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Editorial

Risk of an outbreak of Adenovirus infection in Dhaka city after the outbreak in India: It's high time to develop a 'surveillance' system and create awareness for the virus.

Ritu Saha

Adenoviruses are a group of viruses that can cause various types of illnesses. It has more than 100 serotypes, of them 49 can cause human infection.[1] They are very common and can affect people of all ages. However, children & immune-compromised individuals can develop the disease in a more extensive form with fatal outcomes.[2] Adenoviruses are usually spread through close personal contact, such as touching or shaking hands with an infected person. They can also be spread through the air by coughing or sneezing.[3]

Symptoms of adenovirus infection can include fever, sore throat, coughing, runny nose and congestion. The virus can sometimes cause more serious illnesses such as pneumonia or bronchitis. However, most people recover on their own within a few days. However, people with weakened immune systems or existing respiratory problems may be at greater risk for complications.

India has recently experienced an adenovirus outbreak, with the Indian state of West Bengal being hit particularly hard. From January 2023 more than 13,000 cases of adenovirus have been recorded in the state. The virus has also been found in Maharashtra and Karnataka states.

Adenovirus can cause multisystem infections including respiratory, eye and gastrointestinal tract; recently the virus has attacked children more. Nineteen children died of acute respiratory infections in West Bengal in the year 2023. Thousands more are in hospital as India grapples with the outbreak.[4]

The healthcare system of West Bengal is struggling to cope with the volume of cases. Some hospitals declared their pediatric wards saturated, even children having to share hospital beds. The local government has to set up help lines to handle calls from concerned parents, and the Health and Family Welfare Department has canceled health worker's leave.[5]

While the outbreak has prompted emergency measures from the Indian government; Bangladesh has yet to take any precautions despite many children and elderly patients visiting hospitals with symptoms similar to the adenovirus infection like fever, cough and respiratory distress.[6] There is a lack of the facility for medical tests to determine adenovirus cases in our country. Institute of Epidemiology, Disease Control and Research (IEDCR) has no surveillance system for adenoviruses; so it is difficult to identify the population who actually come in contact with Adenovirus.[7] It is essential to identify the symptomatic patients who come in contact with the adenovirus. Bangladesh faces a high risk as the pathogen has already spread in Kolkata.[8] It's important to know if the symptomatic patients admitted in hospitals of our country are attacked by the sub-variants of the virus, that has spread in Kolkata. If we have patients with similar symptoms in Bangladesh, we must run tests on them. Protocols, such as mask-wearing and social distancing that are used during the COVID pandemic can be introduced to slow down infection.

Coronavirus cases are dropped off after mass vaccination, but people are still at risk of developing emerging viral diseases like Adenovirus. Experts believe that early detection and effective containment strategies are the best way to address an adenovirus outbreak. In addition to these measures, there is a need for increased public awareness about adenovirus and how it spreads. This includes educating people about the importance of good hygiene and encouraging them to stay home if sick.

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Original article

Pregnancy complication in teenage mother: a cross-sectional analysis

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Abstract

Background: Teenage pregnancy is universally accepted as a high-risk pregnancy. Bangladesh has the highest (1 in 10) teenage fertility rate in South Asia. Objective: The study was conducted to find out the common pregnancy complications of teenage mothers. ***Methodology:*** A comparative cross-sectional study was carried out among 100 respondents (50 teenage and 50 adults) in Munshiganj General Hospital from 1st January to 31st December 2018. Respondents were admitted patients who have delivered either vaginally or by caesarian section. Women aged 15 to 19 years were selected as teenage and those aged 20 to 40 years were selected as adults. Past obstetric history, antenatal checkup, antepartum and intrapartum complications, clinical state on admission, and postpartum complications were recorded in a semi-structured questionnaire. Obstetrical parameters of teenage and adult groups were compared. ***Results:*** 56% of teenagers had no ANC. Anemia (62%) and hypertension (24%) were prevalent among the pregnant teenagers. Antepartum and intrapartum complication rates were more in the teenage group, like preeclampsia (12%), eclampsia (14%), preterm labor (12%), prolonged labor (14%), and obstructed labor (8%). The cesarean rate was higher (66%) in teenage pregnancy; more commonly due to eclampsia (14%), preeclampsia (6%), prolonged labor (10%) and obstructed labor (8%). Postpartum complications like PPH (4%) and postpartum eclampsia (4%) were more prevalent in teenagers. ***Conclusion:*** The majority of the respondents had no ANC. Antepartum and intrapartum complication rates were more prevalent in the teenage group. Postpartum complications were more prevalent in teenagers also. As a result, adverse perinatal outcome was observed in teenage pregnancy.

Keywords: Teenage pregnancy, Pregnancy complication, Perinatal outcome.

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Introduction

Teenage pregnancy means pregnancy in females under the age of 20. Teenagers are still growing and their bodies are not yet ready to have babies. Complications during pregnancy and childbirth are the leading cause of death for teenage girls globally[1].In South Asia, Bangladesh has the highest adolescent fertility rate. Here 1 in 10 girls has a child before the age of 15, whereas 1 in 3 adolescents becomes mothers or pregnant by the age of 19[2-4]. Bangladesh has remarkable progress in human development but adolescent childbearing is highly persistent, mostly due to the comparatively higher prevalence of child marriage[5,6]. 50% of all adolescent births occur in just seven countries: Bangladesh, Brazil, the Democratic Republic of the Congo, Ethiopia, India, Nigeria and the United States[7].

Early marriage results in too early pregnancy. Early motherhood results in inadequate growth, undernutrition, hypertension and anemia. Motherhood imposed on an immature body, can result in prolonged and obstructed labor and lifelong health problem as their pelvic growth is incomplete. According to the World Health Organization, globally the leading causes of death among girls aged 15-19 years are pregnancy and childbirth complications. Low and middle-income countries account for 99% of global maternal deaths of women aged 15-49 years[8].

To a vast majority of teenage girls in the developing world, family planning information and services are not accessible. Primarily depend on untrained or relatively less trained traditional birth attendants and older relatives for delivery. So pregnancy complications are much higher in teenage mothers.

The study was conducted to find out the common complications of teenage pregnancy which would help to facilitate generating better policy directions to bring desired changes in teenage childbearing in Bangladesh, which will eventually contribute to ensuring the quality of life of teenage mothers and children.

Materials and Methods

This comparative cross-sectional study was carried out in Munshiganj General Hospital, Munshiganj from 1st January to 31st December 2018. Respondents were admitted patients who have delivered either vaginally or by caesarian section. Women aged 15 to 19 years were selected as teenage and those aged 20 to 40 years were selected as adults. A purposive and convenient sampling method was done to obtain the samples, 50 teenage and 50 adults. After the formulation of the aims and objectives of the study, a semi-structured questionnaire was made for recording all relevant parameters. Information was recorded through face-to-face interviews of the respondents and from the patient's file about socio-demographic condition, contraceptive method, antenatal checkup, antepartum and intrapartum complications, mode of delivery, perinatal outcome and clinical state on admission. Antenatal complications like abortion, molar pregnancy, hyperemesis gravidarum, preterm labor, prelabour rupture of membrane, preeclampsia, eclampsia, antepartum hemorrhage, and malpresentation were recorded. Intrapartum complications like eclampsia, prolonged labor, obstructed labor, or postpartum hemorrhage were also recorded. Mode of delivery whether by normal vaginal delivery or by caesarian section and perinatal outcome whether the baby was normal, cried well just after birth, or was asphyxiated or stillborn were also noted. After obtaining the data statistical analysis of the results was performed using SPSS (Statistical Package for the Social Sciences) version 20 software. The obstetrical parameters of the teenage and adult groups were compared using the z-score test. Statistical significance was set at ≤ 0.05 level and confidence interval at 95% level.

Results

Table I: Antenatal checkup

ANC	Teenage		Adult		Test of significance	
	n=50	%	n=50	%	Z	P
Regular	14	28	23	46	2.4425	0.0146
Irregular	8	16	7	14	0.3960	0.6892
No ANC	28	56	20	40	2.8486	0.0044

Most teenage (56%) had no ANC and it was statistically significant (<0.05).

Table II: Clinical state

Parameter	Teenage		Adult		Test of significance	
	n=50	%	n=50	%	Z	P
Anemia	31	62	19	38	3.6449	.00
Edema	12	24	11	22	-	-
Hypertension	12	24	2	4	9.0011	.00
Proteinurea	6	12	2	4	4.4915	.00

Anemia (62%) and hypertension (24%) were prevalent among the pregnant teenagers which was statistically significant (<0.05).

Table III: Antepartum and Intrapartum complications

Complication	Teenage		Adult		Test of significance	
	n=50	%	n=50	%	Z	P
Hyperemesis	1	2	1	2	-	-
Preeclampsia	6	12	1	2	4.5001	-
Eclampsia	7	14	0	0	-	-
IUD	1	2	1	2	-	-
Preterm labor	6	12	2	4	3.8065	0.423
Malpresentation	5	10	0	0	-	-
Prolonged labor	7	14	2	4	4.605	0.424
Obstructed labor	4	8	2	4	1.1533	0.2460
Scar tenderness	0	0	8	16	-	-
APH	0	0	0	0	-	-
Oligohydramnios	2	4	1	2	1.1533	0.2460
No complication	13	26	31	62	1.1533	0.2460

Complication rate were more in teenage group, like preeclampsia (12%), eclampsia (14%), preterm labor (12%), prolonged labor (14%), obstructed labor (8%).

Table IV: Mode of delivery

Mode	Teenage		Adult		Test of significance	
	n=50	%	n=50	%	Z	P
NVD	22	44	29	58	4.6162	0.00
LSCS	28	66	21	42	3.5714	-

The Caesarean rate was higher (66%) in teenage pregnancy.

Table V: Indication of LSCS

Indication	Teenage		Adult		Test of significance	
	n=50	%	n=50	%	Z	P
Prolonged labor	5	10	2	4	1.0381	0.2984
Obstructed labor	4	8	2	4	1.0081	0.2184
Preeclampsia	3	6	0	0	1.7230	0.0534
Eclampsia	7	14	2	4	0.005	0.005
Fet al distress	3	6	3	6	-	-
Failed trial	1	2	2	4	0.6565	0.5092
Malpresentation	4	8	1	2	0.0381	0.2134
Oligohydramnion	2	4	2	4	-	-
Previous LSCS	1	2	8	16	4.1315	0.2582

LSCS in teenage pregnancy is more commonly due to eclampsia (14%), preeclampsia (6%), prolonged labor (10%) and obstructed labor (8%).

Table VI: Postpartum complications

Complication	Teenage		Adult		Test of significance	
	n=50	%	n=50	%	Z	P
No complication	39	78	43	86	0.3596	0.005
PPH	2	4	0	0	-	-
UTI	3	6	3	6	-	-
Puerperal sepsis	2	4	2	4	-	-
Wound infection	2	4	2	4	-	-
Postpartum eclampsia	2	4	0	0	-	-

Complications like PPH (4%)and postpartum eclampsia (4%) were more prevalent in teenage pregnancy.

