidity pattern. Studies of nutrition Status are very important in the adolescent of child bearing age because of law to moderate prevalence of possible deficiency.9 Protein energy malnutrition has been a common health problem of the third world.[11] Protein energy is of much serious concern among children of school-going age who are deprived of good and ample nutrition due to their poor socio-economic status ignorance and lack of health promotional facilities.[12]

Materials and Methods

This cross-sectional study, conducted in January 2020 among the students of Pularhat High School in Jashore district in southwest Bangladesh. This school was purposively selected at it mostly represented the urban adolescents in the district with average socio-economic status indicators. All students attending grades 6-10 (n=440) were enrolled through convenient sampling. Data were collected by 3rd year female medical students through face-to-face interviews using semi-structure questionnaire. The interviewers were trained by the investigators on interview skills, research ethics and about the objectives of the study. All interviews were conducted in an empty class room with adequate privacy. Data were analyzed using SPSS statistical program version 25. All participants provided written informed consent before participating in the interview.

Results

The study is centered on government secondary school students in Jashore, with the aim of evaluating their nutritional status and identifying prevalent nutritional diseases, along with other associated factors. A total of 440 students participated in the research, comprising 208 (47.30%) males and 232 (52.70%) females. The mean age of the participants was 13 years, with an age range of 10 to 17 years.

Table I: Age of the students (n=440)

Age of respondents (years)	Frequency	Percent (%)
10	5	1.1
11	53	12.0
12	104	23.6
13	84	19.1
14	83	18.9
15	76	17.3
16	28	6.4
17	7	1.6

Table I provides a comprehensive overview of the age distribution among the surveyed students. The most notable age group is 12-year-olds, comprising 104 students, which accounts for 23.6% of the total sample. Following closely, 13-year-olds represent 84(19.1%), while 14-year-olds and 15-year-olds each make up 83(18.9%) and 76(17.3%) respectively. There is a noticeable decline in the frequency of respondents as age increases, with only 7 students (1.6%) being 17 years old.

Table II presents the distribution of respondents based on their academic classification, revealing insights into the educational progression of the surveyed students. The most prominent academic classification is Class Six, comprising 123 students,

Table II: Academic status of the Respondent (n=440).

Class of studying Respondents	Frequency	Percent (%)
Six	123	27.95
Seven	96	21.82
Eight	93	21.14
Nine	42	9.55
Ten	86	19.54

which represents 27.95% of the total sample. Following closely, Class Seven and Class Eight each account for approximately 96(21.82%) and 93(21.14%) respectively, indicating a relatively balanced distribution among these intermediate grades. Class Ten, on the other hand, represents 86(19.54%) of the respondents, while Class Nine constitutes the smallest proportion at 42(9.55%). This distribution suggests a typical academic hierarchy, with the majority of students situated in the lower to middle grades, gradually decreasing in frequency as they progress through higher classes.

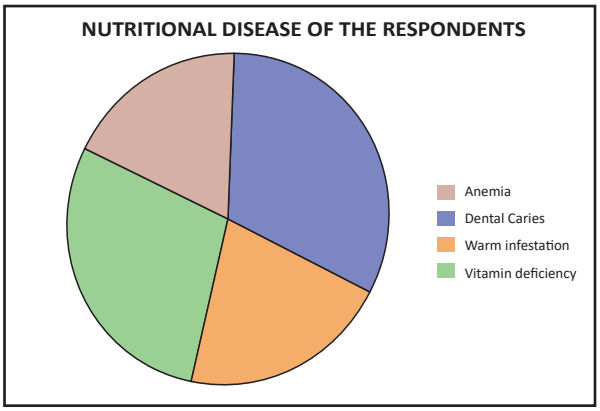
Table III: BMI of the Participants (n=440)

BMI of respondents (kg/m²)	Nutritional Status	Frequency	Percent (%)
< 18.5	Under weight	240	54.5%
18.5-24.99	Normal Weight	179	40.7%
>25	Over weight	21	4.8%

Table III offers an analysis of the representation across different BMI categories among the participants, shedding light on the nutritional status of the surveyed individuals. The data indicate that a significant portion of the participants falls into the "Underweight" category, with 240(54.5%) individuals having a BMI less than 18.5. This suggests a notable prevalence of undernourishment within the studied population. In contrast, a substantial number of participants, 179(40.7%) to be precise, are categorized as having a "Normal Weight" with a BMI falling within the range of 18.5-24.99. This category signifies a relatively healthy weight distribution among a considerable proportion of the respondents. On the other hand, a smaller portion, consisting of 21(4.8%) individuals, is classified as "Overweight," with a BMI exceeding 25. This suggests that a limited number of participants exhibit signs of excess weight, highlighting a potential concern for overweight conditions within the studied group.

Table IV: Deficiency Disease among the Respondents (n=143).

Name of Deficiency Disease	Frequency	Percent (%)
Anemia	26	18.18
Dental Caries	46	32.17
Warm infestation	30	20.98
Vitamin deficiency	41	28.67



Notably, 297(67.5%) of respondents were found to be free from nutritional diseases, while 143(32.1%) exhibited nutritional deficiency diseases. Among those with deficiencies, dental caries 46(32.17%), vitamin deficiencies 41(28.67%), worm infestations 30(20.98%), and anemia 26(18.18%) were prevalent (Table IV).

The study also explored demographic factors, indicating family income levels, parental education, and occupations. Family income falling within the lower income brackets. Parental education and occupation data underscored the challenges faced by families, with a significant portion having education levels up to SSC and engaging in labor-intensive occupations. Furthermore, the majority of mothers were homemakers. The study highlighted that 425(96.6%) of respondents lived with their parents, reinforcing the family as a primary support system.

Discussion

Malnutrition is still common findings in developing countries. Most common is the under nutrition rather than over nutrition. Several factors enable the poor nutritional status of children directly such as low socioeconomical status and poor educational background of their parents as well as low protein diets in the periurban area. The demographic and anthropometric data presented in the study on government secondary school students in Jashore provides valuable insights into the nutritional status of the participants. This information is crucial for understanding the prevalence of malnutrition and its associated factors among the surveyed population. Our study findings align with those of a study conducted in Karimnagar, Telangana, India, by Shaikhn MK et al. (2016)[10], which also indicated a similar gender distribution. In both studies, there is a slight majority of female respondents compared to male respondents in the samples surveyed. The BMI categorization into underweight (54.5%), normal weight (40.7%), and overweight (4.8%) reveals striking insights into the nutritional status of the students. The prevalence of under nutrition among 54.5% of the respondents is a notable concern, indicating a significant proportion of students facing malnutrition-related challenges. This finding emphasizes the urgency of implementing targeted interventions to address undernourishment and prevent associated health complications. Conversely, the 40.7% falling within the normal weight range signals a positive aspect, suggesting that a substantial portion of the student population maintains a balanced nutritional status. The identification of 4.8% of students as overweight highlights the coexistence of over nutrition-related challenges within the same population. While this percentage is relatively low compared to underweight and normal weight categories, it draws attention to the importance of promoting healthy lifestyles and preventing future health risks associated with excess weight. These figures underscore the multifaceted nature of nutritional challenges, ranging from under nutrition to overweight issues. The coexistence of under nutrition and overweight individuals within the same population raises questions about the dietary composition and lifestyle factors influencing these divergent outcomes. Our findings resonate with those reported by Eshita IR (2017)[1] in rural area the majority of the respondents (58.3%) were classified as underweight.

