ISSN : 2313-4919
Recognized by BM & DC

Ad-din Sakina Women's Medical College Journal

Volume 5 Number 1 January 2024

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Official Journal of
Ad-din Sakina Women's Medical College
www.aswmc.edu.bd

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Full Name of the Journal	Ad-din Sakina Women's Medical College Journal
Abbreviated Form	*ASWMCJ*
Type of Publication	Peer Reviewed, Bi-Annual
Published by	Ad-din Sakina Women's Medical College
ISSN No.	2313-4919
Recognized by	BM & DC
Address	Pulerhat, Jashore-7402, Bangladesh

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Editorial

Awareness of Chronic Kidney Disease: Bangladesh Perspective

*Chowdhury D

English Surgeon and Histologist Sir William Bowan, 1st Baronet (July 20, 1816 - March 29, 1892) who discovered that urine is a byproduct of the blood filtration that is carried on the kidney. The word kidney is probably a compound of the old English cwiα 'womb' and ey, 'egg' describing the organ's shape.

Kidneys are a pair of organs located in the right and left side of the abdomen. Human kidneys are shaped like large beans and this is where the "Kidney Bean" a common red colored bean, gets its name. The organs called kidneys are vital to life, as they filter bad stuff from blood, help body get rid of waste, regulate blood pressure and even produce hormones.

Chronic kidney disease (CKD) is gradually and progressively increasing public health concern among healthcare providers worldwide. CKD which affects more than 10% of the world's population has become a global public health crisis in recent decades. The declaration of 'World Kidney Day' and its annual observance remained us that CKD is common and harmful for almost all cross section of people.[1] CKD is characterized by progressive decline of renal function over three months or more, which is linked to a number of risk factors. Once the kidneys have been damaged, they are unable to filter blood or perform other functions, resulting in a decrease in glomerular filtration rate (GFR) and proteinuria, which can develop to end-stage renal Disease (ESRD) or kidney failure. If not treated with dialysis or a kidney transplant, ESRD is deadly and irreversible.[2]

CKD is a silent disease which is treated as one of the leading causes of death worldwide; many developed countries have studied CKD awareness and developed guidelines and educational programs accordingly. Education to improve knowledge on CKD has been documented to play an important role in reducing this particular problem regardless of whether it is primary, secondary or tertiary prevention.[3] Varied risk factors have been reported in the awareness study on chronic kidney disease in different countries.

Bangladesh being a densely populated developing country, its health care budget is only 1.4% of gross national product (GNP) with the priority areas as population control, provision of clean drinking water and eradication of communicable disease. The treatment of non-communicable disease like chronic kidney disease (CKD) has low priority in Bangladesh because of government health policy and high cost of treatment.[4] Development of awareness through screening and educational programs is still in the stage of infancy. The important causes of CKD leading to kidney failure in South Asian region are chronic glomerulonephritis, diabetes and hypertension.[4] In Bangladesh, leading causes of ESRD are chronic glomerulonephritis (40%) diabetes (34%) and hypertension (15%).[5] Patients are not aware of the importance of good control of these risk factors. Survey in a few rural, urban, disadvantageous population suggested that 18 million people have been suffering from CKD as defined by kidney disease outcomes quality initiative (KDOQI) in Bangladesh.[5] About 30,000 patients are reaching end-stage renal failure every year in this country they need either dialysis or transplantation of kidney.[5] Out of 18% kidney patients, 11% have milder to severe form of kidney failure.[5] Increased CKD awareness over time in different countries and a recent increase in nephrology referrals suggested that these efforts may have some positive impact.[6-8]

It has been observed that physicians other than nephrologists are less likely to recognize CKD and sometimes differ in their clinical evaluation of CKD.[9] A significant number of CKD patients are referred to nephrologists much later than it would have been appropriate.[10] Late evaluation of CKD patients by nephrologists, especially those presenting in End-Stage Renal Disease (ESRD) is associated with suboptimal pre-dialysis care and treatment which ultimately increases mortality.[10–12]

CKD is also associated with a significant financial burden, accounting for more than 2-3% of annual healthcare expenditures in high-income countries, despite the fact that patients with ESRD account for only 0.03% of the total population and lower socioeconomic status is linked to a higher risk of ESRD.[13] The burden of CKD in developing countries is substantially greater due to additional hazards associated with poverty, such as infections, hazardous job, inadequate education and poor maternal health, as well as the additional expense of screening and treatment, which must be paid directly by patients.[14,15]

The public awareness and understanding of CKD is a critical aspect in CKD preventive and screening programs' success, whereby early detection and management of CKD can help prevent disease progression in its early stages.[16] Despite this, the majority of CKD cases are not detected early.[17] General knowledge of CKD, its risk factors and individual risk and CKD status consequence and understanding are all parts of CKD awareness among patients.[18]

A better rate of early identification of those with undetected/early CKD or those at risk of developing CKD may be attainable in populations with high levels of knowledge and awareness about CKD.[19] According to research conducted in both developed and developing nations, the public's understanding of CKD and its risk factors is inadequate.[20]

Finally it may be mentioned that to explore the awareness regarding CKD among the population of Bangladesh, inadequate knowledge of CKD and significant gaps in awareness of CKD were observed in mass populations. Therefore, responsible organizations should make an extra effort to raise community awareness and implement targeted CKD educational activities to improve the early detection and management of CKD.

Professor (Dr.) Dipti Chowdhury.
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Original Article

Musculoskeletal Features of Post Covid-19 Patients Attending in a Tertiary Academic Hospital of Bangladesh

***Islam MM[1], Hassan MA[2], Abbasi MZ[3], Sudipta ST[4], Kabir A[5], Ahmmed SU[6], Uddin T[7]**

Abstract

Background: *This is a baseline study performed to assess the relation between musculoskeletal features among the Covid-19 patients. However, no substantial amount of data or previous studies was revealed regarding this issue. This study can be crowned as a pioneer in the arena of Covid-19 infection.* ***Objective:*** *To observes the demographic incidence, clinicopathological spectrum of post Covid-19 patients in Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh.* ***Materials and Methods:*** *This is a cross sectional observational study conducted among 207 cases including musculoskeletal symptoms, socio-demographic characteristics and oxygen saturation >95% in the department of physical medicine and rehabilitation, BSMMU, Dhaka, Bangladesh. Statistical analysis was performed on the tabulated data by chi-square test and independent t test.* ***Results:*** *The mean age was 40.3±9.6 years with male predominance. The most frequent symptoms were respiratory symptoms followed by musculoskeletal pain. Upper back pain was significantly higher in female and shoulder pain among male.* ***Conclusion:*** *Most common symptoms were pain over neck, shoulder, upper back, lower back, hip or thigh, wrist or hands. Older age group significantly suffered with pain in lower back and ankle. Post Covid follow up research is recommended.*

Keywords: Covid-19, Musculoskeletal features, Post-covid pain.

Received: 24.08.2023, **Accepted:** 02.09.2023.

Ad-din Sakina Women's Medical College Journal. 2024; 5 (1) : 04-15

Introduction

SARS-CoV-2 belongs to the corona virus family of positive sense, single-stranded RNA viruses. In addition to SARS-CoV-2, there are 6 other strains of corona virus those are known to infect humans, including 4 less severe strains that cause mild symptoms, as well as the more pathogenic viruses SARS-CoV-1, which causes severe acute respiratory syndrome (SARS), and MERS-CoV, which was responsible for the Middle East respiratory syndrome (MERS).[1,2]

So far, the most common notable early symptoms of the disease were cough, headache and fever. However, recently, the evidence is emerging on the effect of Covid-19 on the musculoskeletal systems.[3] Musculoskeletal symptoms are occurring in one-quarter to one-half of symptomatic patients with Covid-19.[4] Because of the emerging nature of Covid-19, the mechanistic effects of the infection on skeletal muscle are yet to be understood. In a mouse model of SARS, within 4 days of infection, there was a rapid 20% decrease in body mass.[5] Using muscle tissue collected postmortem from patients with Covid-19 who had died, several small studies have provided insight into the nature of muscle dysfunction as a result of SARS-CoV-1 infection.[6,7] Widespread muscle fiber atrophy was noted, with sporadic and focal muscle fiber necrosis and immune cell infiltration.[6] Electron micrographs revealed myofibril disarray and Z disc streaming,[8] which would disrupt force transmission as noted in other muscle diseases.[9] Neuronal demyelination has also been reported in patients with Covid-19, which may also contribute to muscle weakness and fatigue. In addition to potential direct viral infection, the cytokines and pro-inflammatory signaling molecules induced by the infection could lead to pathological changes in skeletal muscle tissue.

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Several of the pro inflammatory signaling molecules known to be elevated in patients with Covid-19 can also impact skeletal muscle. IFN-g, IL-1b, IL-6, IL-17, and TNF-a can directly induce muscle fiber proteolysis and decrease protein synthesis. IL-1b and IL-6 can induce muscle fibroblast activity and lead to fibrosis, which could impair muscle force production and increase injury susceptibility.[10]

Less is known about bone and joint involvement than skeletal muscle disorders in patients with Covid-19. Pain over different anatomical region was most frequently encountered feature among the patients in different studies. This study emphasized on the regional distribution of most common musculoskeletal feature which is pain among the respondents. Arthralgia were commonly reported in patients with Covid-19, but are often combined with myalgias,[11] making it challenging to specifically identify arthralgia prevalence. Arthralgia have also been reported in patients with Covid-19, as well as reduced bone mineral density (BMD).[12] The reduced BMD observed in patients with Covid-19 was largely thought to be dependent on the extent and duration of treatment with corticosteroids, which were a mainstay therapy that attempted to reduce inflammation during the initial infection and subsequent early rehabilitation and recovery period.[10]

The study was conducted to evaluate most commonly reported post Covid-19 musculoskeletal symptom which was pain and its regional distribution among respondents attending post Covid-19 follow up clinic of Bangabandhu Sheikh Mujib Medical University (BSMMU), Bangladesh.

The musculoskeletal manifestation of Covid-19 may include as myalgia, muscle weakness and arthralgia. Ironically, in some patients, some of these symptoms may precede the commonest symptoms of Covid-19. In addition, symptoms such as myalgia, muscle weakness, and headache may render the patients unable to carry out activities of daily living (ADL) such as walking. In humans, the ability to carry out ADL is associated with good quality of life. Furthermore, symptoms such as muscle weakness can result in complications such as muscle atrophy and contracture in the long term. The decreased ability to carry out ADL leads to major rehabilitation problem.[13] Pain over different anatomical region was the most frequent complaint of post Covid-19 patients. Regional distribution of this musculoskeletal feature not yet been studied. So, this study will help to identify major musculoskeletal problem which is pain and the common regional involvement area. Study result will guide in future for area to be looked after for proper rehabilitation. Furthermore, by searching Google Scholar, PubMed and BanglaJOL, it was found that small numbers of studies have been conducted regarding post-covid musculoskeletal features. To our knowledge, there is absence of any study regarding this topic in our country. Recently BSMMU has started an exclusive post-covid follow up clinic were symptoms like fatigue, cardio-respiratory, musculoskeletal and neurological disorders are included.[14] Therefore, this study will address the most frequent musculoskeletal feature of post Covid-19 patients attending post-covid follow up clinic of BSMMU and can provide further information which will help to understand the musculoskeletal problem and the regional distribution of post Covid-19 patients and how to manage them.
General objective of our study is to find out the musculoskeletal features of post Covid-19 patients attending in a tertiary academic hospital of Bangladesh. Specific objectives include exploring the musculoskeletal symptoms and finding out which part of musculoskeletal system is involved, assessing the socio-demographic characteristics of the patients and to assess the association between socio demographic characteristics with the presenting musculoskeletal symptoms.

Materials and Methods

This was a cross sectional observational study conducted among 207 subjects in the department of Physical Medicine and Rehabilitation, BSMMU, Dhaka. The study duration was 6 months; January, 2021 to June, 2021. Subjects were selected by purposive sampling. Post covid-19 patients who were previously Covid positive confirmed by reverse transcription polymerase chain reaction (RT-PCR) or by high-resolution computed tomography (HRCT) of chest, but became Covid-19 free during the time of inclusion in this study. Both male and female subjects age ranged 18 to 60 years were included. Oxygen saturation >95% in pulse-oximeter was also an inclusion criteria.

Respondents who had musculoskeletal symptoms prior to the diagnosis of Covid-19, immunocompromised patients, pregnant women and unwilling subjects were excluded from the study. Standard statistical analyses were preformed; chi-square test and independent student's t-test was performed for hypothesis testing.

Figure 1 shows that most common Covid-19 symptoms were found fever 86.5%, cough 56.0%, body ache 54.6%, respiratory distress 7.2%, back ache 1.9%, shoulder pain 1.4%, malaise 1.4%, neck ache 1.0%, anxiety 1.0%, diarrhea 0.5% and thigh pain 0.5%. 52(25.1%) patients had co-morbidities, among them 29(14.0%) had hypertension, 27(13.0%) had diabetes mellitus and 15(7.2%) had asthma.