Table VII: Perinatal outcome

Condition	Teenage		Adult		Test of significance	
	n=50	%	n=50	%	Z	P
Healthy	28	56	36	72	1.4286	0.1528
Asphyxiated	18	36	10	20	1.5523	0.1212
Stillborn	4	8	4	8	-	-

Better perinatal outcomes were found in the adult group.

Discussion

During pregnancy, the increased demand for blood flow can put a strain on teenage mothers to carry the extra circulatory load. In pregnancy high blood pressure and other complications like preeclampsia, eclampsia can result in reduced fetal birth weight and growth, placing the mother at

risk of many complications and even death. Combined with a diet poor in iron-rich foods, which is common among teens, anemia can result. A study conducted by Rahman M. et al[9] found that maximum teenage suffered anemia complications during the time of pregnancy. The present study revealed that 62% of teenage were anemic whereas only 38% were anemic in the adult group. 24% of teenage became hypertensive during pregnancy and 6% showed proteinuria, 12% developed preeclampsia, 14% suffered from eclampsia while in the adult group, only 2% were hypertensive, 2% showed proteinuria, 2% developed preeclampsia and no one suffered from eclampsia. Several other studies also observed that pregnancy complications like hypertension, eclampsia, and iron deficiency anemia were common among adolescents[10-14].

Teenage mothers have the possibility of premature labor. Asphysically teenage mothers have immature reproductive organs that may not be prepared to carry an infant to term. Sexually transmitted diseases also increase the risk of preterm labor and birth. Immaturity in the growth of birth passage leads to prolonged labor and obstructed labor with all its adverse consequences like a perineal tear, uterovaginal prolapse, and vesicovaginal fistula leading to continuous leakage of urine. This study showed pregnancy culminated in preterm labor in 12%, prolonged labor in 14% and obstructed labor in 8% of cases. The adult group showed 4%, 4% and 2% respectively. A study conducted by Rahman M. et al[9] found that about 98% of teenage suffered delivery complications like eclampsia, lengthy delivery, excess hemorrhage, and delay in delivery of placenta whereas only 16% suffered these complications that were pregnant at age 20 years and later. More than fifty percent of adolescents undergo lengthy delivery and very few (2%) adolescents delivered babies safely[9]. In a study, Rebecca also found preeclampsia, preterm labor, LBW, STD, and postpartum depression were more common in teenage pregnancy[15]. Pregnancy during the teenage years is also associated with a higher risk of health problems such as preeclampsia, anemia, contracting STDs (sexually transmitted diseases), premature delivery, postpartum hemorrhage, and poor mental health outcomes[16].

Prof. Sayeba Akter observed stillbirths and newborn deaths were 50% higher among babies of teenagers. They are also more likely to have low birth weight, having a long-term impact on their health and development[17]. Phuong Hong Nguyen18 study in Bangladesh showed a greater risk of anemia, and low birth weight affecting the lifelong well-being of a young mother and her child. Economic risks also weighed heavily on younger mothers, who demonstrated higher rates of early school dropout which leaves them less empowered in the long term and thus more vulnerable to sustained poverty[18].

Conclusion

Teenage pregnancy is universally accepted as a high-risk pregnancy. The majority of the respondents had no ANC. Antepartum and intrapartum complication rates were more prevalent in the teenage group. Postpartum complications were more prevalent in teenage also. As a result, adverse perinatal outcome was observed in teenage pregnancy.

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Original article

Nutritional Status of the Women of Reproductive Age in a Rural Community of Bangladesh

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Abstract

Background: Nutritional status is an important indicator of the health status of a community. The nutritional status of individuals is determined by a complex interplay between personal and environmental factors. Good nutrition benefits optimal health and the ability to resist and recover from disease, while malnutrition leads to dependency. Dependency interferes with health and the quality of life. Nutrition-related issues are often neglected in adult females living in low-income countries. In developing countries like Bangladesh maternal underweight is a leading risk factor for preventable death and diseases. Objective: The study was carried out with the objective of finding out the pattern of nutritional status among the women aged 15-49 years of a rural community at Keraniganj Upazila, Dhaka. ***Methodology:*** The study was cross-sectional and descriptive in nature. Data were collected through face-to-face interviews with a semi-structured questionnaire. Total 419 women of reproductive age were included in the study. ***Results:*** It was found that 51.3% had anemia, 0.7% had vitamin B-2 deficiency, 0.8% had vitamin C deficiency, 1% had iodine deficiency and 0.9% had protein deficiency. By BMI, it was found that 47.3% were normal, 32.5% were overweight and 14.3% were obese. By MUAC, it was found that 75.2% were normal, 17.2% were obese, 5.5% were severely malnourished, 1.2% were mildly malnourished and 1.0% were moderately malnourished. Regarding the risk factors, it is found that 75.9% performed moderate physical activity, and 13.4% were sedentary. It is also revealed that 21.0% were suffering from chronic diseases, 53.9% were occasionally under mental pressure and 10.5% were very stressful always. ***Conclusion:*** Despite some positive findings regarding nutritional status, it can be considered that further studies in a wider context in this region are needed to gather more information about the nutritional status of the women.

Keywords: Nutritional status; women's health, reproductive age.

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Introduction

In developing countries like Bangladesh, maternal underweight and malnutrition are major risk factors for preventable mortalities and morbidities. Both underweight and obese women are at risk of poor pregnancy outcomes and overall poor maternal and child health.[1] Nutritional status is very important in adolescents of reproductive age because of the low to moderate prevalence of possible nutritional deficiencies.[2] This suggests the need for a population assessment of the trends, prevalence and determinants of underweight and overweight in women of reproductive age. In a country like Bangladesh, medical records on disease patterns are available, but information on morbidity patterns in a specific community is rarely available. A community-based research can reflect the exact scenario of the morbidity patterns and relevant risk factors in a specific community.[3] The overall situation of the healthcare system is poor in developing countries like Bangladesh, due to inadequate access to modern health services and poor utilization of the few services that are available. Therefore, one of the public health challenges in Bangladesh is to identify vulnerable groups and provide them with needed preventive and curative health services. So, this study was designed to identify the specific factors that may enhance the overall health status of the adult female considering their morbidity patterns, nutritional status, and healthcare-seeking behavior.[2]

Materials and Methods

This cross-sectional descriptive study was conducted in a rural region of Keraniganj upazila, Dhaka. A convenience sampling technique was followed to select the 419 respondents from some selected villages. In the beginning, the research protocol was approved by the institutional ethical review committee of Ad-din Women's Medical College. After taking verbal consent from the respondent following introducing and informing the study's purpose and objectives, data were collected by clinical examination, face-to-face interview & using weighing machines & measuring tapes for the measurement of height, weight & mid-arm circumference. Data were recorded on a semi-structured questionnaire based on socio-economic characteristics, risk factors and clinical features of nutritional deficiency disorders. Statistical analyses were performed using the 21st version of SPSS® software. The confidentiality of data and the privacy of the respondents were maintained strictly.

Results

Total 419 women were included in the study, where mean (± SD) age of the patients was 29.6 (±8.9) years. It was found that 41.3% were between 21 & 30, 26.3% were between 31 & 40, 21.0% were less than 20 years and 11.5% were greater than 48 years. In this study, among all respondents 341 (81.4%) were Muslims, 78 (18.6%) respondents were Hindus, 370 (88.3%) respondents were married, 35 (8.4%) respondents were single, 199 (47.5%) were primary educated, 104 (24.8%) were secondary educated, 79.7% were housewives, 5.3% were service holders. Average family income of the respondents was Tk. 15,382.5 (±12241.6 SD). It is revealed that, 41.9% respondents lived in tin made houses and 21.0% were suffering from chronic diseases. In this study, it was found that 53.9% were occasionally under mental pressure, 10.5% were very stressful always. Regarding the other risk factors of nutritional disorders, respondents take fatty food always, smokers, respondents sometimes drink alcohol, 75.9% perform moderate physical activity, and 13.4% perform

Table 1: Socio-economic characteristics of the respondents (n = 419)

Name of variables	Frequency	Percentage	Mean± SD
Age in years			
< 20	88	21.0	
21-30	173	41.3	29.6 ± 8.9
31-40	110	26.3	
> 40	48	11.5	
Religion			
Muslim	341	81.4	
Hindu	78	18.6	
Education			
Illiterate	87	20.8	
Primary	199	47.5	
Secondary	104	24.8	
Higher secondary	22	5.3	
Graduate	5	1.2	
Post graduate	2	0.5	

Occupation			
Unemployed	15	3.6	
Housewife	334	79.7	
Service holder	22	5.3	
Business	10	2.4	
Day laborer	8	1.9	
Student	22	5.3	
Others	8	1.9	
Family size			
Small sized family (1-3)	79	18.9	
Medium sized family (4-6)	273	65.2	
Large sized family (7-13)	67	16.0	
Monthly family income (Tk.)			
Low: 1500-9000	111	26.5	15382.5 ± 12241.6
Middle: 9001-40000	292	69.7	
High: 40001-100000	16	3.8	
Marital status			
Single	35	8.4	
Married	370	88.3	
Divorced	3	0.7	
Widow	7	1.7	
Separated	4	1.0	
Duration of marriage			
<1 y	6	1.4	
1-12 y	197	47.0	12.5 ± 9.2
13-24 y	124	29.6	
25-36 y	62	14.8	
Not applicable (single)	30	7.2	

Table 2: Prevalence of risk factors (n = 419)

Name of variables	Frequency	Percentage
Number of living child (ren)		
0-1	153	36.5
2-3	205	48.9
4-9	61	14.6
Pregnancy		
Pregnant	25	6
Not pregnant	394	94
Lactation		
Lactating mother	73	17.4
Non-lactating	346	82.6
Physical activity		
High	44	10.5
Moderate	318	76
Sedentary	56	13.4
Mental stress		
Very stressful	44	10.5
Occasionally stressful	226	53.9
Not at all	149	35.6

Table 3: Prevalence of deficiency disorders on clinical examination (n = 419)

Disorders	Frequency	Percentage
Anemia	215	51.3
Vitamin B_2 deficiency	10	2.4
Vitamin C deficiency	05	1.2
Iodine deficiency	03	1
Protein deficiency	06	5.5

Table 4: Nutritional status of respondents according to BMI (n = 419)

BMI	Frequency	Percent
Under weight <18.5	23	5.5
Normal 18.5-24.99	198	47.3
Overweight 25-29.99	136	32.5
Obese 30-39.99	60	14.3
Morbidly obese >40	2	.5
Total	**419**	**100.0**
Mean ± SD	25.1 ± 4.7	

Table 5: Nutritional status of respondents according to MUAC (n = 419)

MUAC	Frequency	Percent
Severe malnourished < 160	23	5.5
Moderate malnourished 160-184.99	4	1.0
Mild malnourished 185-219.99	5	1.2
Normal 220-320	315	75.2
Obese > 320	72	17.2
Total	**419**	**100.0**
Mean ± SD	278.5 ± 54.5	

Among the middle-income group, 146 were normal weight, 93 were overweight, 43 were obese, 2 were morbidly obese and among the low-income group 13 were underweight. This association between income group and BMI was statistically significant (p-value 0.019).