Conclusion

This study contributes valuable insights into the nutritional landscape of adolescents, offering a foundation for informed decision-making in public health and nutrition interventions. The prevalence of under nutrition emphasizes the need for comprehensive nutritional programs, including school-based initiatives, community awareness campaigns, and collaborations with healthcare providers. Additionally, addressing overweight concerns requires strategies that promote healthy dietary choices and physical activity among students.

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Original Article

Expression of Vascular Endothelial Growth Factor in Prostatic Adenocarcinoma is associated with High Gleason Grade

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Abstract

Background: *Worldwide, prostate cancer is the second most common cancer in men and the fifth most common cause of mortality. Accurate diagnosis of prostate cancer is based on elevated serum specific prostatic antigen (sPSA) and subsequent histopathological examination with Gleason grading score. Vascular endothelial growth factor (VEGF) is one of the most potent mitogenic, highly specific tumor angiogenic factors, and has been found to be overexpressed in prostate cancer in comparison with normal epithelium or benign prostatic hyperplasia. High tumor expression of VEGF in prostate cancer is found to be associated with a high risk of failure after treatment with radiotherapy. Aim of this study was to determine the expression of VEGF and its association with serum PSA level and Gleason Grade in prostatic adenocarcinoma.* ***Materials & Methods:*** *This was a cross-sectional observational study. A total 81 cases were selected from the patients who were diagnosed as prostatic adenocarcinoma in the department of pathology at BSMMU from September 2021 to August 2023. Immunohistochemical staining for VEGF was performed along with appropriate positive control.* ***Results:*** *Among 81 selected cases, highest number (n=24, 29.6%) of the tumors were in grade group 5. In this study VEGF immune expression was positive in 35 (43.2%) cases and negative in 46 (56.8%) cases. Statistical analysis of present study cases showed a significant association between VEGF expression and Gleason grade group. This study also showed significant association between serum PSA values with VEGF expression.* ***Conclusion:*** *The use of VEGF immune stain, serum PSA value in addition to Gleason grade group may provide significant prognostic information for selected high-risk patients in prostatic adenocarcinoma.*

Keywords: Prostatic adenocarcinoma, Gleason grading system, VEGF, Serum PSA.

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Introduction

Prostate cancer is the second most prevalent type of cancer worldwide,(in terms of age-standardized incidence).[1] According to GLOBOCAN 2018, the prevalence of prostatic adenocarcinoma in Bangladesh is 4.63%. It accounts for 14.8% of male cancers (18.6% in developed countries and 8.4% in the least developed countries). About 6.6% of all deaths in men over 55 years old are attributable to prostate cancer.[2] It is the second-leading cause of men's cancer-related deaths and the leading cause of new cancers in men. In 2016, an estimate of 180,890 recently diagnosed cases of prostate adenocarcinoma were identified in USA. Prostatic carcinoma causes 4.0% of deaths in the Southeast Asian region.[2] In Bangladesh, age-specific incidence and mortality rate of prostatic carcinoma is 1.7 and 1.2 per 100000 people respectively.[3] The prevalence of clinically significant prostate cancer in Asia appears to be rising as the diet becomes more Westernized.[4] Prostatic carcinoma development is largely contributed by hormonal factors, and between 5 and 10 percent of cases also have a genetic component.[5] Pre treatment serum prostate-specific antigen (sPSA) levels and

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Gleason's grading system is crucial parameter in diagnosis and treatment selection.

Core needle biopsy procedure have become increasingly common in recent years. One of the most effective prognostic predictor for prostatic adenocarcinoma is the Gleason grading system, which was developed by Dr. Donald Gleason, chief of pathology at the Veteran's Hospital in Minnesota. From 1959 to 1964, conducted research and developed a prostatic carcinoma grading system.[6] Different histological patterns were the lay out this grading. Most tumors had two distinct histological patterns. Therefore, the two most predominant grade patterns, ranging from 2 to 10 were added. It is evidenced that mortality progressively increased with tumor grade.[7,8]

The new modified Gleason score, which is made up of five groups (groups 1 through 5), was created as a result of this system's extensive revisions. Grade stratification is made simpler and more accurate with the modified Gleason score. Additionally, the lowest grade in the recently changed system is 1 rather than 6.[9]

Prostate-specific antigen (PSA) is still regarded as the most essential prostatic carcinoma biomarker. The normal PSA level in the serum is between 0 and 4 ng/ml. In the early detection and screening of prostatic cancer, serum PSA levels are crucial. It has been found that the PSA level and the microscopic grade of prostatic adenocarcinoma are well correlated.[10,11] There is a strong association between Gleason's score and PSA value. It is inferred that as the Gleason's score raises, the serum PSA level also raises accordingly.[12]

Perineural invasion in biopsies is a significant prognostic marker. Presence of perineural invasion is an independent predictor for survival and therefore a recommended parameter to add in standardized pathology reporting.[13,14] Compared to patients without perineural invasion, those with perineural invasion at biopsy are twice as likely to progress.[15]

Angiogenesis, the synthesis of blood vessels from already existent vessel, is a key event in solid tumor growth, invasion and metastasis.[16] Vascular endothelial growth factor (VEGF) is among the most potent angiogenic factors thus far detected and has been found to be highly specific for endothelial cells in vitro and in vivo, promoting endothelial cell proliferation and increasing vascular permeability of the cell division cycle as well as in mitosis.[17] VEGF is a 45 kDa heparin-binding polypeptide of the platelet-derived growth factor family and is secreted by a variety of malignant cells. It has been shown to be expressed in many different types of tumors, including renal cell carcinoma, breast carcinoma, gliomas, and hepatocellular carcinoma.[18,19] Additionally, angiogenesis is a crucial event in tumorigenicity and metastasis and it is necessary for the development of tumor vasculature and the progression of prostate cancer.[20] Meta-analysis had shown that increased VEGF expression in prostate malignant cells may indicate poor prognosis. Moreover, VEGF levels in the plasma and urine of patients with metastatic castration-resistant prostate cancer are independent predictors of overall survival.[21]