Results

This was a cross sectional observational study conducted among 207 subjects in the department of Physical Medicine and Rehabilitation, BSMMU, Dhaka. The study duration was 6 months; January, 2021 to June, 2021. Subjects were selected by purposive sampling. Post covid-19 patients who were previously Covid positive confirmed by reverse transcription polymerase chain reaction (RT-PCR) or by high-resolution computed tomography (HRCT) of chest, but became Covid-19 free during the time of inclusion in this study. Both male and female subjects age ranged 18 to 60 years were included. Oxygen saturation >95% in pulse-oximeter was also an inclusion criteria.
Respondents who had musculoskeletal symptoms prior to the diagnosis of Covid-19, immunocompromised patients, pregnant women and unwilling subjects were excluded from the study. Standard statistical analyses were preformed; chi-square test and independent student's t-test was performed for hypothesis testing.

Figure 1: Bar diagram showing distribution of Covid-19 symptoms of the study patients (n=207)

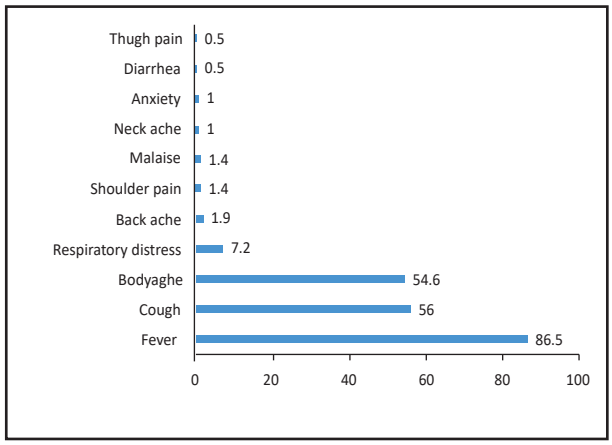

Figure 2: Bar diagram showing musculoskeletal feature (Pain) with regional distribution of the study patients (n=207)

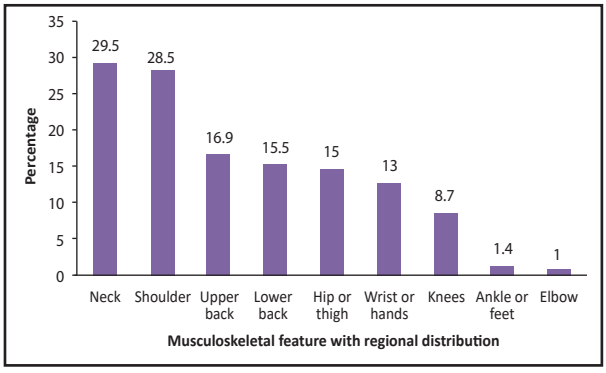

Figure 2 shows that most common musculoskeletal symptom was pain and its regional distribution were found in neck 29.5%, shoulder 28.5%, upper back 16.9%, lower back 15.5%, hip or thigh 15.0%, wrist or hands 13.0%, knees 8.7%, ankle or feet 1.4% and elbow 1.0%.

Table: I : Effect on work and leisure activity after becoming COVID negative (n=207)

Parameter	Number of patients	Percentage
Work activity		
Yes	207	100.0
No	0	0.0
Leisure activity		
Yes	207	100.0
No	0	0.0

Table 1 shows that work activity and leisure activity were hampered due to covid-19 in all patients even after becoming Covid-19 negative.

Table: II : Impedimental effect of post covid-19 patients in their normal work activities (n=207)

Normal work after becoming Covid-19 negative (days)	Number of patients	Percentage
0	1	0.5
1-7	52	25.1
8-30	153	73.9
>30	1	0.5

Table 2 shows that almost three fourth 153(73.9%) of patients had been able to do normal work activities within 8-30 days after becoming Covid-19 negative.

Figure 3: Pie chart showing musculo-skeletal trouble (according to Nordic Musculoskeletal Questionnaire) during the last 7 days of data collection (n=207)

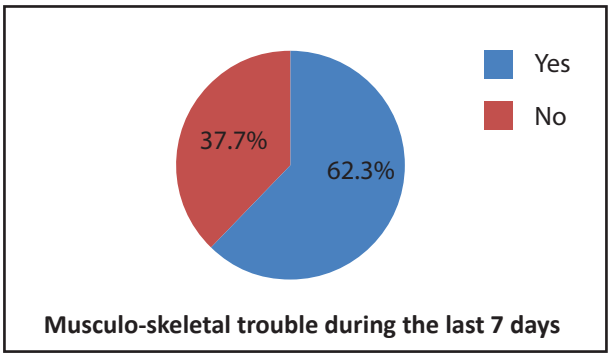

Figure 3 shows that during the last 7 days of data collection 129(62.3%) of participants had musculoskeletal trouble, which was pain. It represents that after complete recovery musculoskeletal symptoms can be relapsed.

Table 3 shows that lower back pain was significantly higher in age group 51-60 years (37.5%). Also ankle or feet pain was significantly higher in age group 41-50 years (50.0%). However, pain over neck, shoulder, upper back, hip or thigh, wrist or hands, knee and elbow were not significantly associated with age group (p>0.05).

Table: III : Association between musculoskeletal symptom (pain) with age (n=207)

Age (years)	Neck (n=61)		Shoulder (n=59)		Upper back (n=35)		Lower back (n=32)		Hip or thigh (n=31)		Wrist or hands (n=27)		Knees (n=18)		Ankle or feet (n=3)		Elbow (n=2)	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	N	%
≤20	0	0.0	0	0.0	1	2.9	1	3.1	2	6.5	1	3.7	0	0.0	1	33.3	0	0.0
21-30	5	8.2	10	16.9	6	17.1	6	18.8	6	19.4	7	25.9	1	5.6	0	0.0	0	0.0
31-40	27	44.3	25	42.4	17	48.6	9	28.1	10	32.3	10	37.0	6	33.3	0	0.0	1	50.0
41-50	19	31.1	12	20.3	8	22.9	4	12.5	4	12.9	5	18.5	9	50.0	2	66.7	0	0.0
51-60	10	16.4	12	20.3	2	5.7	12	37.5	9	29.0	4	14.8	2	11.1	0	0.0	1	50.0
>60	0	0.0	0	0.0	1	2.9	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
p value	0.410^{ns}		0.532^{ns}		0.092^{ns}		0.014^{s}		0.052^{ns}		0.364^{ns}		0.222^{ns}		0.001^{s}		0.837^{ns}	

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

Shoulder pain was significantly higher in male patients (81.4%), upper back pain was significantly higher in female patients (51.4%). However, pain over neck, lower back, hip or thigh, wrist or hands, knee, ankle and elbow were not significantly associated with sex (p>0.05).

Table 4 shows that there was no significant association between musculoskeletal symptom (pain) with occupational status (p>0.05).

Table IV: Association between musculoskeletal symptom (pain) with occupational status (n=207)

Occupational status	Neck (n=61)		Shoulder (n=59)		Upper back (n=35)		Lower back (n=32)		Hip or thigh (n=31)		Wrist or hands (n=27)		Knees (n=18)		Ankle or feet (n=3)		Elbow (n=2)	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Service holder	37	60.7	35	59.3	14	40.0	11	34.4	15	48.4	10	37.0	8	44.4	0	0.0	1	50.0
Housewife	14	23.0	9	15.3	11	31.4	7	21.9	5	16.1	6	22.2	5	27.8	1	33.3	1	50.0
Businessman	9	14.8	13	22.0	5	14.3	11	34.4	7	22.6	6	22.2	3	16.7	1	33.3	0	0.0
Student	1	1.6	2	3.4	4	11.4	3	9.4	4	12.9	5	18.5	1	5.6	1	33.3	0	0.0
Day laborer	0	0.0	0	0.0	1	2.9	0	0.0	0	0.0	0	0.0	1	5.6	0	0.0	0	0.0
P value	0.156^{ns}		0.385^{ns}		0.112^{ns}		0.143^{ns}		0.486^{ns}		0.059^{ns}		0.276^{ns}		0.228^{ns}		0.846^{ns}	

ns = not significant; p value reached from chi square test

Discussion

This cross sectional study was carried out to find out the musculoskeletal features of post Covid-19 patients attending in a tertiary academic hospital of Bangladesh. A total number of 207 post Covid-19 participants attending post covid follow up clinics of BSMMU, Dhaka from January 2021 to June 2021 were enrolled in this study.

Regarding age distribution it was observed that 87(42.0%) patients belonged to age group 31-40 years. The mean (±SD) age was 40.3±9.6 years with age range from 18 to 60 years. In a study conducted by Bakılan et al.[15] where they found mean (±SD) age was 47.45±13.92 years. In a Bangladeshi study conducted by Numan[16] reported the mean age of the participants was 45.43 years with the age range was 35 to 66 years. One retrospective study was conducted in China having 99 post covid participants with the mean (±SD) age (49.40±18.45) years.[17] Another study conducted in Bangladesh by Khasru et al.[18] where they showed majority (70%) of the participants were aged 50 years or younger, and respondents older than 50 were 30%. Ahmed et al.[19] also found most of the participants were from the age group of 18–29 (73.5%) years. These findings were almost similar in the present study.

This study showed male patients were predominant 143(69.1%) with male female ratio was 2.2:1. Bakılan et al.[15] reported that total of 280 post Covid-19 patients, 183(65.4%) women and 97(34.6%) men. In another study in Turkey, phone interviews were conducted with 300 Covid-19 patients (60% male).[20] In a Bangladeshi study by Numan[16] described that 90 participants were selected with 70% (n=63) male and 30% were female (n=27). One retrospective study was conducted in China having 99 post Covid-19 participants with 51 (51.51%) were male and 48 (48.49%) were female participants.[17] Ahmed et al.[19] demonstrated that a total number of 230 volunteers both male and female participated (the number of male participants were greater than female 79.1% vs 20.9%). Another study in our country by Khasru et al.[18] showed among 380 participants, majority were males (65.53%) infected with Covid-19. The enhancing mortality rate from Covid-19 for males found (2.4 times) higher than females also found by another study.[21] The explanations for the sex differences in Covid-19 are perhaps multifaceted including variations in immune response, higher incidence of pre-existing disease, biological differences between the sexes such as high levels of androgens in men, differences in lifestyle such as smoking habits as well as differences in underlying comorbidities.[22,23]

Present study showed majority 83(40.1%) patients completed above SSC education level followed by 72(34.8%) completed up to SSC level, 17(8.2%) up to primary and 35(16.9%) were illiterate. Numan[16] reported that educational status showed that 50 (55.55%) completed secondary level, 33 (36.66%) found to be graduate and only 07 (7.77%) post-graduate. Another study done by Saeed et al.[24] found about 567 (62.4%) were holding a bachelor's degree, while 234 (25.7%), 108 (11.9%) were holding postgraduates and diploma or below, respectively.

Regarding occupational status in this study it was observed that more than half (51.7%) patients were service holder, 43(20.8%) housewife, 42(20.3%) businessman, 13(6.3%) student and 2(1.0%) day labor. In a Bangladeshi study conducted by Numan[16] found occupation of the participants showed that 35 (38.88%) were service holder followed by 20 (22.22%) housewife, 03 (3.33%) student, 15 (16.7%) banker and 02 (2.22%) retired person. Khasru et al.[18] had observed that among all respondents, 18.42% were homemaker, 16.84% retired personnel, 15% businessman, 13.95% healthcare workers, 12.37% students, 10.53% bankers, 5.26% administrative workers, 3.18% garments workers, 2.37% members of

law-enforcing agencies, and others were 1.31%. Another study done in our country by Ahmed et al.[19] where they described majority (50.0%) patients were student followed by 31.3% were in private service, 9.1% were in government service, 3.5% were unemployed, 3.0% were businessman, 3.0% were housewife. Saeed et al. [24] also found almost 585 (64.4%) were employed, while a smaller number of participants, 198 (21.8%) and 126 (13.9%), were unemployed and students, respectively.

Current study showed that majority 118(57.0%) patients came from lower-middle income group, 85(41.15%) came from upper middle income group and 4(1.9%) came from high income group. In our country a study conducted by Khasru et al.[18] where they demonstrated majority of the respondents (50.26%) were from upper-middle income family, 26.84% from lower-middle income family, 17.37% from high income family, and only 5.53% were from low income family.

Present study observed that majority 143(69.1%) patients had duration of Covid-19, 15-21 days. The mean (±SD) duration of Covid-19 was found 16.1±4.1 days. Leon et al.[25] reported that the mean (±SD) duration of rheumatic and musculoskeletal diseases (RMD) was 8.9±8.2 years and the mean (±SD) duration of admission due to Covid-19 was 15.38±14.42 days. Liang et al.[11] had observed that an incubation period was elicited from 12 patients (57.1%), ranging from 2 to 10 days with a median of 6.5 days.