Table 6: Association between income group and BMI

Income group	BMI				
	Under weight (<18.5)	**Normal (18.5-24.99)**	**Overweight (25-29.99)**	**Obese (30-39.99)**	**Morbidly obese (>40)**
Low (1500-9000)	13 (56.5%)	48 (24.2%	35 (25.7%	15 (25.0%)	0 (0.0%)
Middle (9001-40000)	8 (34.8%)	146 (73.7%)	93 (68.4%)	43 (71.7%)	2(100.0%)
High (40001-100000)	2 (8.7%)	4 (2.0%)	8 (5.9%)	2 (3.3%)	0 (0.0%)
Total	23	198	136	60	2
χ^2	18.375				
p-value	0.019				

Discussion

A study conducted by Sultana T et al, aimed to evaluate the use of mid-upper arm circumference (MUAC) as a simpler alternative to body mass index (BMI) to detect adult undernutrition and suggest a suitable cut-off value. The study included 650 adults aged 19-60 years, and measurements of height, weight, and MUAC were taken. The study found a strong positive correlation between MUAC and BMI for both males and females. The study suggests that MUAC <25.1 cm for males and <23.9 cm for females may be considered a simpler alternative to BMI cut-off <18.5 to detect adult undernutrition.[4]

A study conducted by Zaman MK et al, aimed to assess the situation of anemia among non-pregnant, ever-married women of reproductive age in Bangladesh, and examine the associations with demographic, socioeconomic, and nutritional factors. The study found that the prevalence of anemia was 41.3%, with a lower prevalence among non-pregnant women using contraception.[5]

According to a study conducted in Bangladesh, the prevalence of underweight, normal weight, pre-overweight, overweight, and obesity among ever-married women was 24.1%, 46.7%, 12.8%, 13.5%, and 2.9% respectively. The study also confirmed the co-existence of underweight and overweight among women.[6]

According to a cross-sectional study conducted in Bangladesh, female garment workers in the ready-made garment (RMG) sector are paid very little and are vulnerable to different kinds of health-related problems, including malnutrition. The study found that more than half of the respondents (53.67%) had various health problems, and almost half of them (43.33%) were underweight (BMI ≤ 18.5).[7]

According to a study conducted in Mexico, data from the national survey "Health needs and health service use by older-than-60-year-old beneficiaries of the Mexican Institute of Social Security (IMSS)" were analyzed to evaluate the prognosis of chronic and acute diseases. The study only included individuals who reported no chronic disease in the last 20 years and had no hospital admission in the two months prior to the survey.[8]

According to an investigation conducted in India, economic status was associated with increased levels of overweight and decreased levels of underweight among 76,681 women living in 3204 neighborhoods in 26 Indian states. The study found that interventions to address the double burden of under-nutrition and over-nutrition in India must be taken into account.[9]

According to a study conducted in rural Maharashtra, India, four factors were identified that contributed to the disparity in thinness between young women and men. These factors included marriage isolating girls from their own families and villages, increasing the workload of young women, denying women access to supplementary food sources available to men, and encouraging young women to fast regularly.[10]

A study aimed to examine the relationship between body mass index (BMI) and all-cause mortality in Bangladesh, found that low BMI was strongly associated with increased mortality. Severe underweight (BMI <16) and moderate underweight (16.0–16.9) were associated with increased all-cause mortality compared with normal BMI (18.6–22.9). The highest BMI category (≥23) did not show a clear association with mortality. The study concluded that underweight is a major determinant of mortality in the rural Bangladeshi population.[11]

According to a study conducted in Bangladesh, the proportion of underweight females has been increasing in those born during the last 20 years of the study period (1972 to 1992). Body mass index increased with increasing age, education level of the woman and her husband, wealth index, age at first marriage and age at first delivery, and decreased with increasing number of ever-born children.[12]

According to a study conducted in low to middle-income countries, there was a yearly change in birth cohorts starting with those born in 1945 that was associated with a 0.0138 cm increase in height. The increase in heights in more recent birth year cohorts was largely concentrated in women from the richer wealth quintiles. Some 35 of the 54 countries experienced a decline or stagnation in height. The decline in heights was largely concentrated among the poorest wealth quintiles.[13]

Conclusions

Nutrition is a crucial factor that affects the quality of life. The nutritional status of women is an important health indicator that can be used to assess a country's health status and morbidity pattern. This study examined certain socio-demographic factors that play a significant role in the nutritional status of women. The study found that while most rural women were well-nourished, many of them were obese and a significant portion of them were suffering from malnutrition. Malnutrition is a complex social and public health problem. Although some positive findings regarding malnutrition were observed, further studies in a much wider field in this region are needed to gather more information about the nutritional status of women.

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Conflict of interest

The authors declare that no conflict of interest exists.

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Original article

A Study: Pattern of Ligature Material Used in Suicidal Hanging

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Abstract

Background: Suicide is a major public health issue and one of the most common causes of death worldwide. The reasons behind suicide are complex and involve a combination of biological, psychological, social, and environmental factors. The choice of method used in suicide often depends on the accessibility and availability of means at the time of the act. To find out the choice of ligature material used by the victims, the type of hanging in relation to the point of suspension and other related factors. ***Methodology:*** This retrospective observational study summarizes the post mortem examinations on 100 cases of death due to suspension received in the Department of Forensic Medicine, Sir Salimullah Medical College, and Dhaka for postmortem examinations during the span of the period July 2019-June 2020. ***Results:*** Among 100 cases 43 (43%) cases hanged by rope, 62 (62%) used a slip knot where as only 11 (11%) used a fixed knot. The suspension point used was a tree in of 61% cases. Rope is frequently used for domestic purposes and thus it is also the most commonly used ligature material. ***Conclusion:*** Social, cultural and economic values must be strengthened to reduce the incidence of suicide.

Key words: Suicide; hanging; ligature mark; ligature material.

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Hanging is one of the top ten causes of death worldwide, accounting for over a million deaths annually. It is a form of violent mechanical asphyxial death that occurs when a person suspends themselves or is suspended against their will from an object using a ligature around their neck. The force applied to the neck is derived from a gravitational drag of the body or part of the body.3 In India, hanging is one of the common methods of committing suicide along with poisoning, burning and drowning and constituted 41.8% of cases of suicides in 2014.[4, 5]

A study of data from 56 countries found that hanging was the most common method of suicide in most of these countries, accounting for 53% of male suicides and 39% of female suicides. According to WHO, Kuwait and Lithuania have the highest incidence of hanging, with 90.6% and 83.1% respectively, among all suicide cases.[6, 7]

Asphyxia in hanging occurs when neck structures are compressed or constricted by a noose or other structure around the neck that is tightened by the weight of the body.[8]

The position of the body at the time of hanging determines whether it is complete or partial. Complete hanging occurs when the body completely suspends above without touching the ground, while incomplete or partial hanging occurs when some part of the body touches the ground during hanging. The type and position of knot used are important factors in causing death in hanging.[9]

The causation of hangings worldwide can be attributed to biological, psychological, socio-cultural, economic, and environmental factors. These factors contribute to the opportunities and limitations of choice of ligature material used by individuals for committing suicide. Social upheaval and distress resulting from rapid urbanization, industrialization, and emerging nuclear family systems are also contributing factors.[10]

The modern period has been characterized by significant development and gradual changes in societies worldwide. Traditional methods of suicide have not changed with the introduction of new technologies and advancements in India, and vary across countries. In the modern era, internet usage is growing exponentially, shaping our lives and altering our brains. Applications such as Wikipedia, blogs, and social networking are being used extensively, and web postings have become an interactive and self-initiated medium for acquiring information about changing suicide trends in relation to the methods used. In Bangladesh 'Shari', 'orna'('dupatta'), 'lungi', nylon rope, belts, mufflers and ropes are commonly available at home and can be used to hang themselvesat any place and at any time and table, stool, chair and cot are commonly used to reach the site of suspension. There are unique patterns of suicide methods in India that differ markedly from those of Western countries, possibly due to cross-cultural differences. In Western countries, dog chains, belts, electric cables, scarves, ties, dressing gown cords, shoe laces, etc., are used as ligature materials, which are not usually used in India. The present study aimed to investigate the choice of ligature material preferred for hanging and the type of hanging in relation to the point of suspension and other associated factors.

Materials and methods

Data were collected in the department of forensic medicine, Sir Salimullah Medical College, from the victim brought for postmortem examinations during the period July 2019-June, 2020. During this period total of 869 autopsies were conducted. Out of these 100 cases of hanging took place.

Results

All 100 hanging cases were suicidal. Table-1 shows the ligature used by the victims out of total of 100 cases 43 cases (43%) use rope as a ligature material. In 62(62%) the victim used as slip knot and in 11(11%) case fixed knot was found (fig-1). Among the clothing, the orna was used by the majority of the victims (table-2). The victim used the tree as a suspension point in 61(61%) cases (table-3).

Table-1: Materials of ligature

Ligature material	**Percentage**
Rope	43%
Clothing	33%
Sheet	05%
Cable	04%
Others	08%
Unknown	07%
Total	100%

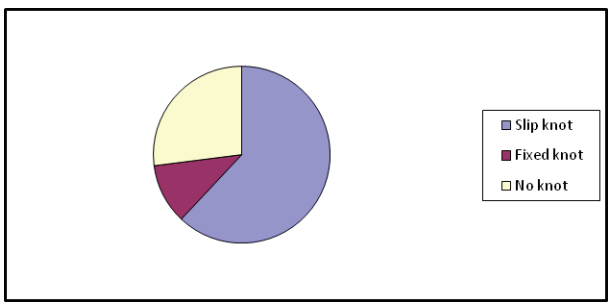
Table-2: Deferent types clothing were used. In 33 clothings used as follows-

Types of clothing	Number
Orna	12
Lungi	03
Gamchha	05
Dhuti	01
Shirt	01
Pyiajama	02
Belt	01
Sharee	05
Others	03
Total	33

Table-3: Suspension points

Types	Number
Tree	61
Hook	07
Beam	11
Ceiling	01
Ladder steps	01
Windows frame	01
Others	14
Unknown	04
Total	100

Fig-1: Types of knots



Discussion

This study revealed the different hanging materials, types of knots and suspension points of hanging present at one tertiary center of Bangladesh. The ligature usually consists of anything that is immediately available near by hand. The most common materials in all hanging are ropes, clothes and even belts of electric wires, which are readily found in most houses. This was reflected in this investigation. Rope was by far the most useful form of ligature with clothing being the next most common. The wide range of ligatures reflects the fact that anything available can and is used in hanging.[11] The category of 'other' included one each of the following: phone wire, steel rope, bicycle chain and iron chain. There have also been cases reported where different materials have been tied together supposedly to make them longer to increase their strength. In suicides, the ligature is tied into a noose which is passed over the head. Some are tied with a fixed knot. But most usually involve a slip knot. Which will tighten quickly around the neck so is the most efficient in occluding blood vessels and air passages. The survey found 62% use a slip knot. Whereas only 11% use a fixed knot. Interestingly 27% use no knot but loop the ligature around the neck. Although the ligature usually passes once around the neck, a proportion wraps it found two or more times. In an unusual case, the loop was not around the neck but was placed under the jaw but behind the ear. The suspension points depend on what is available in the scene of death. If death occurs outside, a tree was the commonest suspension point but others included bridges and even climbing frames. There was a very large range of suspension points inside the house showing almost any secure object rose off the ground and are used in hanging cases. Many low suspension points were found as the weight of the chest and arms are enough to provide fatal pressure on the structures in the neck.[12] The proportions are different from those found in the survey which may be the availability of loci as follows: this survey on hanging involves suspension from hook and other features found. In suicide when the point of suspension is high support is often used to reach the ligature, for example: a chair, stool box or ladder. The victim then jumps off or kicks the support away. Some ligatures stretch easy nylon, so this might still result in partial suspension. The circumstances for hanging are privacy which is essential. In suicide cases, the victims are found left alone long enough for death to occur without intervention from another person. This is especially true for suicide deaths where time is spent findings and securing the ligature. In one survey 72% of cases occur at home. Some hanged themselves in the midnight when other residents were asleep. Or during the day when they were out. Others retired to a bedroom, a bathroom, or out-house. Other locations can include places of work and secluded outdoor areas.