Materials and Methods

This study was a cross-sectional observational study conducted in the Department of Pathology, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, after taking institutional review board clearance (BSMMU/2022/6257). 81 cases of prostatic adenocarcinoma were taken. Carcinomas other than prostatic adenocarcinomas, insufficient biopsies and autolyzed specimens were excluded. Demographical and relevant clinical information such as age, pretreatment serum PSA levels, histopathological diagnosis with Gleason's Grade of the tumor at the time of diagnosis were collected from the departmental records. Paraffin blocks of all selected cases were retrieved from department and checked and reviewed. After confirming the diagnosis immunohistochemical staining for VEGF

was performed along with appropriate positive control. 3-4 mm thick sections were cut and gently lowered on surface of water bath at 45˚ C and were spread wrinkle free on to the slides coated with 0.1% poly L-lysine for 15 minutes at 37°C and air dried. Then the slides were kept on hot plate at 60˚C for baking for 30 minutes. Dewaxing was done by treating the slides in xylene followed by rehydration in absolute alcohol, 90% alcohol and 70% alcohol. For antigen retrieval slides were put in preheated pressure cooker having citrate buffer, then boiled and allowed to cool naturally. To block the endogenous enzyme activity hydrogen peroxide was added in a moist chamber at room temperature. Monoclonal mouse anti-human VEGF (INVITROGEN, Thermo Fisher Scientific, UK) was used as primary antibody. Then primary antibody was added for 1-2 hrs in moist chamber at room temperature.

Enhancement of primary antibody was done by adding antibody enhancer (super enhancer) and incubated in moist chamber for 20min. The peroxidase antiperoxidase method was followed for secondary staining. DAB was used for coloring the antigen-antibody complex. This was followed by counterstaining with hematoxylin. VEGF expression patterns was scored based on the intensity and extent of staining. The intensity of cytoplasmic and/or membranous VEGF staining in the tumor tissue was scored as: 0 (Negative), 1 (weak), 2 (moderate), 3 (strong).

The extent of staining was scored as: 0 (0%), 1 (1-25%), 2 (26-50%), 3 (51-75%), 4 (76-100%) according to the percentage of the positively stained areas in relation to the total carcinoma area. The results of the study were statistically analyzed using the Statistical Package for the Social Sciences (SPSS) version 20 (IBM Corp. SPSS statistics, Chicago, Illinois, USA) for windows. Data were expressed as mean ± SD for the quantitative variables, numbers, and percentage. Comparison between multiple groups were made using Chi square test for qualitative data. A value of $P < 0.05$ was taken as significant.

Results

The present study was a cross-sectional observational study. It was conducted in the Department of Pathology, BSMMU. The study population were the patients diagnosed as prostatic adenocarcinoma in the department of pathology at BSMMU during the study period. Patients of all ages were included in the study. A total of 81 cases were selected and demographic and histopathological variables (age, grading of tumor, etc.) were assessed and immunohistochemically expression of VEGF was observed.

Figure 1 shows age distribution among the study population. The present study reveals that mean age of the study population was 69.03±9.20 (SD) years (Range: 40-100 years). Majority of the patients were in age group 61-70 years (44.40%).

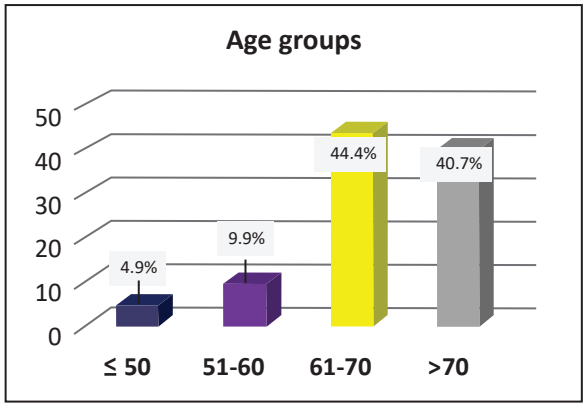

Figure 1: Distribution of study population according to age (n=81).

From the present study we observe that out of the 81 specimens, 90.1% (n=73) were core needle biopsy and 6.2% (n=5) were TURP chips (Figure 2).

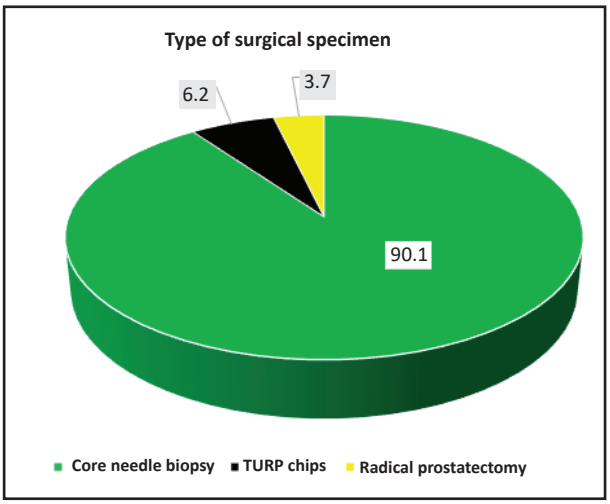

Figure 2: Distribution of study population according to surgical specimens.

In this study 9.9% of patients presented with PSA level 2-10 ng/ml. However, majority of the patients (56.8%) had PSA levels more than 50 ng/ml, while 19.8% and 14.8% of patients presented with PSA levels of 11-25 ng/ml and 26-50 ng/ml respectively (Table I).

Table I: Distribution of the study subjects according to PSA values (n=81)

PSA (ng/ml) Level	Frequency	Percent (%)
2-10 ng/ml	7	9.9
11-25 ng/ml	16	19.8
26-50 ng/ml	12	14.8
>50 ng/ml	46	56.8
Total	81	100.0

Among 81 selected cases, majority (n=24, 29.6%) of the cases were in grade group 5 tumors. Two (2.5%) and thirteen (16%) cases were in grade group 1 and 4 respectively. Remaining 42 cases were equally distributed (25.9% each) into grade group 2 and 3 (Figure 3).

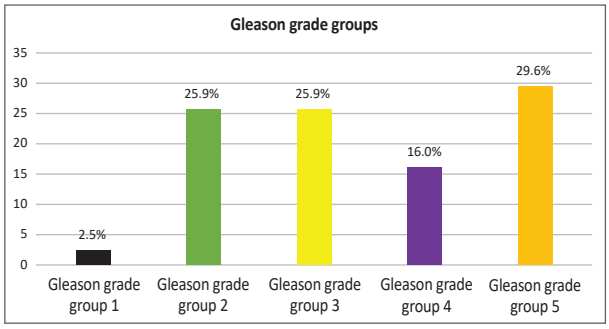

Figure 3: Distribution of Patients According to Grade Group (n=81)

The current study reveals that among the 81 cases, VEGF was positive in 35 cases (n=35; 43.2%). This is shown in Table II.