In this study we found that most common Covid-19 symptoms were fever 86.5%, cough 56.0%, body ache 54.6%, respiratory distress 15(1.9%), back ache 1.9%, shoulder pain 1.4%, malaise 1.4%, neck ache 1.0%, anxiety 1.0%, diarrhea 0.5% and thigh pain 0.5%. In a study done by Bakılan et al.[15] showed the frequency of dyspnea was 30%, cough 18.5% and chest pain 10.7%. In a Bangladeshi study conducted by Khasru et al.[18] where they found most frequent symptoms were respiratory clusters symptoms including fever, cough, rhinorrhea and breathlessness (76.05%) followed by musculoskeletal pain (48.42%), headache (16.05%) and abdominal pain in 0.5% of cases. Another literature reported the clinical symptoms at the onset of illness in patients with Covid-19, in which fever was the most common symptom (98%), followed by cough (76%), dyspnea (55%), muscle pain or fatigue (44%), and headache (8%),[17] which is similar to this study finding. Liang et al.[11] also observed that on presentation, most patients (85.7%) had fever with a mean body temperature of 37.8oC. Cough (42.9%), expectoration (33.3%), fatigue (57.1%), headache or dizziness (38.1%) was common symptoms. Other symptoms included shortness of breath, myalgia or arthralgia, sore throat, nasal symptoms and diarrhea.

Regarding co-morbidities in this study it was observed that 52(25.1%) patients had co-morbidities, among them 29(14.0%) had hypertension, 27(13.0%) had diabetes mellitus and 15(7.2%) had asthma. Saeed et al.[24] reported that the most common chronic diseases were diabetes 6%, followed by asthma in 3.30%. Another study conducted by Leon et al.[25] described 46.15% of the patients had at least one comorbid condition.

Present study showed the most common post-acute Covid-19 musculoskeletal symptom was pain over neck in 29.5%, shoulder 28.5%, upper back 16.9%, lower back 15.5%, hip or thigh 15.0%, wrist or hands 13.0%, knees 8.7%, ankle or feet 1.4% and elbow 1.0%. In a study done by Bakılan et al.[15] showed that most of the patients have fatigue (71.8%), spine pain (70.7%) and widespread myalgia (60.7%). The most common site of spine pain was the back (30.4%). Other symptoms included radicular low back pain 4 (1.4%), hand/wrist pain 4 (1.4%), hip pain 4 (1.4%), foot/ankle pain 4 (1.4%), elbow pain 3 (1.1%), cramp 2 (0.7%), vertigo 2 (0.7%), tremor 1 (0.4%) and headache 1 (0.4%). The common result from

previous studies about post-Covid-19 symptoms was that the majority of patients have at least one symptom.[26,27] Consistent with these studies, 88.2% of our patients have at least one symptom, while 85.7% of our patients have at least one musculoskeletal symptom. Most of the previous studies have focused on whole body symptoms[26,27] after Covid-19. Different from these studies, the present study focused on musculoskeletal symptoms. The most common musculoskeletal symptoms were fatigue, spine pain and myalgia. The frequency of respiratory tract symptoms was lower than that of musculoskeletal symptoms, and the most common respiratory tract symptom was dyspnea. A rehabilitation center in Bangladesh reported that the frequency of head and neck pain was 27%, pain in the lower limb 34%, back pain 24% and pain in the upper limb 13% in 90 post Covid-19 patients.[16] In the study, the most common region of pain was the back (30%) and back pain was also the most frequent symptom on admission to the Physical Medicine and Rehabilitation (PM&R) outpatient clinic. Furthermore, back pain in acute Covid-19 was found to be related to post-acute Covid-19 musculoskeletal symptoms. 72% of these patients have at least one symptom, while most complaints regarding the musculoskeletal system were fatigue (44%), back pain (22.7%), arthralgia (22%), myalgia (21%) and lower back pain (16%) after 1 month.[20]

In a Bangladeshi study conducted by Numan[16] where they described in the location of pain status, 25 (27.77 %) complained of pain in the head and neck, 12 (13.33%) in the upper limb, 31 (34.45%) in the lower limb and 22 (24.45 %) in the back. A similar study conducted in the two Spanish universities to find out the musculoskeletal pain among the 1198 students during the lockdown period. In the study, participants 837 (69.86%) complained of neck pain, 162 (13.52%) shoulder pain, 57 (4.75%) elbow pain, 20 (1.66%) hip joint pain and 22 (1.84) knee joint pain. [28] The main similarity between the studies were the regions of musculoskeletal complaint were almost in a similar location. In contrast, this study participant was from different professionals but the study conducted by Leiros-Rodriguez only focused on the only one group of participants that were university students. [28]

Another study in our country by Khasru et al.[18] had observed pain varied widely in hip, neck, leg and calf muscles, back and spine, shoulder, arms and hand, and other parts of the body among confirmed Covid-19 study respondents. Among musculoskeletal system, the most frequent involved joint was hip joint (20.53%). Among all cases, 15.26% had moderate and 5% had severe hip pain. Neck pain was found in 9.21% of cases and moderate pain was reported in 6.84%, and severe pain 2.10% of cases. Moreover, 5.26% cases had leg and calf muscle pain, 5% back and spine pain, 1.58% shoulder, 1.05% arms and hands, and 5.78% had pain in others region. Among all respondents, 16.05% had headache of which majority had mild to moderate headache (7.63%, and 6.57% respectively, and 1.84% had severe headache). Additionally, 1.58% had pain in the eyes. Hoong et al.[29] also found of the 88 patients with musculoskeletal symptoms, 37.5% had myalgia, 5.7% arthralgia, 6.8% new-onset backache and 50% generalized body ache.

This study showed lower back pain was significantly higher in age group 51-60 years (37.5%). Also ankle or feet pain was significantly higher in age group 41-50 years (50.0%). However, neck, shoulder, upper back, hip or thigh, wrist or hands, knee and elbow were not significantly associated with age group ($p>0.05$). In a study of Numan[16] showed musculoskeletal symptoms and Covid-19 showed a significant association between age of the participants and severity of Covid-19 ($p<0.002$). In contrast, significant associations ($p>0.05$) were not found between age of participants and pain after Covid, living area and pain after Covid, age of participants and global weakness after Covid.

Studies conducted by different researchers found a similar significant association (p<0.05) between exercise and musculoskeletal symptoms[30] age and duration of Covid and severity of Covid (p<0.05).[31] Khasru et al.[18] reported that among respondents of younger age group (aged ≤50 years), 37.59% had moderate pain, 6.77% had severe pain, 13.91% had mild pain, and 41.17% had no pain. On the other hand, among older respondents (aged >50 years), 47.37% had moderate pain, 25.44% had severe pain, 13.15% had mild pain, and 14.03% had no pain. The differences between two groups was statistically significant (p<0.05).

In our study shoulder pain was significantly higher in male patients (81.4%), upper back pain was significantly higher in female patients (51.4%). However, pain over neck, lower back, hip or thigh, wrist or hands, knee, ankle and elbow were not significantly associated with sex (p>0.05). Effect on neck region were more in our study may be due to cervical spine movement is more in daily activities even in resting position like sitting or lying in one side, moreover sedentary lifestyle plays an important role to create impact over neck region. Bakılan et al.[15] demonstrate that a total of 240 (85.7%) of the 280 patients have at least one or more musculoskeletal symptoms, which began with or were aggravated by their Covid-19 infection, while the musculoskeletal problems of 40 (14.3%) of the 280 patients did not change after being infected with Covid-19. Also in these 240 patients, no difference was found according to gender (P = .343). In our country a study done by Khasru et al.[18] showed among 249 males, 43.77% had moderate, 13.25% mild, 10.44% had severe pain, and 32.53% had no pain. Similarly, among 131 females, 35.11% had moderate, 16.03% had severe, 13.74% had mild pain, and 35.19% had no pain. The differences between two groups were not significant (p>0.05). Among different types of pain, their study reveals that joint pain found among 22.63% males and 13.15% females. Rest complained of bone pain or pain in the muscles. Majority of the male and female respondents suffered from headache (22.89%) followed by hip pain (21.84%). According to another study,[32] patients with SARS Cov-2 also reported myalgia (49.3–60.9%), headache (35.4–55.8%), sore throat (12.5-23.2%), chest pain (10.4%), and abdominal pain (3.5%). Similar result found in a literature review,[13] the most common musculoskeletal manifestation found by them was myalgia (48 studies; 80%).

Present study found -no significant association between musculoskeletal symptom with occupational status (p>0.05). Lower back pain was significantly higher in above SSC education level that was 62.5%. However, pain over neck, shoulder, upper back, hip or thigh, wrist or hands, knee, ankle and elbow were not significantly associated with education (p>0.05).

Limitations of the Study

The study population was selected from one selected hospital in Dhaka city, so that the results of the study may not reflect the exact picture of the country. The study was small and single centered. Therefore, a large population based multicenter prospective study is needed to understand the true picture and magnitude of the disease in Bangladesh. Despite these limitations, by using pre-fixed exclusion and inclusion criteria, the ascertainment bias eliminated. Selection bias was eliminated by using simple random sampling method. The results might have drawn attention to the scientific community to conduct more research on musculoskeletal symptoms and post Covid-19 survivors.

Conclusion

The result of this study concludes that the most common post Covid-19 musculoskeletal symptom was pain over neck, shoulder, upper back, lower back, hip or thigh, wrist or hands. Among the participants, older age group significantly suffered

with pain in lower back and ankle or feet. Shoulder pain was significantly more in male patients however upper back pain was significantly more in female patients. To address this issue pain rehabilitation intervention should be designed for Covid-19 infected patients. Additionally, post Covid follow up research is recommended. The musculoskeletal pain might be short term initially, but may possibly develop into a long-term problem and may be burden if proper measures are not taken.The result of this study concludes that the most common post Covid-19 musculoskeletal symptom was pain over neck, shoulder, upper back, lower back, hip or thigh, wrist or hands. Among the participants, older age group significantly suffered with pain in lower back and ankle or feet. Shoulder pain was significantly more in male patients however upper back pain was significantly more in female patients. To address this issue pain rehabilitation intervention should be designed for Covid-19 infected patients. Additionally, post Covid follow up research is recommended. The musculoskeletal pain might be short term initially, but may possibly develop into a long-term problem and may be burden if proper measures are not taken.

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Original Article

Role of Antibiotic in Bronchiolitis Management

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Abstract

Background: *Bronchiolitis is mostly a viral disease in infants and young children. It is a clinical diagnosis characterized by cough and respiratory distress associated with wheeze preceded by runny nose with or without fever.* ***Objective:*** *Objective of the study was to compare the outcome of young children of months to 2 years of age with bronchiolitis, treated with or without antibiotics, along with supportive treatment.* ***Materials and Methods:*** *This was a prospective randomized control trail conducted at Ad-din Sakina Women's Medical College Hospital, Jashore from January 2020 to December 2022. Total 105 children aged 2 months to 2 years, who fulfilled the inclusion criteria (runny nose followed by respiratory distress and wheeze), were included. The study case was randomly assigned in two groups ('without antibiotic' vs 'with antibiotic'). Presenting sign and symptoms were followed thrice daily for 7 days using a structured follow up sheet.* ***Results:*** *There were 70 male (66.66%) and 35 female (33.33%), mean age of the participants were 6.2 months and 90% were under 1 year of age. 44 cases were treated without antibiotic. 32 cases received oral erythromycin and 29 received parenteral ampicillin. Social smile returned in 3 days, feeding improved in 3 days, chest in drawing improved in 5 days. Crepitation improved faster than wheeze. Children with bronchiolitis with or without antibiotic (oral or parenteral) recovered in the same fashion.* ***Conclusion:*** *Thus the dynamics of clinical outcome of bronchiolitis obviates that children not receiving antibiotics had similar clinical outcome than those who received antibiotics.*

Keywords: Bronchiolitis, Antibiotics, Runny nose, Respiratory distress, Wheeze.

Received: 12.09.2023, **Accepted:** 17.09.2023.

Ad-din Sakina Women's Medical College Journal. 2024; 5 (1) : 16-19

Introduction

Bronchiolitis is a clinical condition characterized by runny nose followed by respiratory distress associated with wheeze in children below 2 years of age. Respiratory Syncytial Virus (RSV), is the predominant etiologic agent for acute viral bronchiolitis.

Bronchiolitis is the leading cause of hospitalization for infants younger than one year age. Admissions with bronchiolitis have increased in the last decade and it has been associated with increasing morbidity and cost. It is the most common cause of lower respiratory tract infection (21%) as against pneumonia (8%). Important risk factors include prematurity, male sex, overcrowding, non-breast feeding etc. "WHO classified severe pneumonia" was found to be viral bronchiolitis in 65% cases in one study. Though uncomplicated bronchiolitis can be managed in the hospital settings without antibiotics, it is treated with antibiotics in 99% cases. Physicians in Bangladesh are oblivious of bronchiolitis and cases of bronchiolitis are misdiagnosed as pneumonia. Alarmingly, only 15.4% of bronchiolitis cases are reported to be diagnosed correctly at the community level.