Conclusion

Various methods of hanging in the present study are more or less similar to the pattern found in other countries like India, Nepal, Srilanka. For this similar parameters were also used in this study. The rope was the most common ligature material used in hanging. The tree is the common suspension point and the victim mostly uses slip knots.

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Original article

Detection of SARS-CoV-2 antibody level and associated factors among healthcare workers of a tertiary care hospital

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Abstract

Background: Healthcare workers (HCWs) at the front lines, provided care to Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2) infected patients around the world. In a pandemic, serological testing is a pressing need to estimate the antibodies against SARS-CoV-2 in high-risk communities. The main objective of this study was to detect the level of SARS-CoV-2 antibodies among HCWs of a tertiary care hospital and find out the role of age, sex, occupation, working zone, and co- morbidity with the antibody level. ***Methodology:*** This cross-sectional study was conducted at the Bangladesh Institute of Research and Rehabilitation in Diabetes, Endocrine and Metabolic Disorders (BIRDEM) General Hospital. A total of 125 HCWs of BIRDEM were enrolled, all participants filled out a questionnaire, blood samples were obtained for SARS-CoV-2 Immunoglobulin G (IgG) II Quant assay, a Chemiluminescence Microparticle Immunoassay (CMIA). ***Results:*** Among the study participants, 63.2% were female. Among the HCWs, 50 (40%) were involved working at COVID and 75 (60%) from non-COVID zone of hospital. Among 125 HCWs, 124 (99.2%) HCWs were found seropositive for SARS-CoV-2 anti- Receptor Binding Domain (RBD) IgG. HCWs in direct patient contact (Doctors, nurses, cleaners) had higher antibody levels than those with indirect patient contact (Lab personnel). Among the occupational groups, nurses had significantly higher (P value <0.05*) anti-RBD IgG levels, than doctors, cleaners, and lab personnel. The highest clinical exposure were of nurses may be a cause of increased SARS-CoV-2 infection and robust antibody production. No significant association was found (p>0.05) in anti-RBD IgG concentration among COVID and non-COVID zone workers. SARS-CoV-2 anti-RBD IgG concentration of female participants was significantly higher (p<0.05*) than male participants. Among female participants, the physiological concentration of estrogens may stimulate a humoral response to viral infections and vaccination. SARS-CoV-2 anti-RBD IgG concentration of co-morbid HCWs was not significant compared to the non-co-morbid group. Antibody levels of diabetic and hypertensive HCWs were not statistically significant (p>0.05). ***Conclusion:*** The present study revealed a higher prevalence of SARS-CoV-2 anti-RBD IgG antibodies among HCWs. Nurses had significantly higher antibody levels than doctors, cleaners, and lab personnel. A significant association was found between sex and antibody level. Whereas age, working zone (COVID, non-COVID), and co-morbidity did not affect the antibody level.

Keywords: SARS-CoV-2, COVID-19, Healthcare workers, SARS-CoV-2 anti-RBD, CMIA.

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INTRODUCTION

SARS-CoV-2 is the virus that causes the highly infectious illness- Coronavirus disease 2019 (COVID-19). In March 2020, the World Health Organization (WHO) declared it a world wide pandemic.[1] The initial cases of COVID-19 were first reported in Wuhan, China in December 2019.[2] In March 2020, it was declared a global pandemic by the World Health Organization (WHO).[1] Bangladesh confirmed the detection of its first three novel COVID-19 positive cases on March 8, 2020.[3]

Since COVID-19 remains a serious concern, front-line HCWs are one of the highest-risk occupational groups for COVID-19 infection, as they have contact with both COVID-19 patients and other healthcare professionals.[4] 10–20% of all COVID-19 diagnoses may be attributable to front-line HCWs. Frequent exposure to the virus is expected to cause HCWs to have a larger viral load and worse clinical outcomes than the general population. However, there are discrepancies in the information that is currently accessible. The risk of infection is variable in each HCW category.[4]

To evaluate the amount of exposure among HCWs, to identify high-risk groups among HCWs, and to explain the transmission of COVID-19 among HCWs, it is necessary to ascertain the prevalence of SARS-CoV-2 antibodies among HCWs.[5,6,7] To identify the risk variables connected, the seroprevalence of SARS-CoV-2 antibodies was assessed in a random sample of HCWs working in a large tertiary care hospital. In comparison to the general population, persons who work in health or social care settings are predicted to have a 6-fold higher prevalence by the Office for National Statistics (ONS) of the United Kingdom. Increased infection rates have been reported.[6]

During COVID-19 pandemic, increased infection rates, morbidity, and death among healthcare personnel were reported. Studies are crucial to ascertain the seroprevalence of anti-SARS-CoV-2 antibodies in different clusters of healthcare staff. The outcome of SARS-CoV-2 infection in individuals is heterogeneous and dependent on multiple variables, mainly co-morbidities, obesity, age, sex, etc.[8]

Meta-analyses of antibody prevalence from several countries demonstrate that the presence of IgG antibodies among HCWs varied between 7%.[7,9] Risk factors influencing antibody production are yet unknown other than patient interaction. It is unclear if personal or professional traits, such as a job involving frequent or direct patient contact, raise the risk of COVID-19 infection.[9,10]

A Serological survey is a potentially powerful tool to understand the epidemiology of infection, both before and after the vaccination rollout. It is important to identify the populations of interest and the sampling method to provide a representative sample of those populations, and the selection of the most appropriate laboratory assays.[11]Some serosurveys have already been done in different countries at different time points in the pandemic on different population groups (e.g. general population, healthcare workers, contacts) and using different types of laboratory assays. Xinhua Chen and colleagues in the Lancet Global Health, have synthesized data from published serological studies-based on the use of information from 82 high-quality research, they assessed that the general population's total seroprevalence is 80% (95% CI 68%-92%). The seroprevalence was higher among close contacts of COVID-19 cases and healthcare workers than in low-risk healthcare workers and the general population.[12]

It is important to determine and characterize the immune responses to SARS-CoV-2 infection to understand how well the response protects people against future SARS-CoV-2 infection and how long this protection lasts.[13] Among HCWs, vaccination is important to minimize SARS-CoV-2 infection and mortality, although non-HCWs bear similar levels of COVID-19 risk compared to HCWs.[14]

HCWs remain a priority group for vaccination for multiple reasons, including their continuous potential exposures in the workplace and the risk of transmitting the virus from infected HCP to a large number of at-risk patients.[15] The antibody concentration and affinity are generated according to the viral load and immune response from the host. It is important to know how long these antibody titers can be maintained

in individuals who received the vaccine after a prior infection and those with a second dose and no prior infection.[16] SARS-CoV-2 antibody positivity was higher than the general population among healthcare assistants, which supports patient-related transmission of SARS-CoV-2 to HCWs as these HCWs are involved in most near-patient work. In this systematic review, seroprevalence was higher among HCWs working in COVID-19 units. HCWs in contact with patients with COVID-19 represent a high-risk group for SARS-CoV-2 infection.[17] Females were associated with higher seroprevalence,[18] whereas, there was significantly higher ($p<0.001$) seropositivity of male health-care workers (5.45%) than females (3.66%).[19]

To detect and differentiate anti-SARS-CoV-2-specific antibodies from antibodies of widely circulating CoVs by a sensitive and specific immunoassay is crucial for SARS-CoV-2 serosurvey.

SARS-CoV-2 antibody responses are characterized through the detection of IgG, IgA, and/or IgM. Since IgM coincides with IgG antibodies during early infection, it persists for a short duration and shows cross-reactivity and heterogenic result.[20] We have therefore used the antibody tests targeting the spike protein, S1 antigen. S1 is more specific than S2 or nucleocapsid (N) protein.[21] The assay- we used in this study was Abbott SARS-CoV-2 IgG II Quant Assay, which is a Chemiluminescence Microparticle Immunoassay (CMIA), that targets the Receptor Binding Domain (RBD) of S1 spike protein. The assay has specificity and sensitivity of 99.6% (95% confidence interval [CI], 99.20–99.80) and 100.0% (95% CI 95.72–100.00), respectively.[22]

So, this study was conducted to estimate the seroreactivity rates prevalent in HCWs of a tertiary care hospital in Dhaka city. The study attempted to detect quantitative SARS-CoV-2 anti-RBD IgG antibody concentration by quantitative serological assay, to compare antibody concentration among different groups of healthcare workers as well as to monitor its association with different factors.

Methodology:

Study design: This cross-sectional hospital-based analytical study on HCWs was conducted in BIRDEM General Hospital, Dhaka from November '21 to February 2022. BIRDEM is one of the largest tertiary care hospitals in Dhaka involved in the management of general patients as well as COVID-19 patients, having a dedicated emergency department (ED), intensive care unit (ICU), cabins and admission wards, allocated for COVID-19 patients.

Study participants: Participation in the study was voluntary. HCWs were invited by the internal announcement to participate in the study. Interested participants were asked to contact the study team for an appointment. 125 HCWs were enrolled in the study as study participants. A purposive sampling method was applied to ensure that recruited study samples were representative of the HCW involved in the provision of healthcare for patients directly (doctors, nurses, cleaners) and indirectly (lab personnel). Among 125 study participants, there were 32 doctors, 30 nurses, 33 lab personnel, and 30 cleaners. Above participants were selected regardless of their age, sex, co-morbidity history and working zone (COVID, non-COVID working zone). The majority of the participants were vaccinated.