Table II: VEGF expression in study subjects

VEGF expression*	Frequency	Percent (%)
Positive	35	43.2
Negative	46	56.8

From the current study, a significant association ($p<0.05$) was found between VEGF expression and the grade group of tumors (Table III). The majority of the VEGF-positive patients had Gleason grade group 5 (54.3%, N=19).

Table III: Association between VEGF expression and Gleason Grade Group.

	Categories	VEGF status		X^2 (*p* value)
		Positive	Negative	
Gleason grade groups	Gleason grade group 1	0	2	30.686 (<0.001)
	Gleason grade group 2	2	19	
	Gleason grade group 3	5	16	
	Gleason grade group 4	9	4	
	Gleason grade group 5	19	5	
Total		35	46	81

s = significant ($p<0.05$)

The study shows that a significant association ($p<0.05$) was found between PSA (ng/ml) level and grade group of the tumor (Table IV). PSA was progressively raised with increasing grade groups of the tumor.

A significant association was found between VEGF expression and serum PSA (ng/ml) level ($P< 0.05$) (Table V).

Table IV: Association between Gleason grade group and PSA level

Gleason Grade categories	PSA (ng/ml) Level				Total	X^2 (P-value)
	2-10 ng/ml	11-25 ng/ml	26-50 ng/ml	>50 ng/ml		
Grade group 1	2	0	0	0	2	36.380(0.003^s)
Grade group 2	3	5	3	10	21	
Grade group 3	1	7	2	11	21	
Grade group 4	0	1	3	9	13	
Grade group 5	1	3	4	16	24	

s = significant ($p<0.05$)

Table V: Association between VEGF expression and serum PSA level

	Categories	VEGF status		X^2 (*p* value)
		Positive	Negative	
Serum PSA level in ng/ml	2-10 ng/ml	2	5	8.311 (0.040^s)
	11-25 ng/ml	3	13	
	26-50 ng/ml	4	8	
	>50 ng/ml	26	20	

s = significant ($p<0.05$)

No statistically significant association was found between Gleason grade group and age groups (Table VI).

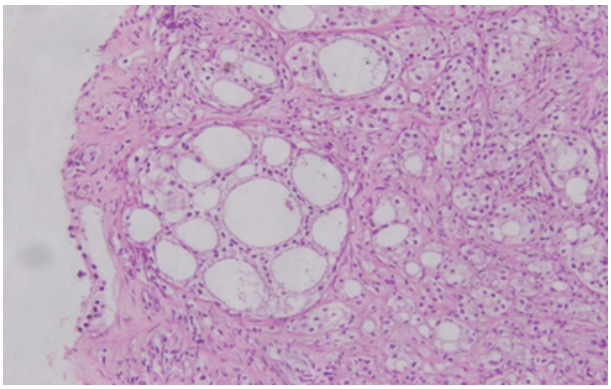

Figure 4: Photomicrograph showing histology of Gleason pattern 4 (poorly formed fused glands forming cribriform architecture) (H&E,200X).

Table VI: Association between age groups and Gleason grade group

		Age Groups				Total	*p* value
		50 or less	51-60	61-70	>70		
Grade Group	1	1	0	0	1	2	0.443^{ns}
	2	1	2	10	8	21	
	3	1	2	8	10	21	
	4	0	2	5	6	13	
	5	1	2	13	8	24	
Total		4	8	36	33	81	

ns= Not significant ($p>0.05$)

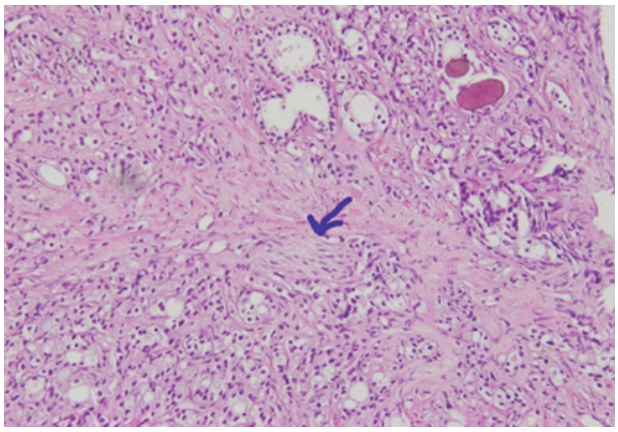

Figure 5: Photomicrograph showing poorly formed glands with focus of perineural invasion (Blue arrow), Gleason pattern 4 (H&E, 200X)

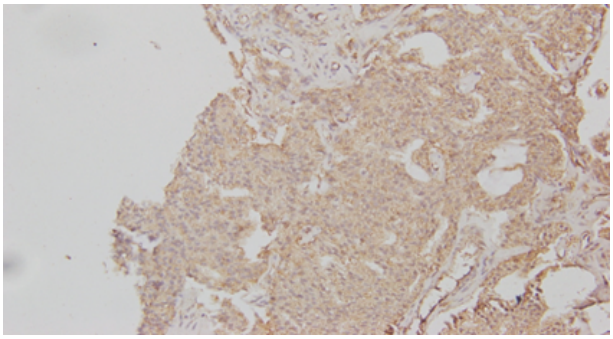

Figure 6: Photomicrograph showing positive VEGF expression in the cytoplasm and cell membrane of a Gleason grade group 3 tumor (Case no 01, 200X).

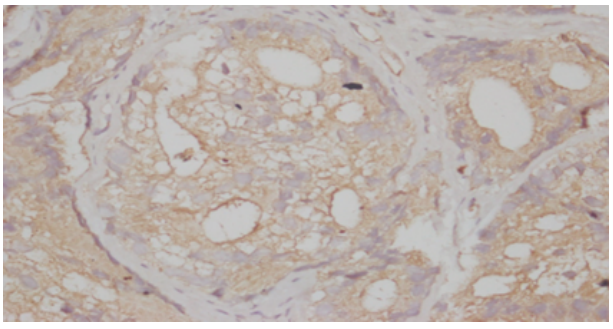

Figure 7: Photomicrograph showing positive VEGF expression in the cytoplasm and the cell membrane of a Gleason grade group 4 tumor (Case no 12, 400X).