Materials and Methods

This was a prospective randomized control trial conducted in Ad-din Sakina Women's Medical College Hospital, Jashore during January 2017 to December 2017. Total 105 cases who fulfilled the inclusion criteria (Runny nose followed by respiratory distress and wheeze) in children aged 2 months to 2 years. Exclusion criteria were atopic condition, congenital heart diseases, and/or known immunodeficiency. A structured questionnaire was filled up through face to face interview with the caregivers. Detailed history and thorough examination were done. Supportive management

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was given to all children according to the national guideline for management of bronchiolitis like, 6 hourly nebulized salbutamol at 0.15 mg/kg, 2 inhalation (if SaO2 <90%), maintenance of nutrition with 10% IV dextrose in 0.225% saline, nasogastric tube feeding or breast feeding (as require), oro-pharyngeal suction (if needed) and paracetamol suspension (if fever persisted). A group of cases got antibiotic (either oral erythromycin or parenteral ampicillin) and other cases were treated without antibiotic. Each patient was followed up 2-3 times in 24 hours for 7 days with a structured follow up sheet. Outcome variables were: Improvement of chest in drawing, feeding difficulty, respiratory rate and return of social smile, status of oxygen saturation (S02), disappearance of rhonchi and crepitation.

Results

There were 70 male (66.66%) and 35 female (33.33%) children. Mean age of the patients was 6.2 months and 91% were under 1 year of age. 44 cases were treated without antibiotics (N-Ab), 32 cases received oral erythromycin (O-Ab) 30mg/kg/day divided 8 hourly & 29 cases were given parenteral ampicillin 50mg/kg/day (P-Ab) divided 6 hourly. The course during the management was as follows in terms of symptoms and signs, such as gradual recovery of chesty features like wheeze, chest in drawing, tachypnea, crepitation and rhonchi. These findings did not differ among three intervention groups. Contrary to chesty, most non chesty features such as feeding difficulty, social smile inconsolable crying hypoxemia demonstrated rapid recovery which also showed no difference among three groups.

Table: I : Effect on work and leisure activity after becoming COVID negative (n=207)

Symptoms and signs	Day-1			Day-3			Day-5			Day-7		
	N-Ab	O-Ab	P-Ab	N-Ab	O-Ab	P-Ab	N-Ab	O-Ab	P-Ab	N-Ab	O-Ab	P-Ab
Chest in drawing	100%	100%	100%	62.8%	50%	62%	34%	25%	27%	5%	10%	8%
Feeding difficulty	58%	42%	41%	11%	9%	10%	Nil	Nil	Nil	Nil	Nil	Nil
Social smile	30%	34%	34.5%	88%	90.6%	89.7%	All	All	All	All	All	All
Respiratory rate/min (Mean)	62	61	62	43	43	49	-	-	-	-	-	-
Oxygen saturation	93%	94%	93%	97%	96%	96%	-	-	-	-	-	-
Wheeze	100%	100%	100%	60%	50%	55%	19%	22%	22%	4%	8%	7%
Crepitation	60%	56%	62%	37%	38%	38%	7%	12%	3.4%	3%	7%	6%
Runny nose	100%	100%	100%	50%	52%	55%	18%	21%	22%	5%	9%	8%
N-Ab, no antibiotic; O-Ab, oral antibiotics, P-Ab, parenteral antibiotics.												

Discussion

This study is a well-designed pragmatic trial, sufficiently large in its random control trail approach. A recovery scale in clinical improvement was graded into two logical outcomes. `Rapid' and `gradual' scales. Instead of studying only two groups, comprising either a administered antibiotics or not, in addition to supportive measures, we added a third group by splitting antibiotic group into `oral' and `parenteral'. This was carried out to ensure that as many influencing factors were addressed as possible. Additionally, the follow up conducted to document the clinical improvement for a week (or less in case of subjects who improved earlier), involving 8 hourly clinical check-up and using as much 8 symptoms/signs, signifies added strength to this study.

There are a few small-scale studies which demonstrate that antibiotics are not necessary in the management of bronchiolitis. It is worth mentioning four studies. The first study was conducted four decades ago by field et al.[1] a two-armed trial with ampicillin and placebo in one hospital with 44 children to assess the progress using eight clinical

features (pulse rate, temperature, respiratory rate, use of accessory muscles of respiration, expiratory wheeze, adventitious sounds and cyanosis).

Friis B[2] conducted a study 26 years ago, with 136 children between 1 month and 6 years of age as participants. Majumder et al.[3] recently conducted another study involving 104 children. While the study was conducted in one hospital, it was done across three groups: one received ampicillin, the other erythromycin and one group received no antibiotics. The most recent study was conducted on infants and young children with RSV lower respiratory tract disease. The study revealed that the duration of hospitalization did not differ, regardless of whether the patients were treated with azithromycin or a placebo.[4]

Antibiotics are usually prescribed in RSV bronchiolitis cases when there is: (a) a suspected secondary bacterial infection, (b) an intention to achieve anti-inflammatory or immuno-modulatory effect and (c) an intention to prevent serious bacterial infection. It has been demonstrated that RSV effect on ciliated respiratory epithelia enhances susceptibility to secondary infections. However, the risk of secondary infections in infants and children with RSV bronchiolitis is remarkably low.[5] If the intention is to reduce the inflammatory process, there would be no place for ampicillin, as there is no evidence that penicillin derivatives or ampicillin have immuno-modulatory properties.

The diagnosis of bronchiolitis is most often made on clinical grounds and the criteria may vary: very simple, the first attack of wheezing in a previously healthy child of less than two years of age[6] or for a diverse criteria with coryzal symptoms followed by rapid onset of wheeze, fever, tachypnea, chest retractions, crepitation, and rhonchi.[7] However, we adopted a midline as the diagnostic criteria for bronchiolitis (runny nose followed by breathing difficulty, chest in drawing and rhonchi on auscultation in less than two year old children).

As with the previously listed studies, findings from our research provides evidence that antibiotics do not influence the natural course of bronchiolitis in terms of recover.[1,2,4] Furthermore, children who did not receive antibiotics had a significantly shorter hospital stay. The reason might be at least two fold: firstly, the poor parents tend to continue antibiotic course like other parents having fascination with antibiotics[8] for their children even if their children fulfilled the discharge criteria, Secondly, the parents did not want to keep their children in hospital any more when their child's condition improved but not receiving any antibiotics. There remains scope to change the existing guideline for the management of bronchiolitis[9] in the light of the findings of this study. As a result, the universal practice of prescribing antibiotics in bronchiolitis may be significan tly reduced as observed in other country.[10]

The research revealed significant information regarding details on the recovery rates of the children. Chesty features had gradual recoveries, not differing among three intervention groups and. Most non-chesty features resolved rapidly and were comparable among three intervention groups, except for runny nose. Moreover, children belonging to N-Ab group stayed for fewer days in hospital than their counterparts of P-Ab or O-Ab group. Knowing the rate of recovery of different clinical features in bronchiolitis bears several important implications. For example, return of social smile, being able to take food and not requiring oxygen any longer provide opportunity of a more speedy turnover in respective hospitals, particularly in the given situation of Bangladesh where persons per hospital bed remain as much as 2732.[11] There is also scope to counsel parents that chesty features, such as cough or wheeze, are likely to persist for a longer period in spite of improvement of other symptoms and a longer hospital stay is not necessary. Limitations of the study include; not assessing the RSV status and

parental desire of not keeping their children for more than seven days in the hospital as they improved sooner.

Conflict of Interest

The authors declare no conflict of interest.

Conclusion

Managing acute bronchiolitis without antibiotics in adjunct to supportive measure remains preferable, as clinical outcomes (recovery rate) were similar to those of cases receiving antibiotics. Moreover, the recovery was 'gradual' in case of chesty features in contrast to 'rapid' recovery of most of the non-chesty features. Antibiotic use should be restricted in the treatment of bronchiolitis and further study is heeded with larger sample size to support these research findings.

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Original Article

Exploring Unnatural Death Patterns in Jashore District: A Descriptive Study

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Abstract

Background: *This study delves into mortality patterns using forensic reports from Jashore District, Bangladesh. It seeks to analyze demographic distributions, monthly variations, and causes of death, emphasizing the importance of comprehensive data for public health interventions.* ***Materials and Methods:*** *A descriptive approach was adopted, scrutinizing 155 forensic reports collected from the Jashore district in Bangladesh for a period of one year. Inclusion criteria ensured data relevance, while statistical techniques, including frequency distributions and percentages were employed. Software tools including IBM SPSS and Microsoft Excel aided analysis.* ***Results:*** *Demographic distributions revealed gender, religious affiliations and geographic disparities. Peaks in reported deaths occurred in February, May, and December. Varied causes of death included asphyxiation, poisonings, and external injuries, complicated by missing data.* ***Conclusion:*** *This study underscores the necessity for meticulous data collection to understand mortality complexities. It highlights the potential for informed public health interventions and policy making, emphasizing the importance of comprehensive forensic analysis for impactful strategies in Jashore District, Bangladesh.*

Keywords: Unnatural death patterns, Suicidal, Accidental, Forensic analysis, Jashore city.

Received: 11.10.2023, **Accepted:** 28.10.2023.

Ad-din Sakina Women's Medical College Journal. 2024; 5 (1) : 20-27

Introduction

A post-mortem report, also known as an autopsy or coroner's report, is an official document that provides detailed findings from a medical examination conducted on a deceased individual's body.[1] This report is prepared by a qualified pathologist or medical examiner and includes essential information such as the deceased person's identification details, medical history if available, observations from external and internal examinations, findings related to organs and bodily systems, toxicology test results if conducted, and a conclusive summary detailing the cause of death and any contributing factors.[2] Post-mortem reports play a pivotal role in determining the cause of death, especially in cases where it is uncertain or in situations involving legal investigations, insurance claims, or medical research, serving as vital legal documents for official records.[3]

Forensic studies play a crucial role in uncovering mortality patterns within specific geographic areas. The insights gained from such analyses not only shed light on the circumstances surrounding fatalities but also serve as a foundation for informed interventions and policies aimed at safeguarding communities' well-being.[4]

Situated in the southwestern region of Bangladesh, Jashore district offers a distinct landscape for investigating mortality patterns. Despite its importance, there exists a discernible gap in thoroughly examining mortality dynamics within this area. Due to lack of forensic experts all-over Bangladesh, there is serious lag in reporting forensic issues.[5] Prior research efforts have been sporadic, lacked depth, or faced constraints in data analysis, resulting in a critical shortcoming in comprehending the nuances of mortality in Jashore. This study aims to provide a comprehensive analysis of mortality patterns within the Jashore district by examining demographic distributions, identifying causes and circumstances of

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deaths, and outlining prevalent mortality trends. The findings from this research hold immense significance, not only as a forensic analysis but also as a potential catalyst for proactive public health interventions and policy formulation. The insights gained are poised to guide policymakers in developing targeted strategies aimed at addressing specific causes of mortality and enhancing overall community well-being in Jashore.

Materials and Methods

This research adopted a descriptive methodology, utilizing 155 forensic reports collected from the Jashore district in Bangladesh from January 2022 to December 2022. These reports constituted the primary dataset for analysis, encompassing cases handled by forensic authorities in the specified district.

Inclusion and exclusion criteria were applied to ensure the relevance and consistency of the results. Only reports meeting specific criteria, such as data completeness, alignment with study objectives, and compatibility with the analytical scope, were considered. Reports that lacked adequate documentation or incomplete were excluded from the analysis.

The study predominantly employed descriptive statistical techniques for data analysis. These techniques involved generating frequency distributions, percentages, and graphical representations to depict the characteristics and patterns observed in the dataset. Various variables within the forensic reports, including demographic details (gender, age, location), cause and nature of death, toxicological information, and circumstances surrounding the fatalities, were examined. IBM SPSS (Statistical Package for the Social Sciences) version 20 and Microsoft Excel version 2019 were used for data analysis and presentation, given their robust capabilities in statistical analysis and visualization.

Ethical consideration

Ethical considerations were paramount throughout the study. Adherence to ethical guidelines involved maintaining confidentiality and anonymity of individuals in the forensic reports, complying with data protection regulations, and obtaining necessary permissions to access and analyzes the reports while upholding ethical standards in research practices.

Results

This study analyzed 155 cases, utilizing extensive descriptive analysis techniques. The demographic distribution revealed that 71 individuals were female, constituting 45.8% of the sample, while 81 individuals were male, accounting for 52.8% of the total. For 03 (1.4%) cases the gender of the participant was missing.