Categories of Participants

As exposure of HCWs to COVID-19 differs based on their specialty and place of work.

Categorization of working zone[23]

COVID zone: COVID-19 zone of the emergency department, COVID-19 transit ward-admitting patients awaiting laboratory confirmation of COVID-19 infection, COVID-19 general wards, and COVID-19 intermediate and intensive care units- all these zones of tertiary care hospital were considered as COVID zone. Non-COVID zone: The zone of tertiary care hospitals other than the COVID zone.

Data Collection procedure: Structured questionnaire and checklist were the tools of data collection. Data contained some parameters e.g. age, sex, history of co-morbidities, working zone, and previous COVID-19 infection. All participants were asked to complete a questionnaire.

Sample collection: In the designated sample collection room of the Microbiology Department of BIRDEM, a phlebotomist collected 3 ml of whole blood sample aseptically by venipuncture from each study participant and kept it in red topped Serum Separator Tube (SST).

Serum preparation: Serum preparation was done in the Microbiology laboratory of BIRDEM. As per the tube manufacturer's processing instructions, the whole blood samples contained in the tube were allowed to clot by leaving them undisturbed for 15-30 minutes at room temperature for gravity separation. Then for the removal of the clot, the samples were centrifuged at 4000 RPM for 10 minutes in a centrifuge machine at room temperature.

Preservation: The supernatant serum was aliquoted in a microcentrifuge tube and kept frozen immediately at -20°C until laboratory analysis.[24]

Laboratory Test: SARS-CoV-2 anti-RBD IgG Testing: SARS-CoV-2 IgG II Quant assay was performed in the Immunology laboratory of BIRDEM General Hospital. Before this Chemiluminescent Microparticle Immunoassay (CMIA) technique, all serum samples were held at room temperature and centrifuged briefly. SARS-CoV-2 IgG II Quant assay is a fully automated two-step immunoassay to determine the presence of specific IgG antibodies, to the automated two-step immunoassay to determine the presence of specific IgG antibodies, to the spike receptor binding domain (RBD) of SARS-CoV-2 human serum using CMIA technology with flexible assay

protocols, referred to as chemiflex. This assay is a fully automated two-step immunoassay on ARCHITECT i2000SR (Abbott Laboratories, Abbott Park, IL, US) and was done according to the manufacturer's instructions. The IgG antibody concentrations in human serum are expressed as-relative light units (RLU) and grade the results, indicating a direct relationship with the amount of IgG antibodies to SARS-CoV-2 in the sample and the RLUs detected by the ARCHITECT i2000SR system optics. As the assay detection range is from 21.0 – 40000.0 AU/mL, by the manufacturer protocol (reference number 06S61; Abbott Laboratories). SARS-CoV-2 S1 IgG <50 AU/mL ll was reported as negative. Test result ≥ 50 AU/mL is considered positive.[25]

Ethical consideration: The research proposal was approved by the ethical review board of BIRDEM Academy with reference no. BIRDEM/IRB/2021/285. For participation in the study, informed written consent was taken from all participants after informing them of the purpose, procedure, risk, privacy, etc. issues related to the study.

Data Analysis and Interpretation: Categorical variables were expressed as counts, and percentages and compared using the Chi-Square test. Continuous variables were described as the mean, standard deviation, standard error, median and interquartile ranges (IQR) value. An Independent t-test was applied to compare two continuous variables. ANOVA test was done to compare three or more continuous variables. Statistical analyses were performed using SPSS version 23.0. A two-sided P-value < 0.05 was considered statistically significant.

RESULT

SARS-CoV-2 anti-RBD IgG antibody response was observed among 125 healthcare workers of BIRDEM General Hospital, a tertiary care hospital in Dhaka City.

Table 1: Age, sex, co-morbidity, working zone distribution of healthcare workers

Trait	Total N(%)
Age (in years)	
21-30	32(25.6)
31-40	27(21.6)
41-50	33(26.4)
51-60	30(24.0)
>60	3(2.4)
Gender	
Male	46(36.8)
Female	79(63.2)
Patient contact	
Direct	92(73.6)
Indirect	33(26.4)
Working zone	
COVID	50(40.0)
Non-COVID	75(60.0)
Occupation	
Doctor	32(25.6)
Nurse	30(24.0)
Cleaner	33(26.4)
Lab personnel	30(24.0)
Presence of co-morbidity	
Yes	55(44.0)
No	70(56.0)
Name of co-morbidity	
Hypertension (HTN)	29(23.2)
Diabetes Mellitus (DM)	17(13.6)
Bronchial Asthma (BA)	6(4.8)
Cardiovascular disease	3(2.4)
Hypothyroidism	5(4.0)

Table 1 shows the age, sex, working zone, and co-morbidity distribution of healthcare workers. Age range 21 years to above 60 years, the highest 26.4% of HCWs were within 41-50 years and the lowest 2.4% of participants were above 60 years. The mean age (±SD) of HCWs was 40.92 (±11.5) years. 63.2% of the study population were female. The nurse and laboratory personnel group had more female participants, doctors, and the cleaner group had an almost equal sex ratio. 60% of HCWs were from the non-COVID zone and 40% from the COVID zone. 48% of participants had co-morbidities. Hypertension (HTN) and Diabetes Mellitus (DM) were the predominant co-morbidities among 23.2% and 13.6% of participants respectively.

Table 2: Range of antibody levels among the study participants (N=125)

Antibody level in the range (AU/mL)	Frequency n	Serostatus	Total N
40-49	1	Seronegative	1
50-5000	83	Seropositive	124
5001-10000	10		
10001-20000	17		
20001-30000	6		
30001-40000	9		

Table 2 shows the frequency of different antibody levels among 125 study participants. Antibody levels were divided

into 6 ranges starting from 40 up to 40000 AU/mL. Only 1 participant had an antibody level below 50 AU/mL, considered as seronegative, and the rest 124 participants had an antibody level more than 50, considered as seropositive. Out of these 124 HCWs, a maximum of 83 HCWs had the lowest antibody range from 50-5000 AU/mL. Only 15 HCWs had the highest antibody level from 20001-40000 AU/mL.

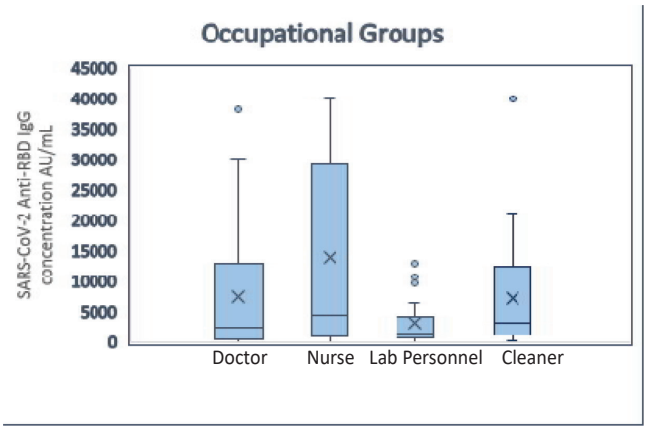
Table 3: Mean SARS-CoV-2 anti-RBD IgG antibody concentration according to age, sex, co-morbidity, occupation and working zone

Trait	SARS-CoV-2 anti-RBD IgG (AU/mL) Mean± SE	*P value*
Age (in years) 21-30 31-40 41-50 51-60 Above 60 years	 9602.4 ± 2371.5 6231.8 ± 1653.0 6263.9 ± 1728.6 9001.0 ± 2270.8 10387 ± 4268.5	*P value=0.6*
Sex Male Female	 5797.2±122.1 7779.9±1493.9	***P value=0.012****
Occupation Doctor Nurse Lab personnel Cleaner	 7563.1±1759.8 13911.4±2996.6 3214.4±640.4 7266.7±1656.4	*Nurse vs Doctor, Lab personnel, Cleaner* ***#P=0.002****
Working zone Covid Non-Covid	 10108.3 ±1939.3 8855.9±1682.5	*P value= 0.6*
Co-morbidity Present Absent	 8011.3± 1196.8 7754.5± 1355.3	*P value= 0.9*
Name of co-morbidity DM Non-DM HTN	 8011.3± 266.9 7754.5±1729.4 7011.6±1500.5	*P value=0.2*

P value was determined by independent t-test. # P value was measured by one-way ANOVA test. ***P value <0.05**** was considered significant.

Table 3 shows the mean SARS-CoV-2 anti-RBD IgG concentration according to age, sex, co-morbidity, occupation and working zone. The mean ± SE value of anti-RBD IgG concentration did not correspond with increasing or decreasing age (p>0.05). The mean ± SE value of anti-RBD IgG of females was 9779.9 ±1493.9AU/mL, significantly higher (p=0.012*) than the value of males 5797.21± 122.1 AU/mL. The antibody concentration in diabetic HCWs, 8011.3± 1100.8 AU/mL was not significantly higher than non-diabetic HCWs 7754.5±1729.4 AU/mL. The mean value of Hypertensive HCWs was 7011.6 ± 1500.5 AU/mL, which was not significantly higher than other co-morbid groups. The SARS-CoV-2 mean anti-RBD IgG concentration of COVID zone workers was not significantly higher (p>0.05) than non-COVID zone workers. Nurses had significantly higher (#P-value<0.05*) antibody concentrations than doctors, lab personnel and cleaners.

Fig 1: Box and Whisker plot shows SARS-CoV-2 anti-RBD IgG antibody concentration among different occupational groups



Group A(Doctor): Median- 2629; IQR-526-13669; Range: 68-30000…….. AU/mL
Group B (Nurse): Median-4447; IQR-1100-32308; Range:110- 40,000… AU/mL
Group C (lab personnel):Median-1596; IQR- 749-4225.5; Range: 48-6527……AU/mL
Group D (cleaner): Median: 3202.5; IQR- 1250.5-12555.8; Range: 269- 21278….. AU/mL

Box and Whisker plot of Fig 1 shows SARS-CoV-2 anti-RBD IgG concentration among different occupational groups. Median antibody level was highest in the nurse group, followed by cleaners, and doctors, and lowest in the lab personnel group. The interquartile range (IQR) of the nurse group was highest at 1100-32308.5 AU/mL, indicating the highest level of dispersion of antibody concentrations of the participants of this group. The lowest IQR was presented by lab personnel group 759-4225.5 AU/mL.

DISCUSSION

This cross-sectional survey was done to estimate the seroprevalence of SARS-CoV-2 anti-RBD IgG among 125 HCWs of BIRDEM and to find out the role of some factors affecting the antibody level. The Mean ± SD of the age of the participants was 40.92±11.5 years. Out of 125 HCWs, 124 (99.2%) had SARS-CoV-2 anti-RBD IgG antibody level of more than 50 AU/mL (cut-off value of manufacturer), were considered seropositive and 1 participant had antibody level 48AU/mL, considered seronegative. The only seronegative HCW was a 25 years old female laboratory personnel, who had no vaccination history against SARS-CoV-2.