Discussion

Prostate cancer is the second most common cancer in men and the fifth most common cause of mortality worldwide. The majority of prostate carcinomas may not progress to clinically significant disease. A minor fraction of the clinical cases remains confined to the prostate for many years and other carcinomas progress rapidly to a life-threatening disease. How to distinguish these three biologically different types of prostate cancer is a question of great importance.[22] In view of the above, early diagnosis and effective treatment of the disease are immensely important. The increasing number of options for the treatment of prostate cancer has made the prognostic evaluation of the disease even more important. Histological grading is a very important factor for the assessment of prognosis. The Gleason's grading system is the most favored prognostic factor, and significantly associated with survival and/or progression. Angiogenesis is found to play an important role in tumorigenesis, proliferation, and metastasis in prostate cancer.[23] VEGF is one of the most potent mitogenic, highly specific tumor angiogenic factors and has been found to be overexpressed in prostate cancer.[24] High tumor expression of VEGF in prostate cancer is found to be associated with poor prognosis in those receiving both surgery & radiotherapy as primary treatment.[25] In this study, 81 cases were included. The age of the patient ranged from 40 years to 100 years and the mean age of the patients was 69.03±9.20 (SD) years. The majority of patients were in the age group 61-70 years (44.4%). These results were consistent with studies that found the mean age of the patients was 67.9 years. A cohort study conducted in the USA reported that older men were more likely to have high-grade prostate cancer.[26] Another study found that the probability of a high Gleason score and high-risk disease increased with age, nearly tripling from ages 50-54 years to 80-84 years.[27] It was also observed that older men were more likely to be diagnosed with

high-grade or high-risk disease than younger men. The patients were grouped into five grade group. Grading was done on the basis of recent WHO grade group (Grade group 1 - Gleason's score ≤6; Grade group 2 - score 3+4=7; Grade group 3 - score 4+3=7; Grade group 4 - score 8; Grade group 5 - score 9 to 10).[28] Out of 81 cases, 24 (29.6%) cases were in grade group 5, 2 (2.5%) and 13 (16%) cases were in grade groups 1 and 4 respectively. The remaining 42 cases were equally distributed (21% each) into grade groups 2 and 3 respectively. This finding was similar to a study where 33% of cases were in grade group 5.[28]

In the past, digital rectal examination was a screening tool for the detection of prostate cancers but currently, emphasis has been shifted to measurement of PSA levels. However, the confirmation of prostate cancer is carried out only through histopathological analysis of the biopsy sample. The demographic profile and clinical details of the cases of the current study were similar to many studies conducted in relation to prostatic carcinoma. In this study, PSA levels in prostate carcinoma were divided into four groups: 2-10, 11-25, 26-50, and >50 ng/ml.[29] Out of 81 cases, the majority of patients (56.8%) had PSA levels of more than 50 ng/ml, while 19.8% and 14.8% of patients presented with PSA levels of 11-25 ng/ml and 26-50 ng/ml, respectively. Similar results were observed in other studies.[30]

Pretreatment serum PSA levels are a prognostic marker and stratify patients into different prognostic categories. This study's results were in concordance with other studies that found a statistically significant association between higher Gleason score and increased PSA levels. A significant association ($p<0.05$) was found between PSA (ng/ml) level and the Gleason grade group of tumors (shown in Table IV. It was observed that PSA progressively increased with the increasing grade group of the tumor. Similar results were obtained in other studies.[31,32] The data regarding these variables varied among different authors.[33] Regarding the evaluation of vascular growth factor (VEGF) expression, the final immunohistochemical staining score (0–7) was obtained by the sum of the intensity (0-3) and the extent of staining (0-4), with tumors having a final staining score of 3 or more being considered as positive.[34]

In this study, among 81 cases, positive VEGF staining was found in 35 (43.2%) cases and negative in 46 (56.8%) cases. In a previous study, VEGF expression was positive in 53.4% of patients with prostate cancer.[35] Another study found that 58% of patients with prostatic adenocarcinoma had high VEGF expression. These findings are consistent with prior studies in the literature that report VEGF expression in approximately 40% to 100% of prostate cancer cases.[36] From the current study, a significant association was found between VEGF expression and Gleason grade group as well as serum PSA.[37] This finding is consistent with previous studies. Similar results were observed in other studies.[38,39]

Conflict of Interest

The authors have no conflict of interest to declare.

Ethical Approval

This study was approved by the Institutional Review Board of Bangabandhu Sheikh Mujib Medical University (BSMMU/2022/6257).

Conclusion

Gleason grade of prostatic adenocarcinoma showed statistically significant association with immunoexpression of VEGF and serum PSA. Gleason scoring pattern is the overall useful predictor of prostatic carcinoma and assessment of angiogenesis status by VEGF immunoexpression may add value to the Gleason scoring pattern in selected patients.

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Original Article

Urinary Tract Infection in a Tertiary level Hospital of Bangladesh: Age and Gender Dependent Cross-sectional Observational Study

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Abstract

Background: *Urinary tract infection (UTI) is one of the most common clinical problem that practicing physicians come across worldwide. It is well established that, urinary tract infection is commonly a bacterial infection and antimicrobial resistance is an emerging issue in treating UTI, even for uncomplicated cases.* ***Objective:*** *The primary objective of our study was to identify the common causative organisms on the basis of gender, age group and some other demographic issues for UTI among patients attending in a tertiary care hospital of Jashore district in Bangladesh.* ***Materials and Methods:*** *This study was an observational study of cross-sectional design carried out at Ad-din Sakina Women's Medical College, Jashore. Standard procedure was followed in sampling and laboratory procedures.* ***Results:*** *Among 404 (female 340 vs male 64) cases 153 (37.9%) were found positive for bacterial culture; 134 female vs 19 male (87.6% vs 12.4%). E. coli was the most common causative organism (74.5%) among all cases. There was higher prevalence in positive culture in female subjects, but Chi-square test showed no statistical significance (p = 0.924). Variations in prevalence were observed in the context of 'age groups' but those were also not significant statistically (p = 0.479).* ***Conclusion:*** *E. coli was the most common organism isolated. Further large scale study was suggested to make conclusive remark regarding gender and age related superiority about discrimination of causative organism.*

Keywords: Urinary tract infection (UTI), Culture-based UTI diagnosis, Hospital-acquired UTI, Community-acquired UTI, Escherichia coli, UTI in Bangladesh, Age and sex discrimination in UTI.