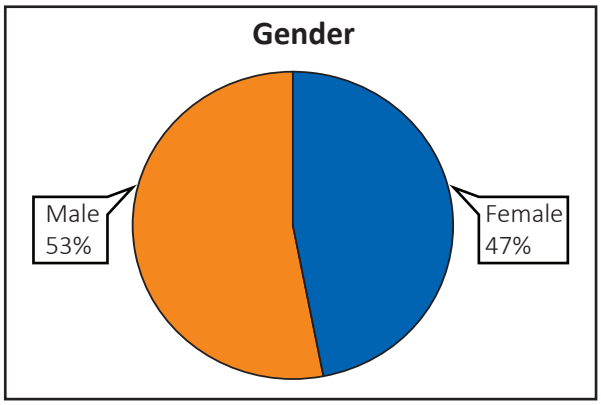

Figure 1: Demographic Distribution

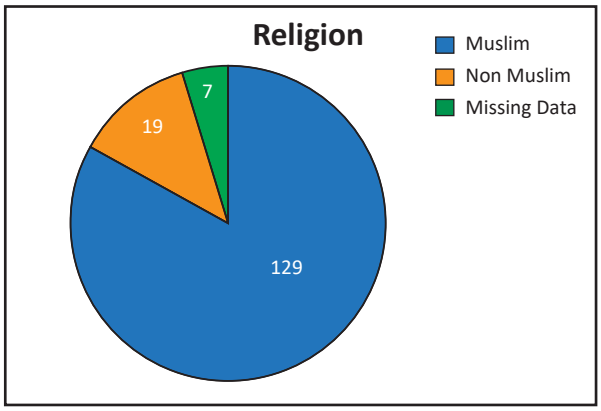

Figure 2: Religious Affiliation

Geographically, the distribution of cases varied across different upazilas. Specifically, the data indicated that the Abhaynagar upazila accounted for 9 cases (5.8%), Bagherpara upazila for 8 cases (5.16%), Chaugachha upazila for 10 cases (6.45%), Jashore Sadar upazila for 33 cases (21.29%), Jhikargacha upazila for 16 cases (10.32%), Keshabpur upazilla for 4 (2.6%) cases, Manirampur upazila for 22 cases (14.19%), Sharsha upazila for 12 cases (7.74%), cases outside Jashore for 30 instances (19.35%), and 11 cases (7.1%) with missing address information.

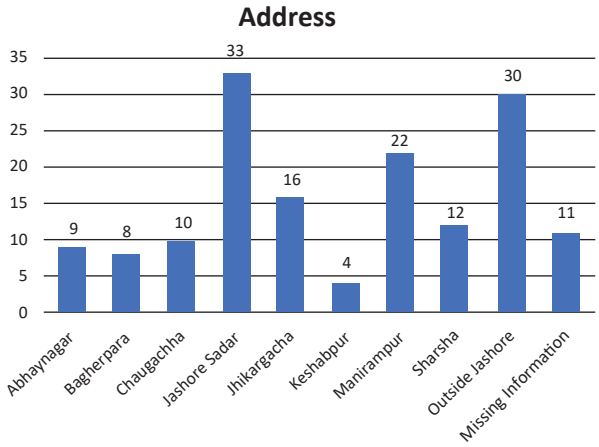

Figure 3: Geographical Distribution of Cases across Upazilas

The distribution of cases based on the month of birth demonstrated varying frequencies, with the highest burden of reported deaths in February, May, and December. Specifically, the data indicated that January accounted for 8 cases (5.2%), February for 19 cases (12.3%), March for 14 cases (9%), April for 11 cases (7.1%), May for 21 cases (13.5%), June for 16 cases (10.3%), July for 8 cases (5.2%), August for 7 cases (4.5%), September for 9 cases (5.8%), October for 4 (2.6%) cases, November for 15 cases (9.7%), and December for 23 cases (14.8%).

The examination of inflicted injuries revealed a diverse distribution among different weapon categories. Among the recorded cases with

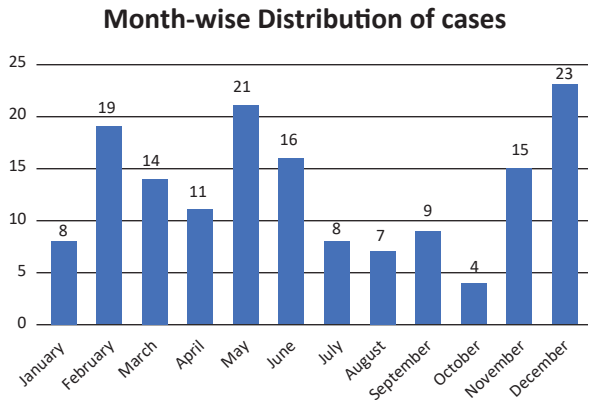

Figure 4: Frequency Distribution of Reported Deaths by Month of Birth

weapon related histories (n=13), the majority, comprising 46.2% (n=6), involved injuries caused by blunt weapons. Close behind were cases involving sharp weapons, accounting for 38.5% (n=5) of the incidents. In contrast, injuries attributed to pointed weapons constituted a smaller proportion, with 15.4% (n=2) of the cases. Among the cases that either were not due to weapon related incidents (n=142), 2 lacked specific classification, making it challenging to attribute the injuries to any defined weapon category. This varied distribution underscores the complexity in classifying weapon-related injuries and highlights the importance of precise categorization methods in forensic investigations to accurately document and interpret such cases.

The examination of ligature marks on deceased bodies uncovered a diverse array of findings. Among the cases reviewed, a majority, accounting for 34.8% (n=54), displayed incomplete ligature marks, while a smaller proportion, constituting 3.2% (5), exhibited completed marks. In contrast, a minimal percentage, just 1.3% (n=2), showed an absence of ligature marks. Notably, a significant portion, approximately 60.3% (n=94), fell under the category of "Not Applicable," potentially indicating cases where the assessment of ligature marks wasn't relevant or couldn't be conclusively determined. This multifaceted distribution

emphasizes the variability in the presence, completeness, and applicability of ligature marks, underscoring the complexity of forensic examinations in determining their significance in post-mortem assessments. 7 (4.5%) of the case reports revealed that these were sexually abused while the rest (n=148, 95.5%) were not abused.

The analysis of post mortem report statuses within the scope of 155 cases reveals a pertinent distribution. Among these cases, 67, constituting 43.20% of the total, remain pending, indicating ongoing investigations or necessary procedural steps yet to be finalized. Conversely, the remaining 88 cases, comprising 56.80% of the total, have completed their post mortem processes and are not pending further action. This dichotomy in statuses delineates a clear division between concluded and ongoing post mortem examinations. The pending cases signify instances where examinations or supplementary procedures are still in progress, while those categorized as not pending denote concluded evaluations within the dataset.

Upon examining post mortem findings within the sample set, a distinctive pattern emerges. Rigor mortis, the natural stiffening of muscles after death, predominates the observations, evident in 139 cases, comprising 89.68% of the total (n=155). A smaller subset, approximately 6.45% of the cases (10 instances), displayed signs of advanced decomposition. Additionally, a minority of cases, accounting for 3.87% (6 cases), presented with diverse conditions beyond rigor mortis or decomposition. This breakdown underscores the prevalence of rigor mortis in the majority of cases, with a notable yet smaller proportion indicating advanced decomposition, while a few others manifest distinct post-mortem conditions or characteristics.

The data pertaining to the presence of parchmentization in post mortem examinations offers valuable insights. Among the cases scrutinized, 99 instances, comprising approximately 63.9% of the total, displayed an absence of parchmentization. Contrastingly, parchmentization was identified in 54 cases, representing about 34.8% of the total cases examined. Interestingly, only 2 cases, a mere 1.3% of the dataset, lacked documentation regarding the presence or absence of parchmentization. This distribution underscores the varied occurrence of parchmentization within these post mortem observations, with a notable majority showing its absence, a significant proportion revealing its presence, and a minor subset where specific details were unrecorded.

The investigation of the nature of death among the decedents displayed a multifaceted distribution pattern. Out of the 155 cases analyzed, 53 were attributed to suicidal incidents, which constituted 34.2% of the sample. Homicidal causes were linked to 18 cases, accounting for 11.6% of the total. On the other hand, 10 cases were classified as accidental deaths, making up 6.5% of the studied cohort. It is noteworthy that, 1 case (0.6%) did not fall into the previous classifications and 73 cases (47.1%) lacked unambiguous classification within the specified categories, presenting as missing data within this classification schema. This diverse distribution emphasizes the intricacy and variety of circumstances surrounding the documented fatalities.

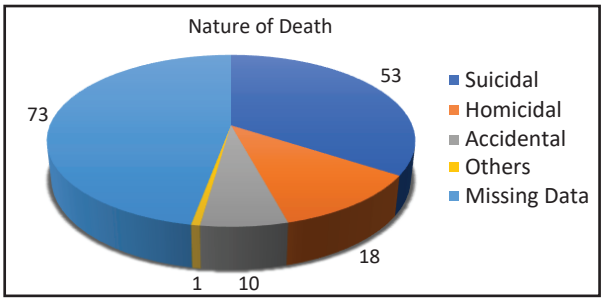

Figure 5: Nature of Death among Decedents

The analysis of the cause of death unveiled a vast array of circumstances. Asphyxia realted deaths were reported in 63 cases, comprising 40.65% of the total cases studied. Instances of poisoning were identified in 42 cases, amounting to 27.1% of the sample. Deaths resulting from external injuries were documented in 24 cases, which accounted for 15.48% of the studied cohort. Furthermore, 26 cases (16.77%) were categorized as missing data within this classification, signifying the absence of clear information regarding the cause of death for this particular group of individuals. This sophisticated categorization underscores the diverse factors contributing to the recorded fatalities and highlights the complexity of attributing specific causes in some instances.

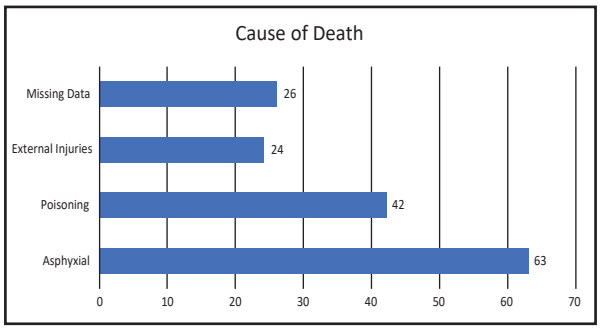

Figure 6: Analysis of Causes of Death

The specific categorization of cases revealed that hanging incidents were reported in 53 cases, constituting 34.2% of the studied cohort. Notably, a considerable number of cases, totaling 92 (59.4%), were classified as "Not applicable" within this context. The rest included 5 (3.2%) cases of strangulation, 2 (1.3%) cases of smothering, 2 (1.3%) cases of drowning and 1 (0.6%) case of missing information. This classification likely indicates cases where hanging was not a pertinent or applicable factor in the cause or circumstances of death, emphasizing the extensive range of situations and factors contributing to fatalities within this dataset.

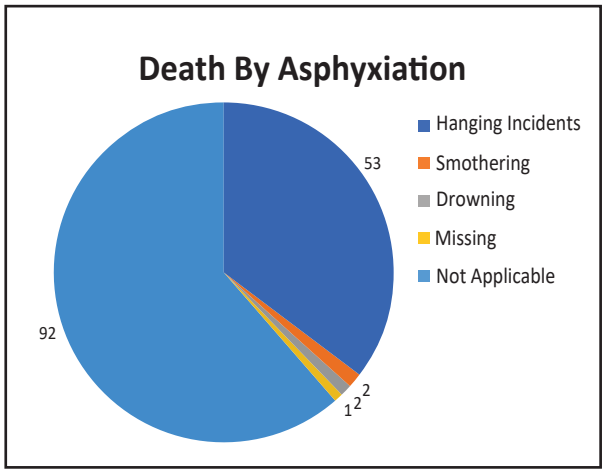

Figure 7: Specific Categorization of Hanging Incidents

In the subset of poisoning cases, an analysis revealed distinct classifications. Of the 155 cases studied, 28 involved insecticides (OPC), representing 18.1% of the total. Additionally, 10 cases (6.5%) were categorized as ill-defined poisoning cases. Notably, a significant majority of 112 cases (72.3%) were placed in the "Not applicable" classification, indicating instances where poisoning, specifically related to insecticides or with clear definitions, was not considered a relevant or applicable factor in the recorded fatalities. This highlights the complexity and diversity of factors contributing to poisoning-related deaths in this dataset.