In this study, the prevalence of SARS-CoV-2 antibody was 99.2%. This seroprevalence rate was higher than many studies of different countries on HCWs. Seropositivity was 45% in London, UK,[26] 24.4% in Birmingham (UK),[27] in Santa Clara County, United States 1.5 %,[28] in China, 4.2%, Italy, 9%, and USA, 17.8%.[29]After the vaccination rollout started worldwide, some studies showed higher seropositivity 60.10%,[30] 99.4%.[31] The cause of the discrepancy between this study and others could be multifactorial. First of all, during the study period, vaccination against SARS-CoV-2 had already been started in Bangladesh and the maximum number of healthcare workers in Bangladesh, as well as our study participants (90%), were vaccinated at that period time.The variation of participants' eligibility criteria among the studies may also be contributed to the discrepancy. This present study focused on all categories of HCWs regardless of age, sex, occupation, working zone. The mean ± SE value of anti-RBD IgG concentration of female participants was 9779.9±1493.9 AU/mL, significantly ($p<0.05$*) higher than male participants' 5797.2±122.1 AU/mL. Like this study, females were associated with higher seroprevalence.[18] Whereas, significantly higher ($p<0•001$) seropositivity was found in male healthcare workers (5•45%) than in females (3.66%).[6] Variable results were found in a majority of the studies, including no association between gender and seroprevalence rates. While there was a significant association between male gender with higher seroprevalence.[6,32] Higher COVID-19 prevalence among males was described as male-based employment in essential jobs, engaging them in risky behaviors, including smoking.[33] In this study, the previous SARS-CoV-2 infection rate was higher in females. In particular, sex hormones differentially modulate immune responses. In females, the physiological concentration of estrogens stimulates a humoral response to viral infections by inducing higher levels of antibodies and activating antibody-producing cells. Females show a better response to vaccination also.[34] Testosterone and Androgen are combinedly responsible for the immunosuppressive effects, in producing fewer antibodies in males.[35]

In this study, the mean ± SE value of SARS-CoV-2 anti-RBD IgG concentration varied in different age groups. The youngest age group had mean anti-RBD IgG level of 9602.4±2371.5 AU/mL, 60 HCWs within 31-50 yrs 6200±1700 AU/mL, 30 HCWs within 51-60 yrs, 9001±2270.8 AU/mL and 3 HCWs above 60 years age had the highest level of anti-RBD IgG 10387± 4268.5 AU/mL. Statistically, no association was found between age with anti-RBD IgG level. Whereas among healthcare workers, a trend for decreasing seroprevalence with seniority of age was demonstrated.[17] The cause of the highest range in the younger group in our study is probably due to the maximum exposure of young aged healthcare workers in contact with patients for longer duration and frequent exposure, junior staff being more likely to share breakrooms and office space, maximum HCWs perform duties from the hostel.[8] But some conflicting results showed significantly increased seroprevalence among HCWs over 65 years of age.[36] In a systematic review, COVID-19 incidence rates at a global level were higher in older HCWs, especially in the 50–59 years age group.[37] Like our study, many serosurveys among HCWs have not shown any association between age and SARS-CoV-2, HCWs younger than 30 years, had a slightly increased risk of seropositivity. Younger HCPs may be more likely to have children in school or daycare and have contact with other younger persons who may have fewer symptoms of infection.[38]

A large study in Denmark showed a higher positivity rate of frontline HCP than a group of blood donors and HCP with more hospital exposure to COVID-19 patients had a higher risk.[6]

Another similar study, a large study of more than 40000 HCP in New York found no association between work location or direct patient care and seropositivity.[39] This study showed the mean of SARS-CoV-2 anti-RBD IgG antibody concentration of HCWs of COVID working zone 10108.3 AU/mL, not significantly higher than non-COVID zone workers 8855.9 AU/mL ($p>0.05$) (Table-4). A similar non-significant finding between COVID and non-COVID zone area health staff was found.[40] This finding was in contrast with a study showing significantly higher seropositivity among HCWs working in COVID-19 units.[41] A study showed a higher seroprevalence of HCWs in COVID-19 wards than in other non-COVID wards ($p<0.001$).[6]

Our study unmasked that clinical care of COVID-19 unscreened patients was associated with a similar prevalence of SARS-CoV-2 antibodies as in COVID-19 facilities uncovering a relevant source for nosocomial SARS-CoV-2 transmission. In addition, healthy HCWs may also be another relevant source for SARS-CoV-2 transmission. So, HCWs of a non-COVID zone are at equal risk as HCWs of a COVID zone. If segregation of these 2 areas is not done properly in a tertiary care hospital, the chance of risk of infection in non-COVID zone HCWs will be even more than COVID zone workers. Sero-surveys in hospitals may be helpful to design strategies that control the SARS-CoV-2 epidemic.

In this study, 48% of HCWs had co-morbidities, having Mean (± SE) anti-RBD IgG 8011.3 (±1496.8) AU/mL, which was not significantly higher than the level of non-co-morbid HCWs, ($p> 0.05$). Among the co-morbid groups, 23.2% had HTN, 13.6% had Diabetes Mellitus (DM), 4.8%, Cardiovascular disease, and 4.0% had Bronchial Asthma. The mean SARS-CoV-2 anti-RBD IgG concentration of diabetic HCWs was 8011.3±266.9 AU/mL was not significantly higher ($p> 0.05$) than non-diabetic HCWs 7754.5±1729.4 AU/mL. The hypertensive participants had 7011.6±1500.5 AU/mL of anti-RBD IgG, which was not significantly associated with the value of- the co-morbid groups. Association of co-morbidity with SARS-CoV-2 antibody level was not found in our study.

Out of a total of 125 healthcare workers, 49(39.2%) had a known history of documented past COVID-19 infection. The Laboratory personnel group had the highest percentage of SARS-CoV-2 infection. Another interesting finding was the lowest rate of infection among the cleaner group (76.8%). These two findings are generally in contrast with different studies, in the low-risk group, lab personnel are less infected, cleaners, who usually belong to low socio-economic conditions, have less knowledge of hygiene and social distance as well as living in gatherings, are more vulnerable to infection. The highest mean value of anti-RBD IgG was found in nurses who suffered from known infection. Previous data suggested that nurses are the most common healthcare professionals infected with SARS-CoV-2.[15] But this likely reflects workforce demographic characteristics given that nursing is the most common healthcare role.[10]

Limitations of our study include its single-centered setting, purposive sampling, and smaller sample size. Longitudinally serial sample collection and detection of antibody level was not possible due to a shortage of time and constrain of budget.

Conclusion: In our study, we found an association between sex with SARS-CoV-2 antibody level. Females were more likely to be infected and had higher antibody levels. However no association was found with age, occupation, working zone (COVID, non-COVID), co-morbidity with SARS-CoV-2 infection risk as well as SARS-CoV-2 antibody level.

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Conflict of interest

The authors thereby declare no conflict of interest exists.

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Review article

Role of Interleukin-8 in *Helicobacter pylori* induced gastric cancer: Targeting Il-8 can have a potential antitumor effect.

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Introduction:

Helicobacter pylori is a spiral-shaped Gram negative bacteria that is specialized in colonizing the human gastric mucosa, where it causes a variety of clinical outcomes ranging from asymptomatic carriage to gastritis, peptic ulcers, and cancer.[1] Since *H. pylori* is a noninvasive bacterium, it has been assumed that trans-epithelial signal transmission must be involved in initiating the inflammatory response in *H. pylori*-associated gastritis.[2] Of the many cytokines that can be induced by a bacterial infection followed by the pathologic changes seen in inflammation; chemokines are possible candidates to act as a signal following the contact of bacteria with the epithelium.[3,4] An important cytokine that plays a central role in the pathogenesis of *H. pylori*-induced diseases is Interleukin 8. It is a potent chemoattractant for neutrophils and lymphocytes. It also has effects on cell proliferation, migration, and tumor angiogenesis.[5]

Genetic factors like cytokine gene polymorphism is also responsible for the pathogenesis and severity of gastroduodenal disease. The IL-8 gene has a well-established promoter polymorphism at position -251 (*IL-8*-251 Thymine/Adenine). The A allele is associated with increased production of IL-8 in *H. pylori*-infected gastric mucosa. It was also found to increase the risk of severe inflammation and precancerous gastric abnormalities in white and Asian populations.[6,7]

IL-8 polymorphisms may increase the risk of gastric cancer. Taguchi et al reported the association of the IL-8-251 A/Tpolymorphism with higher expression of IL-8 protein, severe neutrophil infiltration and higher risk of atrophic gastritis and gastric cancer.[6]

Role of IL-8 in developing H.pylori induced gastric cancer:

IL-8 seems to have significant potential as a prognostic and predictive cancer biomarker. IL-8 was originally identified as a chemoattractant for neutrophils that release some growth factors that promote angiogenesis as a part of cancer progression. The roles for IL-8 in the angiogenesis of gastric cancer have drawn much interest. Since invasion and angiogenesis are all involved in the metastatic process, IL-8 expression in gastric cancer can influence their metastatic capabilities. Upregulation of IL-8 in human gastric carcinomas correlates closely with their angiogenesis. In contrast, inhibition of IL-8 decreases angiogenesis in gastric cancer.[8]

The downstream signals of IL-8 produced by *H. pylori* have been intensively studied. All biological effects of IL-8 are mediated by two receptors designated CXCR1 and CXCR2. It binds with high specificity to CXCR1 and with less specificity to CXCR2 expressed on stromal, endothelial and tumor cells. IL-8 stimulates vascular endothelial growth factor (VEGF) expression in endothelial cells *via* CXCR-2 and thereby promotes the activation of VEGF receptors in an autocrine fashion.[9] IL-8 has also been linked with cell adhesion and migration in gastric cancer. IL-8 activates NF-κB and Akt signals and induces adhesion molecules including intercellular adhesion molecule- 1 (ICAM-1), vascular cell adhesion molecule-1 and CD44 expression in gastric cancer cells.[10]

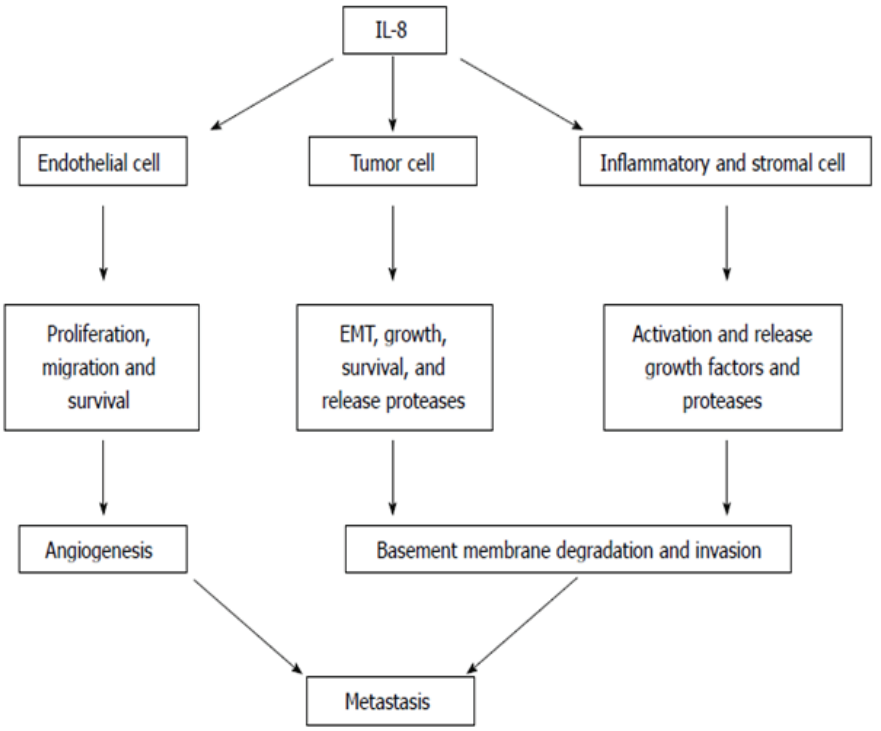

Figure 1: Roles for interleukin-8 in tumor progression and metastasis.[11]

(EMT: Epithelial-mesenchymal transition; IL-8: Interleukin-8.)