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Introduction

Urinary tract infection (UTI) can affect in any part of the urinary system (kidneys, ureters, bladder and urethra). The most common causative organism of infection is Escherichia coli, though other bacteria and fungi are also involved.[1] About 150 million people develop UTI each year worldwide.[2] In clinical practice particularly in developing countries, UTI is one of the most commonly found bacterial disease.[3] UTI affects invariably in all age groups and both sexes.[4] It is also seen both in indoor and outdoor patients. Highest prevalence of UTI is found in female cases, having age 18 years and above.[5] UTI may involve both in upper and lower urinary tract. The lower urinary tract infection is more common which is termed as cystitis. It is characterized by some features like dysuria, frequency, urgency and occasionally lower abdominal pain. These symptoms are not only found in cystitis only, but also in upper UTI.[6]

The most common pathogenic organism of UTI is Escherichia coli, which is responsible for causing UTI in more than 80% cases.[7-8] Other relatively common pathogenic organisms responsible for UTI are Staphylococcus saprophyticus, Staphylococcus aureus, Proteus sp., Klebsiella pneumoniae, Pseudomonas aeruginosa and Enterococci.[9-11] The primary objective of our study was to identify the commonly causative organisms for UTI in the community we worked with, as well as variations in causative organism on the basis of gender and age group in the same population. Furthermore, as antimicrobial resistance is an emerging issue in treating UTI, continuous surveillance for resistant strains among different community regularly is also mandatory.[12]

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Materials and Methods

This retrospective study was carried out in the laboratory of the Department of Microbiology, Ad-din Sakina Women's Medical College, Jashore, Bangladesh. The duration of the study was 6 months (March to August 2024). Samples were collected from the patients with clinically suspected UTI cases, who were admitted in inpatient department and also from the outpatient department of Ad-din Sakina Women's Medical College hospital, Jashore, Bangladesh. Valid, informed and written consent were taken from the study subjects and for minor subjects, consent was taken from legal guardians.

Urine samples were collected aseptically through either midstream clean catch method or through bladder catheterization in case of hospital admitted patient.

The urine specimens for routine urinalysis were tested using a fully automated urine chemistry Analyzer UC-3500 & a particle analyzer UF-5000 sysmex corporation. Pyurea was defined as the presence of >5 WBC per high power field on arise sediment. The urine was mixed thoroughly and the top of the container was removed, standard loop was inserted vertically into the urine to allow urine to adhere to the loop. After that, the loop was touched to the blood agar & Mac Conkey's agar media. Then the plate incubated for 18-24 hours at 37°C and colonies were counted on each plate. Bacterial growth was obtained from culturing of samples according to the different morphological & biochemical characters.

General urine examination involved physical & chemical examinations of urine such as color, turbidity, pH, protein, specific gravity, bile pigment, bile salts & possible presence of blood. The urine spun in centrifuge at 500-3000 rpm for 5 min to allow sediments blood cells, bacteria & other particles. Light microscope was used to diagnose these sediments.

All statistical analysis was performed using 'IBM SPSS Statistics 25' software. Chi-square test was done for hypothesis testing to see the level of significance. 'p' value < 0.05 was considered 'statistically significant'.

Results

Urine samples from a total of 404 (female 340 vs male 64) cases with clinical symptoms of UTI were collected and analyzed over 6 months duration. Mean ± SD age of the study subjects was 35.59 ± 18.92 years with a range from 1 year to 75 years. Mean ± SD age of culture positive female and male was 34.93 ± 18.27 years and 40.26 ± 22.97 years respectively. Among the study subjects, 153 (37.9%) were found positive for bacterial culture; 134 female vs 19 male (87.6% vs 12.4%).

Table I showed, E. coli was the most common causative organism (74.5%) both in male and female subjects (75% and 74% respectively). In case of male subject number of Pseudomonas as the causative organism was a little bit higher when comparing with female subjects (21.1% vs 12.7%). Klebsiella appeared to be the third common causative organism both in female and male subject. In our study there were some minor

Table I : Gender of Subject: Organism Isolated in Culture - Cross-tabulation

Gender		A	B	C	D	E	F	G	Total	*p*
Female	Count	100	17	10	2	1	3	1	134	0.924
	% within Gender of the Subject	75%	12.7%	7.5%	1.5%	0.7%	2.2%	0.7%	100%	
	% within Organism Isolated in Culture	88%	81%	90.9%	100%	100%	100%	100%	87.6%	
Male	Count	14	4	1	0	0	0	0	19	
	% within Gender of the Subject	74%	21.1%	5.3%	0%	0%	0%	0%	100%	
	% within Organism Isolated in Culture	12%	19%	9.1	0%	0%	0%	0%	12.4	
Total	Count	114	21	11	2	1	3	1	153	
	% within Gender of the Subject	74.5%	13.7%	7.2%	1.3%	0.7%	2.0%	0.7%	100%	
	% within Organism Isolated in Culture	100%	100%	100%	100%	100%	100%	100%	100%	

A = E. coli; **B** = Pseudomonas; **C** = Klebsiella; **D** = S. saprophyticus; **E** = E. faecalis; **F** = Cytobacter; **G** = S. aureus. . ***p*** value < 0.05 denotes statistical significance.

variation in prevalence in different organism causing UTI among female vs male subjects, but Chi-square test showed no statistical significance (p = 0.924).

Table II showed higher incidence of E. coli causing hospital acquired UTI (HA-UTI). Incidence of community acquired UTI (CA-UTI), the rate of Pseudomonas was a little bit higher when compared to HA-UTI (22.6% vs 11.5%), although the difference was not significant statistically (p = 0.600).

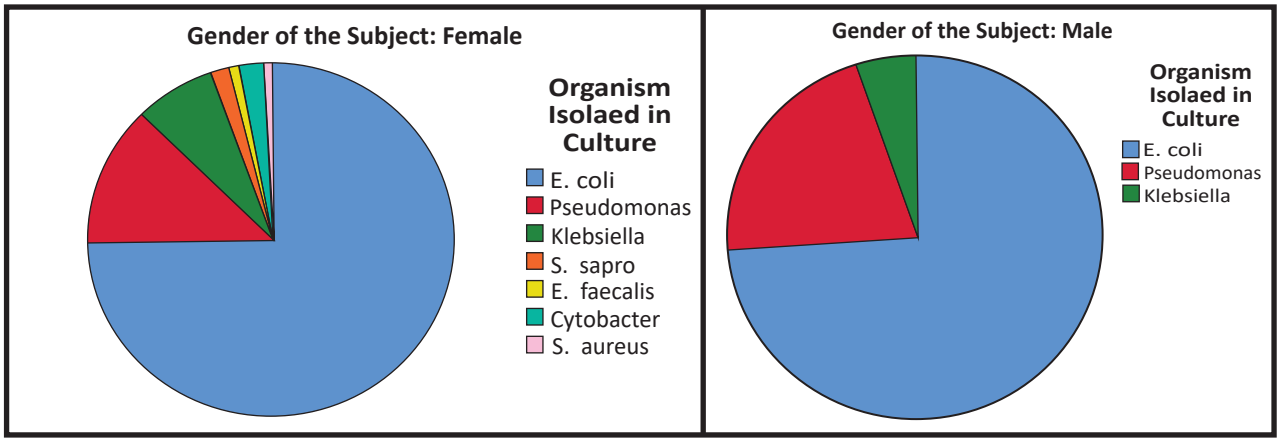

Figure 1: Pie chart showing organisms involved in UTI against female and male subjects.