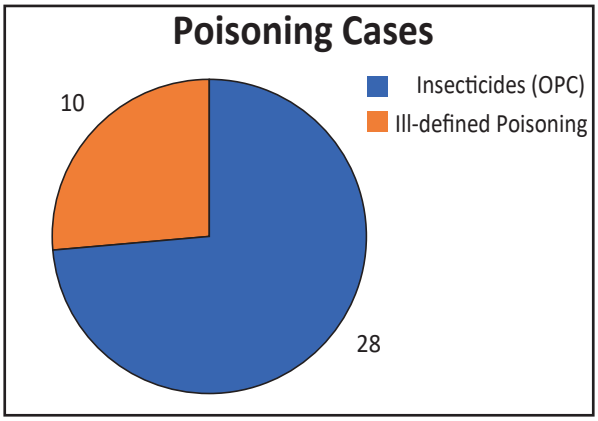

Figure 8: Classification within Poisoning Cases Subset

In examining the case statuses within the studied sample of 155 cases, it was observed that 86 ante mortem cases accounted for 55.5% of the total cohort. Conversely, 69 cases (44.5%) were classified as missing, signifying instances where specific information or data related to the case status was absent or unavailable. This underscores the importance of comprehensive and complete data collection in analyzing the status and details of cases within this study.

Discussion

The outcomes of this cross-sectional study, which involved 155 cases, reveal a wide array of demographic, geographic, and forensic elements. The findings shed light on various aspects of these cases, providing insights into the complexities and patterns that exist within forensic investigations. To further contextualize these results, it is crucial to examine the demographic and geographic aspects alongside forensic details to understand the comprehensive picture painted by the study.

The demographic distribution of the sample revealed gender and religious affiliations, showing a balanced representation across genders and a predominantly Muslim majority. The study also showed diverse geographic distribution of cases across different regions, highlighting the variations in the distribution of cases. These demographic and geographic nuances underscore the importance of considering cultural and regional factors in forensic analysis, as they may influence the patterns observed in the study. Maria reported in her paper that micro-graphical population structure analysis is significant in forensic cases.[6]

The frequency distribution based on the month of birth and the analysis of inflicted injuries showed interesting patterns, demonstrating different frequencies in both birth months and types of injuries caused by various weapon categories. These patterns emphasize the need for precise categorization methods in forensic investigations to accurately interpret and document such cases. When comparing the patterns of birth months and types of injuries, it becomes evident that a more nuanced approach to classification is essential for a comprehensive understanding of the data, considering the varied nature of the observed patterns.[7]

The examination of ligature marks, post mortem report statuses, and post mortem findings provided substantial insights into the complexity and variability of forensic examinations. The prevalence of rigor mortis and the presence or absence of parchmentization in post mortem observations showed distinct characteristics, contributing to the multifaceted nature of these examinations. In delving into the forensic details, it is apparent that the examination of ligature marks and post mortem findings adds depth to the understanding of the cases, showcasing the intricate nature of forensic investigations. A study conducted on the informative aspects of the ligature mark reported that proper investigation of the ligature marks can provide significant inputs regarding hanging and strangulation cases.[8] Furthermore, the distribution of causes and nature of death among the decedents showed a diverse pattern, with a considerable number categorized as missing data, emphasizing the intricacy in classifying specific causes in some situations. When considering the distribution of causes of death, the prevalence of missing data adds a layer of complexity to the analysis. This highlights the challenges in precisely classifying certain cases, underscoring the need for caution in drawing definitive conclusions from incomplete information. A recent study concluded that the distribution of cause and nature of death is essential in better understanding the mortality dynamics of that region.[9] To better understand the epidemiology in regards to forensic reports, distribution of causes and nature of death is essential.[10]

The analysis also revealed an extensive range of circumstances contributing to fatalities within the dataset. To comprehensively assess the findings, it is crucial to acknowledge the diverse circumstances contributing to fatalities. Similar to our concern, a recent study on flood fatalities reported that creating a dataset on the fatalities required trial and errors to address the complex circumstances involved with fatality.[11]

The study utilized a robust dataset of 155 forensic reports collected over a one-year period in the Jashore district of Bangladesh. This comprehensive dataset provides a detailed and diverse sample, enhancing the study's ability to draw meaningful conclusions about mortality patterns in the region. The study conducted a multifaceted analysis, examining demographic distributions, causes and circumstances of deaths, and prevalent mortality trends. This comprehensive approach contributes to a nuanced understanding of mortality patterns in the Jashore district, offering valuable insights for both forensic analysis and potential public health interventions. As similar studies have not been conducted previously, our study highlights the lack of research into this subject-matter and our findings hint that complex analysis of larger data might reveal nuances which may help is shaping policy.

Limitations of the study

The study's limitations, such as missing data in certain categories and the absence of clear information in some cases, imply potential avenues for further research and the necessity for comprehensive data collection methods in future studies. These findings provide a foundational understanding of the complexities inherent in forensic investigations, serving as a starting point for future research endeavors in this field.

Conclusion

This study provides a comprehensive perspective on the demographic, geographic, and forensic factors associated with 155 fatalities, highlighting the diversity of the sampled population through the distribution of demographic data including gender, religious affiliation, geographic distribution, and birth months. The intricate nature of forensic examinations and classifications is further emphasized through the examination of inflicted injuries, ligature marks, post mortem report statuses, and post mortem findings. The varied causes of death, including asphyxial deaths, poisoning, and external injuries, and the classification of cases based on the presence or absence of parchmentization and the classification of poisoning cases provide insight into the characteristics observed in post mortem examinations. The classification of case statuses, such as ante mortem and missing cases, highlights the importance of comprehensive and accessible data. The findings contribute to the understanding of forensic patterns within this dataset and serve as a foundation for further research in forensic science and medicolegal investigations.

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Original Article

Association of Serum Uric Acid and Lipid Profile in Adults at a Tertiary Level Hospital in Bangladesh

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Abstract

Background: *While some studies have found a connection between increased uric acid and metabolic syndrome, nothing is currently known about the interaction between serum uric acid (SUA) and lipid profile. The purpose of this study was to evaluate the association between SUA and lipid profile in Bangladeshi adults as a whole.* ***Materials and Methods:*** *In this cross-sectional study, a total of 140 blood samples were collected from apparently healthy adults aged >18 years. SUA, lipid profile, liver enzymes and other biochemical markers were measured in the collected samples by using standard methods. All statistical analyses were performed by using SPSS version22.0 software and p<0.05 was considered statistically significant.* ***Results:*** *A total of 140 subjects were selected. Among them 70 were male and 70 were female. SUA showed significant positive correlation between SUA and TC, TG, LDL-C while negative correlation between SUA and HDL-C among all subjects (p<0.001). It also revealed that SUA, alanine aminotransferase (ALT), aspartate aminotransferase (AST) and gamma-glutamyl transferase (GGT) levels were significantly higher (p<0.001) in male than female group. Pearson's correlation analysis showed that in all subjects there were significant positive correlation between SUA and serum ALT, AST & GGT (p<0.001).* ***Conclusion:*** *SUA is positively correlated with TC, TG and LDL-C in adults. More prospective studies are needed to clarify the complex relationship between SUA and lipid profile in the general population.*

Keywords: Serum uric acid, Total cholesterol, Triglyceride, LDL cholesterol, HDL cholesterol.

Received: 15.10.2023, **Accepted:** 29.10.2023.

Ad-din Sakina Women's Medical College Journal. 2024; 5 (1) : 28-37

Introduction

Serum uric acid (SUA) is the major end product of the purine metabolism and the level of SUA is maintained by the balance between SUA production and excretion.[1] Intracellularly uric acid can act as a pro-oxidant inducing the release of inflammatory mediators and growth factors.[2] Uric acid has been shown to contribute to lipoprotein oxidation and inflammation which are thought to play vital roles in the development and progression of nonalcoholic fatty liver disease (NAFLD).[3] Hyperuricemia has been linked to both metabolic syndrome (MetS) and cardiovascular disease.[4] The SUA was increased in most NAFLD patients which was an independent risk factor for NAFLD. Therefore, increased SUA may play the role of linking NAFLD with MetS.[5] Dyslipidemia has long been understood to be a major metabolic event that raises the risk of cardiovascular disease (CVD) and atherosclerosis. It manifests as a change in the blood's lipoprotein concentrations. In Bangladesh, the levels of triglycerides, LDL cholesterol, and mean cholesterol are all rising. It has long been known that dyslipidemia is a major metabolic event that is associated with atherogenicity and cardiovascular disease (CVD). It can show up as a change in the concentrations of lipoprotein in plasma.[6]

Patients with type 2 diabetes mellitus (T2DM) are thought to be at increased risk for renal problems due to elevated serum uric acid levels. In type 2 diabetes, dyslipidemia poses a general risk for

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cardiovascular problems. In T2DM patients, a greater amount of SUA is thought to be a risk factor for kidney disorders.[7] A number of cardiovascular disorders have been linked to abnormal levels of low-density lipoprotein cholesterols (LDL-C) and very-low-density lipoprotein cholesterols (VLDL-C). Cardiovascular disorders of various kinds are the most frequent consequences among people with type 2 diabetes. Therefore, in T2DM patients, dyslipidemia, frequently raised triglyceride (TG) levels, and low levels of high-density lipoprotein cholesterol (HDL-C) are significant issues.[8] Evidence suggests that elevated SUA levels and increased activity of liver enzymes gamma-glutamyl transferase (GGT) and alanine transaminase (ALT) and to a lesser extent aspartate transaminase (AST) are also associated with the development of MetS and NAFLD. Hyperuricemia is quite prevalent worldwide; rates of 35.1% in the Seychelles for men and 8.7% for women, 10.6% in Thailand, 7.2% for men and 0.04% for women in England and Scotland, 11.2% in the USA, and 8.4% in Saudi Arabia have all been documented. It is unclear how hyperuricemia and dyslipidemia are related.[9–13]

The overall population now experiences hyperuricemia more frequently due to changes in modern lifestyle. Uric acid crystals start to develop on the artery wall when uric acid levels reach beyond 7 mg/dl, a condition known as hyper saturation. Conversely, men and women are valued differently. Monosodium urate binds to plasma IgG. Platelets become activated when the monosodium urate-IgG combination is recognized by the Fc receptor on the platelets. Through this process, blood coagulation is induced. Cytokine secretion is the cause of atherosclerosis progression.[14] Elevated levels of blood uric acid have been associated with elevated insulin levels, also referred to as hyperinsulinemia, reduced physical activity, excessive alcohol use, hypertension, elevated body mass index (BMI) and decreased HDL cholesterol levels.[15] These traits are all associated with an increased risk of stroke and coronary artery disease (CAD). Because of this, there is disagreement on whether uric acid causes the pathologic processes observed in these disorders or if it is merely a co-existing marker.[16] Numerous investigations have shown that, in patients with coronary artery disease (CAD), hyperuricemia may be utilized as an independent predictor of death after standard risk indicators were taken into consideration.[17] This study was conducted as an attempt to find association between uric acid levels and lipid profile in Bangladeshi adults.

Materials and Methods

Study settings and study population: This cross-sectional analytical study was conducted from 1st March, 2019 to 29th February, 2020 at the Department of Biochemistry, Sir Salimullah Medical College, Dhaka, Bangladesh. The study was conducted on 140 subjects (70 males and 70 females). Apparently healthy people of 30 to 59 years were included in the study. These subjects were selected from the attendants accompanying the patients attending the outpatient department of Sir Salimullah Medical College and Mitford Hospital. Study population included both male and female categorized into four quartiles including hyperuricemia on the basis of SUA level. Inclusion criteria: (i) Healthy adults with age range of 30- 59 years (ii) Both genders. Exclusion criteria: (i) Subjects with DM and renal failure. (ii) Those taking anti-hypertensive, anti-diabetic, lipid-lowering and hypouricemic drugs. (iii) Chronic liver disease such as cirrhosis, liver cancer, viral hepatitis, autoimmune hepatitis and taking hepatotoxic drugs and (iv) Alcoholism.

Anthropometric data collection: Using a measuring device, height was measured (shoes off) and recorded to the closest few centimeters. Body

weight was assessed without shoes and in light clothing. Weight in kilograms divided by height in meters squared yielded the body mass index (BMI). After at least five minutes of rest in a quiet room, blood pressure was taken three times at two-minute intervals while sitting down using a manual sphygmomanometer. All analyses were performed using the computed mean of the three blood pressure readings. Each patient was interviewed prior to the collection of specimens, and pertinent information was methodically documented in a standard pre-designed data sheet. The data was then amended and verified.

Study procedure: After a standard baseline biochemical investigation, a physical examination, and a history, these patients were recruited. Following appropriate counseling, each participant received a detailed explanation of the study's purpose, goals, risks, and methodology. Candidates were only sought out voluntarily to participate in the study. The participants were allowed to leave the research at any time and written informed permission was obtained from each subject. Socio-demographic as well as other relevant data were taken and recorded in the data collection sheet with a prefixed questionnaire. A blood sample was collected for biochemical variables to be measured.