Although it is well known that *H. pylori* enhances IL-8 expression in gastric cancer cells, the molecular mechanism of the underlying fact is not fully understood. Genomic structure analysis of IL-8 showed many potential targets for both transcriptional and post-transcriptional regulation. Within its 3'-flanking region, the IL-8 gene contains a repetitive ATTTA motif, which destabilize various cytokine mRNAs. Within the 5'-flanking region, the gene contains multiple cis elements including a CCAAT box, steroid-responsive factors, interferon regulatory factor-1, hepatocyte nuclear factor-1, binding sites for activator protein-1 (AP-1), CCAAT/enhancer binding protein and NF-κB. These stimulations can induce *IL-8* gene transcription.[13,14]

Mutation and deletion analyses demonstrated that, these promoter elements are regulated in cell type-specific manners. A cascade of intracellular signals mediates the effects of *H. pylori* including production of reactive oxygen species (ROS), and activation of transcription factor NF-κB, AP-1 and mitogen-activated protein kinase (MAPK).[14] ROS plays pivotal role in the pathogenesis of *H. pylori*-associated gastric diseases that include gastric cancer.[15]

Signals involved in H. pylori-induced IL-8 in Gastric Cancer

After exposure to *H. pylori* a whole genome analysis of the epithelial response revealed *IL-8* as the most markedly upregulated gene. IL-8 play a significant role in the epithelial cell response to *H. pylori* infection and in the pathological processes leading to gastroduodenal disease.

IL-8 induction in gastric epithelial cells are correlated with a functional *cagA* gene.[16] In *vitro* examinations of *H. pylori* infection of gastric epithelial cells showed that, the proteins encoded by the *cagPAI* are required for IL-8 secretion and the regulation of IL-8 induction by the NF-κB pathway.[17,18]

ROS induce apoptotic cell death of *H.pylori*-infected gastric epithelial cells and produced by NADPH oxidase (NOX1). NOX1 produce superoxide anion and hydrogen peroxide. 13ROS also activates MAPKs, such as extracellular signal-related kinases (ERKs), c-Jun NH2-terminal kinases (JNKs) and p38 MAPK, and enhances transcription of NF- κB.Increased expression of NOX1 mRNA provokes the generation of superoxide anion, which is indicative of oxidative stress. Interestingly, IL-8 contributes to the generation of copious quantities of ROS, and induction of IL-1β, IL-6, IL-8, IL-12, tumor necrosis factor-alpha, and interferon-gamma.[19]

IL-8 activates the CD11b/CD18 dimer that can make a complex with neutrophils. This complex activates ICAM-1 on the vascular endothelial cell membrane. Infiltration of this tetramer (CD11b/CD18/ neutrophil/ICAM-1) in gastric epithelial cells facilitates the copious release of ROS through neutrophil NADPH oxidase. Ultimately an oxidative burst occurs. The ROS released from gastric epithelial cells mediate the chemoattractant function of neutrophils and monocytes in *H. pylori*-infected gastric tissues.[20,21,12]

H. pylori can activate the transcription factor AP-1 like cagPAI. The AP-1 complex activated during *H. pylori* infection is composed of c-jun and c-fos heterodimers. AP-1 is activated by MAPK. It can induce potential pro-inflammatory response, often in concert with NF-κB.[22]

H. pylori can activate MAPKs when they come in contact with gastric epithelial cells. MAPK cascades are well characterized pathways that cause signal transduction from the cell surface to the nucleus. This family includes following subgroups: ERKs, JNKs and p38 MAPK. Some bacterial factors including vacA and cagA can also activate MAPK. JNK activation during H. pylori infection also requires a functional T4SS.[22]

Peptidoglycan of *H. pylori is* delivered to the host cell via the T4SS, where cytosolic nucleotide binding and oligomerization domain 1 (NOD1) recognize it.[15]

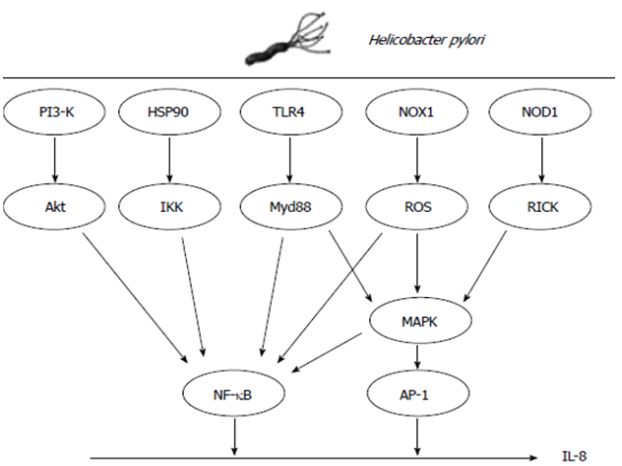

Figure 2: Scheme of signaling of Helicobacter pylori-induced interleukin-8 in gastric cancer cells.[11]

[PI3-K: Phosphoinositide 3-kinase; HSP: Heat shock protein; TLR: Toll-like receptor; NOX: NADPH oxidase; NOD: Nucleotide binding and oligomerization domain; IKK: IκB kinase; ROS: Reactive oxygen species; RICK: Receptor- interacting protein serine-threonine kinase; MAPK: Mitogen-activated protein kinase; NF-κB: Nuclear factor kappa B; AP-1: Activator protein-1.]

NOD1 with the receptor-interacting protein serine-threonine kinase 2 can trigger a pro-inflammatory response upon stimulation with purified agonist. This response is characterized by NF-κB activation and IL-8 production. In addition to activation of the classical NF-κB pathway, NOD1 is required for activation of MAPK in response to bacterial infection. This NOD1-dependent p38 MAPK activation enhances IL-8 production.[23,24] Understanding the signals involved in IL-8 expression by *H. pylori* may be beneficial to develop new therapeutics in gastric cancer.[13]

IL-8 as a Therapeutic Target in Gastric Cancer:

Increased IL-8 expression in gastric cancer suggests that IL-8 might be a potential therapeutic targetto prevent progression of cancer. Prevention of *H. pylori*-induced IL-8 expression and regulation of the IL-8 downstream signals can be achieved by many proposed inhibitors. IL-8 induction by *H. pylori* can be inhibited by polyphenols derived from natural products that include resveratrol, apigenin and anthocyanins. Resveratrol suppresses the secretion of IL-8 from *H. pylori*-infected gastric epithelial cells. It reduces ROS, inhibits MAPK, AP-1 and NF-κB. [25]

Resveratrol may inhibit the expression of IL-8 by modulation of regulatory enzymes like MAPK. Anti-oxidant anthocyanins from black soybean may inhibit IL-8 production. Anthocyanins contain abundant of Cyanidin- 3-glucoside, which is an effective anti-oxidant. It inactivates NF-κB by inhibiting phosphorylation of IκB.[15] Apigenin also inhibits NF-κB by increasing the IκBα.[26]

Phenyl-thiophenyl propenone RK-I-123 is a small molecule that suppresses the activation of NF-κB and AP-1,reduces the level of ROS and expression of IL-8 in *H. pylori*-infected gastric epithelial cells.[27]

7-Carboxymethyloxy-3',4',5-trimethoxy flavone (DA-6034) is a synthetic derivative of eupatilin that may reduce the level of IL-8 induction by *H. pylori*.[28]

Rebamipide [2-[4-chlorobenzoylamino]-3-[2[1H] quinolinon -4-yl]; OPC-12759], is a mucosal protective anti-ulcer agent; is a propionic acid derivative. It was reported to inhibit IL-8 in gastric cancer by the regulation of phospholipase D (PLD) expression.[29] Gefitinib (Iressa™, ZD1839)is an orally active quinazoline-derived agent that inhibits EGF receptor (EGFR)-tyrosine kinase thus downregulate epidermal growth factor (EGF) signals and IL-8 production in gastric cancer cells.[30]

Surprisingly some scientists observe that IL-8 production induced by *H. pylori*-activated Toll-like receptor 4 (TLR4) may be inhibited by application of probiotic, such as lactobacilli. *Lactobacillus bulgaricus* (LBG) is used in the production of yogurt, which is one of the best-studied probiotic microbes. Activation of NF-κB and IL-8 expression in *H. pylori*-infected gastric epithelial cells is also inhibited by conjugated linoleic acids (CLA) produced by Lactobacillus acidophilus (LBA).[31]

IL-8 gene expression is regulated by several microRNAs (miR); which are central regulators of several physiological processes. So, disruption of miR is associated with human diseases. Some studies suggested that miR-146a negatively regulated *H. pylori* induced IL-8 *via* reduced NF-κB activity. [32]

In a nutshell, the above mentioned discussion on the basis of a large number of published articles suggest that, IL-8 can be a potential target in *H. pylori* induced gastric cancer and have large spectrum of antitumor effect. Anti-IL-8 anticancer therapy are yet to enter in clinical trials; so, further clinical experiment based studies can open a window in the treatment of *H. pylori* induced gastric carcinoma.

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Case report

A Case of Alleged Sexual Assault

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Abstract

Here we present a case of 16 year's old unmarried girl, who is sexually assaulted by son of her house owner on 22/4/17 at 1.00 pm and came in forensic department of Sir Salimullah medical college for medico legal examination on 24/04/17 with prerequisites for her examination. On general examination she was average built, weight 39kg, height 5 feet 1 inch, number of teeth – 28 (all are permanent), secondary sex characteristics are normal, marks of violence and marks of struggles are absent, her LMP was 10/4/17 and on local examination labia majora onboth sides in close apposition.Vaginal canal was one finger dilated, red, congested and tender, hymen was rupture at 3, 5, 8'O clock position. Laboratory workshop was done including radiological and microbiological examination that ended up an opinion that she has sign of recent force full sexual intercourse.