Table II : Source of UTI: Organism Isolated in Culture - Cross-tabulation

Source		A	B	C	D	E	F	G	Total	*p*
Hospital Acquired UTI	Count	93	14	8	2	1	3	1	122	0.600
	% within Source of UTI	76.2%	11.5%	6.6%	1.6%	0.8%	2.5%	0.8%	100%	
	% within Organism Isolated	81.6%	66.7%	72.7%	100%	100%	100%	100%	79.7%	
Community Acquired UTI	Count	21	7	3	0	0	0	0	31	
	% within Source of UTI	67.7%	22.6%	9.7%	0%	0%	0%	0%	100%	
	% within Organism Isolated	18.4%	33.3%	27.3%	0%	0%	0%	0%	20.3%	
Total	Count	114	21	11	2	1	3	1	153	
	% within Source of UTI	74.5%	13.7%	7.2%	1.3%	0.7%	2.0%	0.7%	100%	
	% within Organism Isolated	100%	100%	100%	100%	100%	100%	100%	100%	

A = E. coli; **B** = Pseudomonas; **C** = Klebsiella; **D** = S. saprophyticus; **E** = E. faecalis; **F** = Cytobacter; **G** = S. aureus. ***p*** value < 0.05 denotes statistical significance. **UTI**, Urinary Tract Infection.

Table III, showed the most commonly found culture positive subjects belonged to the age groups '19-30 years' and '31-45 years' in female (29.1% and 25.4%) and in case of male subjects, age group '31-45 years' and '46-60 years' appeared to be with higher culture positive frequencies (26.3% and 26.3%). Although apparently some age group showed some gender specific predominance in particular age group, but they were not proved to be significant statistically.

Table III : Frequency and percentage of culture positive cases among different age groups against gender.

Age Group	Female Count	*p* (2-sided)	Male Count	*p* (2-sided)	Total Count
0-18 years	23 (17.2%)	0.688	4 (21.1%)	0.352	27 (17.6%)
19-30 years	39 (29.1%)		2 (10.5%)		41 (26.8%)
31-45 years	34 (25.4%)		5 (26.3%)		39 (25.5)
46-60 years	27 (20.1%)		5 (26.3%)		32 (20.9)
> 60 years	11 (8.2%)		3 (15.8%)		14 (9.2%)
Total	134 (100%)		19 (100%)		153 (100%)

p < 0.05 = statistically significant. Percentages are shown within parentheses.

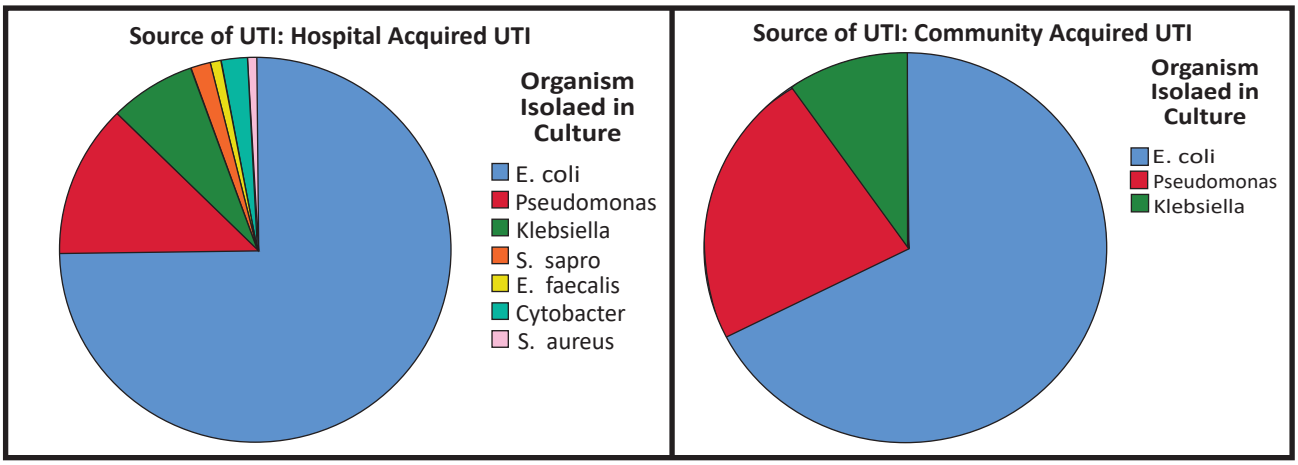

Figure 2: Pie chart showing organisms involved in UTI against hospital acquired and community acquired cases.

Table IV : Age Group: Organism Isolated in Culture Cross-tabulation

Age Group		A	B	C	D	E	F	G	Total	*p*
0-18 years	Count	21	2	3	0	1	0	0	27	0.479
	% within Age Group	77.8%	7.4%	11.1%	0%	3.7%	0%	0%	100%	
	% within Organism Isolated	18.4%	9.5%	27.3%	0%	100%	0%	0%	17.6%	
19-30 years	Count	31	4	3	2	0	0	1	41	
	% within Age Group	75.6%	9.8%	7.3%	4.9%	0%	0%	2.4%	100%	
	% within Organism Isolated	27.2%	19.0%	27.3%	100%	0%	0%	100%	26.8%	
31-45 years	Count	32	4	2	0	0	1	0	39	
	% within Age Group	82.1%	10.3%	5.1%	0%	0%	2.6%	0%	100%	
	% within Organism Isolated	28.1%	19.0%	18.2%	0%	0%	33.3%	0%	25.5%	
46-60 years	Count	22	7	2	0	0	1	0	32	
	% within Age Group	68.8%	21.9%	6.3%	0%	0%	3.1%	0%	100%	
	% within Organism Isolated	19.3%	33.3%	18.2%	0%	0%	33.3%	0%	20.9%	
> 60 years	Count	8	4	1	0	0	1	0	14	
	% within Age Group	57.1%	28.6%	7.1%	0%	0%	7.1%	0%	100%	
	% within Organism Isolated	7.0%	19.0%	9.1%	0%	0%	33.3%	0%	9.2%	
Total	Count	114	21	11	2	1	3	1	153	
	% within Age Group	74.5%	13.7%	7.2%	1.3%	0.7%	2.0%	0.7%	100%	
	% within Organism Isolated	100%	100%	100%	100%	100%	100%	100%	100%	

A = E. coli; **B** = Pseudomonas; **C** = Klebsiella; **D** = S. saprophyticus; **E** = E. faecalis; **F** = Cytobacter; **G** = S. aureus. . ***p*** value < 0.05 denotes statistical significance.