Blood collection and laboratory analysis: Each participant's overnight fasting blood sample, which included about 5 mL, was taken for biochemical evaluations. Serum uric acid (SUA), fasting plasma glucose (FPG), triglycerides (TG), total cholesterol (TC), low-density lipoprotein cholesterol (LDL-C), high-density lipoprotein cholesterol (HDL-C), liver enzymes - alkaline phosphatase (ALP), gamma-glutamyl transferase (GGT), aspartate aminotransferase (AST), and alanine aminotransferase (ALT) were all measured in the blood biochemical studies. Serum kinetic techniques were used to determine the liver enzyme activity, and other biochemical parameters were examined by conventional colorimetric techniques. A biochemistry analyzer was used to measure the biochemical parameters. Biochemical tests were done in the Biochemistry laboratory of Sir Salimullah Medical College, Dhaka.

Operational definitions:

- **Elevated liver enzymes** defined as ALT >45 U/L in male and >34 U/L in female; AST >35 U/L in male and >31 U/L in female; GGT >55 U/L in male and >38 U/L in female.[18]
- **Hyperuricemia** was defined according to sex-specific SUA levels: SUA >7.0 mg/dL for male and >6.0 mg/dL for female.[19]
- **Lipid profile** cutoff level of TC, TG, HDL-C and LDL-C were < 200 mg/dl, < 150 mg/dl, > 40 mg/dl and < 100 mg/dl, respectively.[20]

Statistical analysis: Continuous variables were expressed as mean values and standard deviation (SD), whereas categorical variables were described as frequencies and percentages. SUA levels were divided into quartiles including hyperuricemia. Statistical methods followed were unpaired students' t-test, analysis of variance (ANOVA) test where indicated. Bonferroni test was performed to show the difference in between different categories of SUA level. Pearson's correlation test was performed to analyze the relation between SUA level and lipid profile. All statistical analyses were performed by using SPSS version 22.0 software and $p<0.05$ was considered statistically significant.

Results

A total of 140 participants were chosen for this investigation. There were 70 males and 70

females among them. The study individuals' baseline characteristics are shown in Table I. Male average age (±SD) was 44.43±7.32 years, while female average was 42.80±6.92 years. Additionally, it showed that there was no age-related statistically significant difference between the two groups. Regarding BMI, there was no significant difference found between the two cohorts. Males had a considerably higher mean (±SD) SBP in mmHg than females (130.83±12.08 vs. 125.71±13.89, p<0.05). The average DBP in mmHg (87.50±9.66 against 82.93±9.80, p<0.01) showed a significant difference between the male and female genders.

Table II showed mean±SD of the biochemical parameters. Analysis of lipid profile showed that TC (p<0.05) and LDL-C (p<0.05) level were significantly higher in male than female subjects whereas HDL-C (p<0.01) was significantly lower in male than female group and also serum uric acid (SUA), ALT, AST and GGT levels were significantly (p<0.001) higher in male than female group. How-

Table I: Baseline characteristics of study subjects (n=140)

Variables	All subjects (n=140)	Male (n=70)	Female (n=70)	*p*-value
Age (years)	43.62±7.15	44.43±7.32	42.80±6.92	0.175
BMI (kg/m^2)	24.11±2.86	24.51±2.87	23.71±2.81	0.099
SBP (mmHg)	128.27±13.22	130.83±12.08	125.71±13.89	<0.05
DBP (mmHg)	85.21±9.96	87.50±9.66	82.93±9.80	<0.01

Results were expressed as mean±SD.
Unpaired student's t-test was performed to compare between group means.

Table II: Biochemical parameters of study subjects (n=140)

Biochemical parameters	All subjects (n=140)	Male (n=70)	Female (n=70)	*p*-value
FPG (mmol/L)	5.34±1.11	5.45±1.16	5.22±1.04	0.228
*SUA (mg/dl)	4.94±1.35	5.46±1.33	4.49±1.32	<0.001
*TC (mg/dl)	193.86±21.97	198.30±23.04	189.43±20.03	<0.05
*TG (mg/dl)	157.01±26.09	160.14±21.15	153.89±30.06	0.157
*HDL-C (mg/dl)	39.93±4.38	38.90±4.08	40.96±4.46	<0.01
*LDL-C (mg/dl)	125.80±12.60	128.09±13.21	123.51±11.61	<0.05
ALT (U/L)	29.51±1.33	33.88±1.32	25.70±1.26	<0.001
AST (U/L)	27.54±1.32	31.62±1.29	24.55±1.27	<0.001
GGT (U/L)	35.48±1.46	43.65±1.42	29.51±1.34	<0.001

Results were expressed as mean±SD and *geometric mean±SD.
Unpaired student's t-test was performed to compare between group means.

ever, in cases of TG and FPG no significant difference was observed in between groups.

Table III showed the characteristics of study subjects categorized by serum uric acid (SUA) level. Participants in the higher quartiles of SUA and hyperuricemia showed an increasing pattern of age as well as BMI, SBP and DBP. Serum biochemical parameters such as TC, TG, LDL-C, ALT, AST, GGT and FPG all intended to increase from lowest to highest quartiles of SUA and hyperuricemic subgroup while HDL-C intended to decrease from lowest to highest quartiles of SUA and hyperuricemic subgroup (p<0.001).

Table III: Characteristics of subjects categorized by SUA level in all subjects (n=140)

Variables	Quartiles of normal serum uric acid (SUA)				Hyperuricemia (n=18)	*p*-value
	Q1 (n=26)	Q2 (n=32)	Q3 (n=34)	Q4 (n=30)		
*SUA (mg/dl)	3.34±1.14	4.20±1.08	4.97±1.09	6.05±1.08	8.28±1.15	<0.001
Age (yrs)	37.54±5.85	39.75±5.61	44.06±5.60	48.50±5.53	50.33±4.70	<0.001
BMI (kg/m^2)	21.47±2.73	23.36±2.34	24.15±2.42	25.21±1.98	27.38±1.63	<0.001
SBP(mmHg)	118.65±12.37	122.19±10.77	127.50±12.51	135.93±7.45	141.67±9.39	<0.001
DBP(mmHg)	77.69±8.63	80.94±8.93	87.79±7.41	88.50±8.00	93.33±10.85	<0.001
FPG (mmol/L)	4.67±0.96	5.05±0.99	5.17±0.75	5.55±0.65	6.78±1.37	<0.001
*TC (mg/dl)	178.42±21.50	183.47±14.89	190.18±12.88	205.60±14.75	222.06±22.10	<0.001
*TG (mg/dl)	135.85±12.28	146.13±21.69	160.29±32.52	169.37±15.41	180.17±16.12	<0.001
*HDL-C (mg/dl)	42.73±3.69	41.81±3.37	40.50±4.16	37.43±3.65	35.61±3.11	<0.001
*LDL-C (mg/dl)	115.69±11.83	120.97±10.61	124.32±9.16	133.60±8.60	138.78±10.36	<0.001
ALT (U/L)	23.44±1.34	26.91±1.29	29.51±1.26	33.88±1.20	39.81±1.16	<0.001
AST (U/L)	21.88±1.38	25.70±1.25	27.54±1.27	32.36±1.16	37.15±1.16	<0.001
GGT (U/L)	25.12±1.49	31.62±1.41	36.31±1.33	44.67±1.26	50.11±1.22	<0.001

Results were expressed as mean±SD and *geometric mean±SD. ANOVA test was performed to compare all the variables between normal SUA and hyperuricemia.

In table IV Pearson's correlation analysis showed that significant positive correlation between SUA

and TC, TG, LDL-C while negative correlation between SUA and HDL-C among all subjects (p<0.001). These correlations were also significant among male and female subjects. And also in all subjects there were significant positive correlation between SUA and serum ALT, AST, GGT (p<0.001).

increasing trend in levels of TC, TG, LDL-C, FPG as well as age, BMI, SBP, DBP except HDL-C which showed decreasing trend with increasing SUA level. Nearly similar pattern of observation was reported by two studies.[5,22] Following stratification based on the SUA level quartiles, it became clear that participants of both genders had higher

Table IV: Correlation of SUA (mg/dl) with TC, TG, HDL-C, LDL-C in study subjects (n=140)

Parameters	All subjects (n=140)		Male (n=70)		Female (n=70)	
	r value	*p*-value	r value	*p*-value	r value	*p*-value
TC (mg/dl)	+0.621	<0.001	+0.640	<0.001	+0.541	<0.001
TG (mg/dl)	+0.534	<0.001	+0.696	<0.001	+0.420	<0.001
HDL-C(mg/dl)	-0.549	<0.001	-0.446	<0.001	-0.617	<0.001
LDL-C (mg/dl)	+0.592	<0.001	+0.615	<0.001	+0.513	<0.001
ALT(U/L)	+0.656	<0.001	+0.580	<0.001	+0.633	<0.001
AST(U/L)	+0.678	<0.001	+0.607	<0.001	+0.653	<0.001
GGT(U/L)	+0.697	<0.001	+0.613	<0.001	+0.706	<0.001

Data were log transformed.
Correlations were determined by pearson's correlation co-efficient test.

Discussion

In this study it was observed that there was no significant age difference between male and female subjects. However, it was not consistent with the study done by Yang[21] who found a significant age difference between two groups. The study showed that BMI did not differ in between two groups. Similar results were observed by a Chinese study.[21] In this study, mean (±SD) SBP and DBP in mmHg of male differed to some extent from those of female (130.83±12.08 vs 125.71±13.89 and 87.50±9.66 vs 82.93±9.80, p<0.01). Similar observation was found in other studies.[5,21] It was evident from the study that participants with hyperuricemia as well as those in the highest quartile (Q4) of SUA within reference range had elevated lipid profile (TC, TG, LDL-C). The data of this study also revealed that there is a stepwise increase in lipid profile with increasing levels of SUA even within the reference range. Participants with increasing quartiles of SUA and hyperuricemia showed an

percentages of TC, TG, and LDL fat profiles as well as higher uric acid quartiles overall and in the hyperuricemic subgroup. Several researchers noticed almost identical results.[5,21] In line with previous research, the current study found that SUA was inversely connected with HDL-C in both genders and significantly and positively correlated with TC, TG, LDL-C, as well as ALT, AST, and GGT.[23] Additionally, our results suggested that a higher SUA is connected to a lipid profile on its own.

According to Zhang[24], elevated xanthine oxidoreductase activity might cause an increase in uric acid production, which can hasten the onset of nonalcoholic fatty liver disease (NAFLD). By encouraging the over-expression of pro-lipogenic enzymes such as sterol regulatory element binding proteins[25], elevated uric acid causes the buildup of triglycerides. Research indicates that reactive oxygen species are produced in tandem with the uric acid that xanthine oxidoreductase catalyzes. Thus, NAFLD development is caused by oxidative stress mediated by xanthine oxidoreductase.[26]

However, it has been reported that SUA is significantly associated with hypertension, obesity, CVD, hypertriglyceridemia and hyperglycemia which may increase the risk of MetS.[27] Moreover, SUA has been considered as a marker of oxidative stress associated with CVD[28] and MetS. MetS is therefore thought to have a significant impact on the onset or course of NAFLD. Increased blood uric acid levels have also been linked to the onset of nonalcoholic fatty liver disease (NAFLD), which can result in cirrhosis. According to certain research, uric acid levels and lipid profiles are highly correlated, and uric acid levels may be impacted by factors such as age, gender, smoking, alcohol use, obesity, and insulin resistance.[29] Our findings are supported by the study conducted by Baliarsingh[30], which shown that hypertriglyceridemia is significantly elevated when serum uric acid levels rise.

There is enough evidence to conclude that cardiovascular illnesses and hyperuricemia are related.[31–34] In addition to being linked to an increased risk of oxidative stress and the production of free radicals, hyperuricemia predisposes people to the development of hypertension and may eventually be the precursor to cardiovascular disease.[35] The study using animal models has demonstrated that uric acid significantly increases MCP-1 expression and release, macrophage infiltration, and the expression of the proinflammatory cytokine TNF-α in vascular smooth muscles. These events can ultimately result in smooth muscle atherosclerosis.[36–38] There are additional factors that raise a patient's risk of CVD in hyperuricemic individuals. Bendek presented one of the first studies demonstrating hypertriglyceridemia in hyperuricemic individuals, and further research has confirmed this correlation.[39] There is an inverse association between uric acid and HDL, according to several research. HDL negatively correlate with hyperuricemia led to a drop in HDL, which in turn increases atherosclerosis and ultimately put people at risk for CVD. LDL cholesterol is always regarded as bad cholesterol, and an increase in LDL causes atherosclerosis, which can results a variety of cardiovascular problems, including myocardial infarction and angina.[40–42]

In our study, it can be concluded that almost all the variables except HDL-C are increased with the increment of SUA level and hyperuricemia. Increased SUA is associated with elevated lipid profile (TC, TG, LDL-C) and also liver enzymes (ALT, AST and GGT) in adults and this association is independent of other confounding factors. Subjects in higher quartiles of SUA and hyperuricemia showed an increasing pattern of age with significantly higher BMI, SBP, DBP, FPG, TC, TG, LDL-C, ALT, AST, GGT and lower HDL-C. The variation of these parameters based on quartiles of SUA and hyperuricemia were almost similar in both genders. Pearson's correlation analysis showed positive correlation of SUA with TC, TG, LDL-C, ALT, AST, GGT and negative correlation with HDL-C among all male as well female study subjects.