Key word: Rape, Sexual assault, Rape trauma syndrome

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Introduction:

According to B.P.C.351, assault is an offer or threat or attempt to apply force to the body of another in a hostile manner. Rape is an example of natural sexual offence and is common all over the world. Rape is a legal term and not a diagnosis to be made by the examining physician.[3]Offence means any act or omission made punishable by law for the time being in force.[1]Sexual offence can be defined as sexual intercourse performed in a way, which is against the provision of the law of the land.[2] Sexual offence may be defined as an act of illegal sexual intercourse with a second person or with an animal to obtain sexual gratification. The laws and customs of the society normally permit heterosexual intercourse between a man and his wife as

provided by nature with the sex organ intended for reproduction. If intercourse is carried out with the use of sex organs in natural manner, the alleged act by convention is known as natural sexual offence. If there is no valid consents, intercourse who is not his wife would constitute an offence in law. The moral values of the society and traditional culture and heritage is declining from the society for various reasons, violation of human rights, in the form of rape is spreading over the world. In our country, the incidence of rape is very high due to low-socio-economic condition and diminished law and force orders. No age is exempted from such kinds of sexual assault. No age is safe for rape.[4] Children are the common victims due to superstition that sexually transmitted diseases (STDs) may be cured by intercourse with a virgin. Younger a girl, greater the possibility of her being virgin. Rape (Section 375) may be defined as sexual intercourse with a woman under circumstances falling under any of the five following descriptions: Firstly- Against her will. Secondly-without her consent. Thirdly-with her consent, whenher consent has been obtained by putting her in fear of death or of hurt. Fourthly-with her consent when the man knows, that he is not her husband and that her consent is given because she believes that is another man to whom she is or believes herself to be lawfully married. Fifthly-with her consent, when at the time of giving such consent, by reason of unsoundness of mind or intoxication or the administration of any stupefying substance, she is unable to understand the nature and consequences of that to which she gives consent. Sixthly-with or without her consent when she is under sixteen years of age. Slight penetration is sufficient to constitute the sexual intercourse necessary to offence of rape.[5] Hence full erection, intermission and ejaculation are not essential; old age is not a bar for a man to be capable of performing sexual intercourse. There are important features related with sexual offence: Social and economic insecurity, Political instability, Political terrorism, Pornography culture, Dish culture, Sex linked ego and super ego of man over woman, Social insecurity of women, Downward position of woman in society, Lack of appropriate laws for the punishment of accused delay in legal procedure, dishonesty of police administration. Complications after unlawful sexual acts may be: a)Death of the victim may occur from Shock due to fright and emotion or by blunt force, Haemorrhage from injuries to the genitals and perineum, Suffocation if the mouth and nostrils are closed by the hand or cloth or by strangulation,[6] Septic infection. Rape may be followed by murder usually by throttling, head injury or stabbing. Research has shown that such killing is usually not carried out by firearm. Death may also occur due to suffocation by closure of the mouth and nose or the victim by the accused or due to Gagging to stop her cry b) Pregnancy c) Contracting sexually transmitted disease d) Psychological complications such asrape trauma syndrome which has two stages:(1) Disorganization phase (2)Reorganization phase.Fox and Scher described three possible phases of reaction following a rape attack.(i)The acute reaction phase includes shock, dismay and fear. (ii) Her outward adjustment phase when denial, suppression, rationalization take place. (iii) Finally integration when there may be depression, guilt feeling and a desire to talk or feeling of being damaged or unclean. The unpleasantness of having to be interrogated and examined by medical personal, the police, the magistrate, the long drawn out legal procedure, the publicity all added to the strain, Here, in our country, no referral system to sympathetic psychiatric counseling.

Case history

The victim named Kaniz Fatema , Age-16 years, unmarried girl from Laxmibazar, Dhaka is a college student. Permission was taken from the concerned authority before interviewing the victim. According to the statement of the Victim On 22/04/17she was going to her college, she has been forcefully taken in a microbus by Asad, son of house owner beside her residence at about 08:00AM by his friends. Asad was proposing her to get married with him but she did not agree with him. On that day, Asad took her to an unknown place and raped (as stated by the victim) at 01.00PM 22/04/17. The victim came to Forensic Medicine Department of Sir Salimullah Medical College for medico legal examination on 24/04/17 with the prerequisite for performing medico legal examination. These are authorized requisition from investigating police officer, 3 copies attested passport size photographs, Written informed consent given by the victim,(as she is above 12 years old), Identification of the victim by escorting police constable and also with presence of a female attendant for helping as well asthe witness of the medical examination. On general examination, she was an average built with light complexion, no abnormality was detected in her gait. number of teeth-28(all are permanent),with Identification Mark: A black mole right side of cheek. One black mole over the left side of cheek. Secondary sex characteristics are normal, marks of violence and marks of struggles are absent, her LMP was 10/4/17 , She was worn a red sallower and printed Kamiz. The clothes were clean and showed no tears or stains because the dress was changed at night. And on Local examination: Mons Pubis was healthy and no matting of semen with pubic hair was observed. Labia majora normally developed reddish, fleshy and both sides are in close apposition. Vaginal canal admits tip of one finger, red congested and tender. Hymen ruptured at 3, 5, 8'O clock position. Posterior commisure healthy and intact. Laboratory Investigation was done, high vaginal swab for spermatozoa and Gonococcus, Radiological examination for age determination .

Discussion:

For the purpose of coming to a definite conclusion, the following points should be taken into consideration: Medical evidence of rape are (1)Marks of violence on

victims or accused (2)Marks of violence over genitalia of the victim (3) Presence of stain of semen in the body or clothing (4)Presence of semen In vagina (5)Evidence of gonorrhea or STD in both partners (6)Forceful sexual intercourse has taken place, but no evidence is left. Rape on different ages: Infant and children a)A little general violence would be absent in children b)Signs of local violence-depends upon the degree of penetration- when penis has been forced into the vagina. i) a little redness and tenderness of the vulva. ii) Hymen is usually intact but may become red and congested. iii) The victim may complain of difficulty in walking, micturation and defecation. Adolescent girl a) Marks of generation violence- sign of active resistance may be present round the mouth, throat, breast, arm, wrist, inner aspect of thigh and back. b) Marks of local violence-1)Vulva-swelling and inflammation with or without bruising of vulva and vagina with effusions of blood. 2) Stain of semen- may be found over pubic hair, genitalia or clothing. 3) Gonorrheal discharge and inflammation of the part of signs of syphilis may be founded. Rape on Deflorate or Married Women:a) Signs of general violence- will be found over the body and limbs. b) Sign of local violence-The vagina may show some deep injury, laceration or bruising and inflammation of vulva. Tearing or perforation of vagina may occur. When old women are raped- vaginal laceration and perineal tear may occur. Detection of Semen: Detection of semen is not so easy in Bangladesh. The only absolute proof of semen is thefinding of at least one unbroken spermatozoa and by DNA analysis. Semen can be detected by-chemical examination-Florence test, Barberio's test, The acid phosphatase test, Creatinine phosphokinase, Microscopic examination, Precipitin Test. In the absence of spermatozoa, a stain which gives characteristic fluorescence in ultra violet light, positive precipitin test, a high level of acid phosphatase and a high creatinine phosphokinase can be considered to be due to semen. In this case, radiology report bearing the Plate No. 48017 is received on 27/04/17 age appears 15-16 years. In vaginal swab, no spermatozoon was found. Punishment of Rape: According To The Existing Legal system of a country, it varies from nation to nation. In our country, the punishment in a rape case is according to the B.P.C. 376, But recently on 14/02/2000, this law was modified and amendment made to provide higher punishment in a charge of rape. According to the recent law, the maximum penalty for rape is the death sentence with or without fine.

Social Aspects

In our country the interaction disappointingly exists between the rape victim and society. The woman as no liability to the act of rape, but she has to bear all the consequences. A series of problems may arise out of such act. After rape occurrence, the victim is isolated from the society. If working, unemployed, modesty lost, not easily get married, burden to the parents,psychologically disturbed and may destroy herself. If delivered, the issue is a bastard child. Psychiatric referral system introduction should be introduced. STDs if not screened, may spread to the healthy citizen of the country. Encouragement to the young female to learn selfdefense technique. Legal prostitutions in the brothels should be allowed for adults. Reassurance and advice to both the victim and family. Make awareness to the society that the rape victim is innocent.Studies on rape cases shows the study by willet and allured of the persistence of sperm in the vagina of living individuals. They examined 1332 vaginal swabs taken in alleged rape cases. 57% of the cases were positive for sperm. The longest time for identified up to 120 hours. A cervical swab was positive for sperm at 179 hours.[7] In an analysis of 451 rape victim examined at parkland hospital in Dallas by staff gynecologist Mr. Stone, found that only 34% showed any evidence of trauma (abrasion, contusion or lacerations) of the 451, victims, only 18% had any trauma to the genitalia (reddening abrasions, contusions or lacerations), vaginal fluid examinations revealed the presence of motile spermatozoa in 19.3% cases, with motile in and non-motile spermatozoa observed in 47% of all the victims. Absence of trauma to a rape victim does not negate the validity of their claim of rape. Again, failure to demonstrate the sperm does not preclude intercourse. Non availability of sperm in a rape victim may be due to drainage of semen or assailant is azoospermic, vasectomy, long delay in appearing to the doctors, ejaculation outside the vagina.Graves et al, found that, mean period of acid phosphates detected in vaginal fluid 14 hours after intercourse, whereas semen specific glycoprotein P^{30}, mean period is 27 hours after intercourse. Graves et al, also showed that of 27 females alleged raped in which acid phosphates was negative, 26% were positive for P^{30}, this indicating sexual intercourse had taken place.

Conclusion:

Rape is an accusation easily to be made and hard to be proved and harder to be defended by the party accused. From legal point of view, rape can be committed without producing any injury to the genitals or having any seminal emission. Only slight vulva penetration of penis may produce rape.So diagnosis of rape is a very complicated matter. The diagnosis of rape mainly depends on circumstantial evidence. In this case the pathological report stated that no spermatozoa was found. The radiological finding state that the age of the victim is about 16 years. Here, in this case, it was observed that no matting of semen with pubic hair. Labia Major was found reddish and fleshy and both sides in close apposition. Labia Minora was slightly congested and reddened. Vaginal canal was one finger dilated, red, congested and tender. Hymen was found ruptured at 3, 5, 8'O clock position. On general examination, no signs of violence were seen over the body. The incidence of rape occurred on 22/04/17 but the victim came to forensic medicine department for medico legal examination on 24/04/17. During this interval, the signs of violence may disappear. So from above discussion we come

to a decision that, 'Considering physical examination findings, microbiological report and radiological findings (as regard to bony ossification) the opinion is that the age of the victim is about 15-16 years and signs of recent force full sexual intercourse were found on her body, which are consistent with the history given.

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