E. coli was the commonest organism (74.5%) Isolated in urine culture. Pseudomonas showed some degree of higher incidence (21.9% and 28.6%) in age group '46-60 years' and '> 60 years' when compared with other age groups for the same organism. Age group entitled '19-30 years' and '31-46 years' had higher rate for positive isolation of organism in culture; although these variations mentioned above was not proved to be significant (p = 0.479) statistically (Table IV).

Discussion

As the etiological factors, patterns of antibiotic resistance and even the differences of challenges in treating the same causative organism in different demography, continuous surveillance is essential in various geographical areas with different people with different age, sex, race and associated comorbidities. The primary objective of this cross sectional study was to identify and to evaluate the prevalence of common causative

organisms on the basis of gender, age group and some other demographic issues for UTI among patients attending in a tertiary care hospital of Jashore district in Bangladesh. The aim of the study was also to compare the study outcome with the already existing information so that local physician might make appropriate decision about the available treatment options suitable for the indigenous UTI patients.

In this study a total of 404 (female 340 vs male 64) cases with clinical symptoms of UTI were selected by random sampling. Between them, 153 (37.9%) were found positive for bacterial culture; 134 female vs 19 male (87.6% vs 12.4%). Almost all other studies showed higher prevalence of UTI among female particularly among young sexually active women.[13] A similar study conducted in Dhaka city of Bangladesh by Sanjee SA et al. in 2017 demonstrated that among 55.08% positive culture, 34.75% was female and 20.33% was male subject.[14] On the contrary Islam MA found positive culture in 29% cases, which was also in agreement with our study.[15]

Our study also revealed that E. coli was the most common causative organism (74.5%), both in male and female subjects (75% and 74% respectively). Islam MA et al. in their research also showed that among causative organisms, E. coli was 51.6%, Klebsiella was 12.1% and Pseudomonas was 4.4%; which were more or less similar to our research outcome.[15]

Moreover, in this study, among 153 culture positive cases, 79.7% was HA-UTI and 20.3% was CA-UTI which was almost similar to the study conducted by NS Ochada et al.[16] Compromised immunity in hospitalized patients due to comorbidities and catheterization might contribute to this issue. JP Horcajada and his associates in their study[17] found that among 279 (42% of their study subjects) culture positive cases, 246 (37%) were CA-UTI and 142 (21%) were HA-UTI and this outcome was very much divergent with our study result.

The present study also demonstrated highest incidence of E. coli (76.2%) to be the agent causing HA-UTI, it was 67.7% in case of CA-UTI. In the incidence of CA-UTI, the rate of Pseudomonas was higher when compared to HA-UTI (22.6% vs 11.5%), although the difference was not significant statistically (p = 0.600).

E. coli was the most frequent organism (74.5%) responsible for all age group isolated in urine culture. Pseudomonas showed higher incidence (21.9% and 28.6%) in age group '46-60 years' and '> 60 years' when compared with other age groups for the same organism. Age group entitled '19-30 years' and '31-46 years' had higher rate for positive isolation of organism in culture; although these variations mentioned above was not proved to be significant (p = 479) statistically (Table IV). SH Almukhtar et al in their study showed that 58.4% of participants were from the age group

Competing interest : The authors declare that they have no competing interests.

Limitation of the study : Although samples were collected by random sampling, there were few male cases when compared to female cases; this was due to the fact that the hospital from the samples was collected is traditionally visited by more female patients then male patients.

Conclusion

Female in their sexually active age group showed highest prevalence of UTI, although in our study the result was not statistically significant. E. coli was the commonest organism to be isolated in urine culture. HA-UTI had more prevalence than CA-UTI, although this was not proved to be significant statistically in our study. Further large scale study is required to make conclusive remark with better sampling technique.

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Case Report

Management of Baker's Cyst with Platelet-Rich Plasma (PRP): A Case Report

***Kamal N[1]**

Abstract

Baker's cyst, also known as a popliteal cyst, is a fluid-filled swelling behind the knee, often associated with underlying joint pathology. Traditional management includes conservative treatments like aspiration and corticosteroid injections, with surgical options reserved for refractory cases. This case report presents the management of a Baker's cyst using platelet-rich plasma (PRP), highlighting its potential as a noble, less invasive therapeutic approach.

Keywords: Baker's cyst, platelet-rich plasma, regenerative medicine, knee pain, minimally invasive therapy.

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Background

Baker's cysts are commonly linked to knee conditions such as osteoarthritis, meniscal tears, or rheumatoid arthritis. The cyst can cause pain, swelling, and impaired mobility, significantly affecting the patient's quality of life. PRP, a concentration of autologous platelets in a small volume of plasma, has shown promise in regenerative medicine due to its high content of growth factors that facilitate tissue repair and reduce inflammation. This report explores the use of PRP for treating a Baker's cyst in a middle-aged patient with chronic knee discomfort.

Case Presentation

A 52 years old male presented at Bangabandhu Sheikh Mujib Medical University on 4 February 2019 to 19 march with a three-month history of swelling and pain in the posterior aspect of his left knee, which worsened with activity. The patient had a history of mild knee osteoarthritis but no previous trauma. Physical examination revealed a palpable cystic mass in the popliteal fossa, measuring approximately 5 cm in diameter. Diagnostic ultrasonogram confirmed the diagnosis of a Baker's cyst without significant intra-articular pathology.

Conservative measures, including non-steroidal anti-inflammatory drugs (NSAIDs) and physiotherapy, provided limited symptom relief. Cyst aspiration was performed, yielding 30 mL of serous fluid; however, the symptoms recurred within two weeks. The patient sought alternative treatments, and PRP therapy was considered.

Intervention

After obtaining informed consent, 30 mL of the patient's blood was collected and centrifuged to prepare PRP. Under ultrasound guidance, PRP was injected into the cyst, ensuring precise placement of the biologic agent. The procedure was performed in an outpatient setting with no complications.

Outcome and Follow-up

The patient reported a significant reduction in pain and swelling within two weeks post-injection. At the six-week follow-up, the cyst size had reduced to 1.5 cm on ultrasound, and the patient experienced improved knee function. A three-month follow-up MRI showed near-complete resolution of the cyst, with no recurrence of symptoms. The patient remained symptom-free at the six-month review.

Discussion

PRP offers a promising, minimally invasive treatment for Baker's cysts by addressing the inflammatory component and promoting tissue healing. The growth factors present in PRP, such as platelet-derived growth factor (PDGF) and

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transforming growth factor-beta (TGF-β), are thought to enhance synovial healing and reduce fluid accumulation. This case supports the potential role of PRP as a therapeutic option for patients with recurrent Baker's cysts, especially when conventional therapies fail.

Conclusion

The use of PRP in managing Baker's cyst may offer a noble and effective treatment strategy, especially for patients with refractory cases. Further studies are needed to establish standardized protocols and evaluate long-term outcomes.

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