Limitations

The present study shows an important correlation between lipid profiles and SUA in Bangladeshi adults. Moreover, adult Bangladeshis may have a decreased risk of associated cardiovascular disease if they do not have dyslipidemia or hyperuricemia. Further investigation that takes factors such as lifestyle, diabetes, and hypertension is needed to have a more thorough understanding of the study outcome.

Acknowledgments: The authors are grateful to the participants of the study.

Author contributions: Conceptualization, methodology and software by Manashe Chanda, Tapos Biswas and Nazia Tannim. Data curation, writing original draft preparation by Manashe Chanda, Md. Ashiqur Rahman and Sadia Islam. Data cura-

tion and writing original draft preparation by Manashe Chanda, Md. Ashiqur Rahman and Sadia Islam. Visualization and investigation by Nazia Tannim and Afsana Mahbub. Supervision by Manashe Chanda and Tapos Biswas. Software and validation by Sadia Islam and Afsana Mahbub. Writing, reviewing and editing by Md. Ashiqur Rahman and Manashe Chanda.

Conflict of interest: Authors have no conflict of interest to declare.

Ethical approval: This study was approved by the Institutional Ethics Committee of Sir Salimullah Medical College, Dhaka (SSMC/2019/194). All participants were informed about the study and they gave their written consent before inclusion in the study.

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Case Report

Unusual Presentation of Primary Hyperparathyroidism in a Young Girl: A Case Report and Review of Literature.

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Abstract

Primary hyperparathyroidism presenting as a severe bone disease in adolescents is rare. We herein report a case of 21 years old Bangladeshi Muslim female, initially presenting with progressive height loss, generalized weakness, gradual weight loss and then gradually developed large joint pain. Subsequent biochemical, radiographic & scintigraphic findings were consistent with primary hyperparathyroidism due to a parathyroid adenoma

Keywords: Hyperparathyroidism, Bone disease in adolescents, Parathyroid adenoma.

Received: 20.11.2023, **Accepted:** 05.12.2023.

Ad-din Sakina Women's Medical College Journal. 2024; 5 (1) : 38-42

Background

Primary hyperparathyroidism is a disorder of one or more of the parathyroid glands. It is the third most common endocrine disorder after diabetes mellitus & thyroid disease. The parathyroid glands become overactive & secrete excess amounts of parathyroid hormone. As a result, blood calcium rises to a level that is higher than normal. Population screening in the context of bone health has led to the identification of a new clinical entity, normocalcemic primary hyperparathyroidism (PHPT).[1] These patients have persistently elevated parathyroid hormone (PTH) levels despite normal serum calcium concentrations when causes of secondary hyperparathyroidism have been excluded. The incidence of PHPT is increasing with a rate of 42 in 100,000 per year. While in women over 60 years of age the average annual incidence approaches 190: 100,000 per year.[1,2]

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Case Presentation

A 21-year-old Muslim female with no known comorbidities was admitted in the Medicine ward of Uttara Adhunik Medical College Hospital on 24.02.22 with the complaints of generalized weakness for 1 year, progressive height loss of 1ft from 4.9 feet to 3.9 feet within 3 years, gradual weight loss of 15 kgs from 45kgs to 30kgs over 2 years & multiple large joints pain for 2 months which increases on movement but no associated stiffness. She does not give any significant family history.

On examination, she was markedly undernourished, short stature & had pigeon chest. Rest of her physical examination findings were unremarkable. Palpation of thyroid gland did not reveal a goiter or discrete thyroid nodule. Respiratory, cardiovascular & nervous system examination revealed no abnormality. Musculoskeletal system reveals no abnormality except pain of large joints on movement.

Laboratory investigation revealed as follows (Table I)

Table: I : Laboratory test results

Parameters	Test Result	Parameters	Test Result
Hb%	13.8 g/dL	**FT_4**	0.92mg/dL
ESR	15 mm in 1st hour	**HLA B-27**	Negative
TC WBC	6×10^3 / µL	**Anti-CCP**	0.9 (Negative)
TC RBC	4.8×10^6 / µL	**R.A/R.F test**	<8 IU/mL
TC Platelet	320×10^3 / µL	**S. Na^+**	138 mmol/L
S. calcium	10.3 mg/dL	**S. K^+**	3.0 mmol/L
Inorganic phosphate	1.8 mg/dL	**S. Cl^-**	106 mmol/L
Serum albumin	37 g/L	**S. HCO_3^-**	19 mmol/l
Alkaline phosphatase	2652 U/L	**S. urea**	13 mg/dL
25-OH Vit D	7 ng/mL	**S. creatinine**	0.49mg/dL
IPTH	>2500 pg/mL	**S. uric acid**	3.7mg/dL
S. TSH	4.24 µIU/mL	**GFR**	60 mL/min/1.73m²

TC; Total count, IPTH; Intact parathyroid hormone, GFR; Glomerular filtration rate, TSH; Thyroid-stimulating hormone, Anti-CCP; Anti-cyclic citrullinated peptide

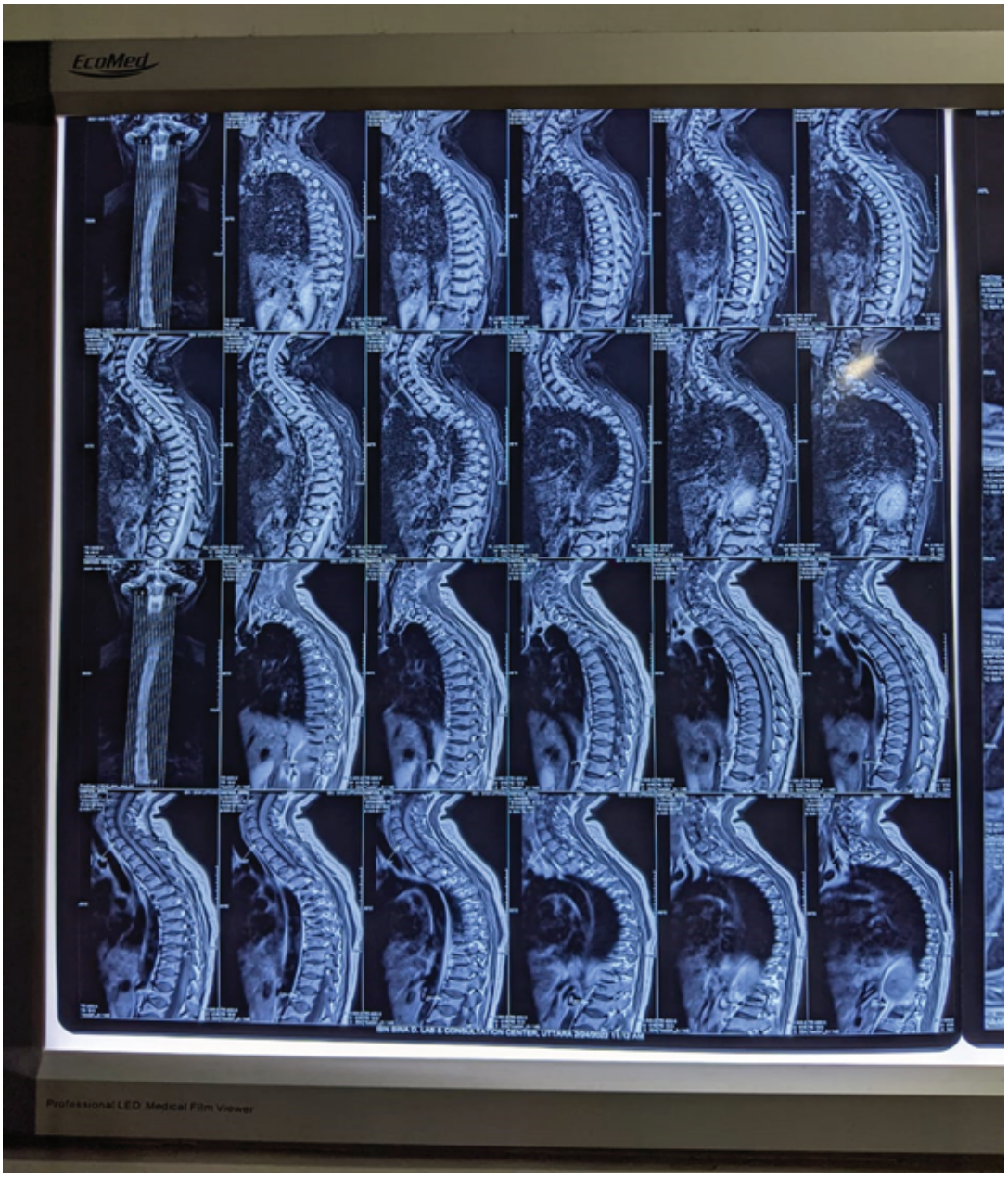
Bone densitometry of femur & spine by DXA showed osteoporosis with T score value: <-7.5 SD. Chest X-ray P/A view was normal. X-ray dorso-lumbar spine revealed diffuse osteopenia and multiple partially collapsed vertebrae, but the disc spaces were maintained with intact pedicles and apparently normal sacroiliac (SI) joints. Skull x-ray (both views) showed prominent trabecular markings with cortical thinning and mottled 'salt & pepper' or 'pepper-pot' appearance of cranial vault (Photograph 1)

Photograph 1: X-ray skull (both view)

USG of neck showed mildly swollen (28×12) mm right lobe of thyroid gland. USG of whole abdomen revealed multiple bright echogenic structures with posterior acoustic shadow within the lumen of gallbladder suggestive of cholelithiasis.

MRI of spine was suggestive of kyphoscoliosis at dorsolumbar region with variable degree of compression collapse at multiple dorsal & lumbar vertebrae. There were no evidence of disc herniation, neuroforaminal narrowing or canal stenosis (Photo 2). MRI of brain was unremarkable with diffuse thickened calvarium.

Contrast CT scan of abdomen showed generalized osteopenia, intracortical lucency / ground glass opacity was seen in ribs, vertebrae, pelvic bones



Photograph 2: MRI of spine

and sacrum. Subchondral bone resorption was also noted. Collapses of all dorso-lumbar vertebral bodies were seen (Cod-fish vertebrae). Fracture of superior pubic ramus was also noticed on the right side. Right renal calculus (2mm) seen in mid calyx. Tc-99m sestamibi scanning was positive for parathyroid adenoma within the right lobe of thyroid gland.

Considering the history, clinical examination findings and investigation reports, we diagnosed her as primary hyperparathyroidism most likely due to parathyroid adenoma. Before reaching the confirmatory diagnosis, we gave her symptomatic treatment that included non-steroidal anti-inflammatory drug (NSAID) for the joint pain, nutritional support for undernourishment, vitamin D injection for severe vitamin D deficiency and bisphosphonate for osteoporosis. Her symptoms improved slightly following the treatment. We also consulted neurosurgeon after the report of MRI of spine. After confirming the diagnosis by parathyroid scintigraphy test report, we transferred her to the department of ENT.

Discussion

The incidence rate of primary hyperparathyroidism varies from 34 to 120 cases per 100,000 individuals, and it increases with age. In any case, Primary hyperparathyroidism is relatively rare in the clinical setting. As a result, some clinicians have inadequate understanding of this disease, fail to make a timely and correct diagnosis, and are prone to misdiagnose. Because this disease mainly manifests as pathological fractures most patients are first diagnosed in the department of orthopedics or bone oncology, resulting in a high rate of delayed treatment or misdiagnosis.[3] So, once confirmed, timely excision of the diseased parathyroid glands is considered to be the most preferred method for the treatment of primary hyperparathyroidism with severe bone disease, rather than treatment of skeletal system disease only.[4]

The discussed case is a relatively rare case of multiple skeletal destructions in addition to primary hyperparathyroidism. This patient had longer duration and continuous bone destruction due to misdiagnosis. She already presented with indicative bone manifestations in imaging scans and bone deformities. Therefore, the potential pathological mechanisms underlying bone destruction in primary hyperparathyroidism patients should be further explored. In patients suffering from primary hyperparathyroidism over a long-term period, it always co-exists with severe vitamin D deficiency, which could have devastating consequences on the skeleton as seen in this very case.[5,6]

This degree of severity of skeletal disease in the Asian population affected by primary hyperparathyroidism has consistently been observed across various studies from the region. A study from India showed that bone pains and painful proximal myopathy were the commonest presentation (47%), followed by pathological fractures in 23.5% cases.[7]

Conflicts of interest

The authors declare no conflict of interest regarding the publication of this paper.

Conclusion

In conclusion, primary hyperparathyroidism should be kept in mind in all patients presenting with longstanding history to bone problems, from simple bone pain to severe bone disease and hypercalcemia. Elevated serum levels of PTH confirm the diagnosis.

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