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Contents

ESSENTIAL SOFT SKILLS FOR DOCTORS

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"The practice of Medicine is an art, not a trade; a calling, not a business; in which your heart will be exercised equally with your head" – Sir William Osler 1849-1919.

Around the globe doctors are considered as gifted human beings. They have exceptional memory to retain a lot of information that need to be stored perfectly and be retrievable swiftly. All this is commonly required under extremely stressful conditions. They are altruistic and they have been known for sacrifices of family lives and at times their own lives. They remain consciously focused on improving their technical skills by taking examinations and attaining degrees and diplomas. The system in this part of the world is such that certain skills remain under focused among the doctors. These skills if acquired in early career become part of the personality and would help all professionals in making their journey of life enjoyable and smooth.

Patients have their fears about the outcomes of their illnesses, they are worried about being embarrassed, hurt and they are worried about the financial implications in the form of cost as well the loss due to absence from work. For all these issues they look up to their doctors and expect to be looked after and the doctors do so. Certain soft skills, if developed by the doctors, would have significant impact not only on the outcome of the patients but also put a halt to process of ethical decay of the profession.

Soft Skills for Doctors

Young doctors are empathetic and caring about their patients. But somehow, they avoid leadership roles, face difficulty in getting connected to the staff and at times lack warmth towards patients, colleagues and their own families. The soft skills that are being mentioned here are easy to learn. These need practice from early career and their impact is fabulous. These are:

1. Empathy

Empathy not only improves job satisfaction, but can help in preventing burnout. You can decipher the reason why 'You' were chosen to be in this profession if you are compassionate. Doctors have to be empathetic towards their patients, colleagues and above all their own families. Feeling so is important but communicating this feeling is even more important because only Allah knows what is in your heart. Listening to people and addressing their concerns earns trust and goodwill. They follow the treatment plans well, which improves the treatment outcomes.[1]

2. Work Ethics

Adhering to the official timings, positive attitude, will to contribute to the best of ones' capabilities, spirit to learn and grow and being dutiful is being ethical. Long tiring working hours and surprises on a daily basis are norms in this profession. The force of strong work ethics helps us sail through this rough ocean. This also keeps us motivated to excel technically in our specialties.[2]

3. Communication Skills

Doctors need effective communication skills. They have to master this skill keeping in mind the variety of people that they come across daily. Clear explanation of the patients' conditions to the patients and attendants is required on regular basis. Sound communication leads to patients' satisfaction, trust and improved compliance to treatment.[3] Clear communication with staff and teams lead to improved performance and avoids confusions. Use of proper verbal, paraverbal and non-verbal components of communication leave positive lasting effects. As the doctors move up the hierarchy, they have to focus more on listening skills so that the communicators feel that they have been listened to.

4. Stress Management

A sound patient care comes from a relaxed mind.

Keeping appropriately cool under stressful conditions is important because pressure leads to blurred mind which impairs decision making. A doctor has to be in a state of perfect physical and mental health to give the best output. Under extreme stress, the decision to take a break is very important to avoid irreparable damage. Doctors have to know the limits of the profession and explain this to the patients and attendants. A sound soul is backed by a sound body which needs ample sleep, regular exercise and proper time management.[4]

5. Emotional Intelligence

Emotions influence our lives as doctors, as patients and as attendants. Self-awareness recognizes when your mental state is affecting your competence. Emotional perception enables you to accurately identify various emotions both in yourself and in others. Emotional understanding enables you to understand the influence of emotional state on your decisions and others. Emotion management leads to self-control to avoid the influence of our emotional state on our judgement and decisions. Emotion utilization would help doctors in using their emotional states to improve their working and the emotional states of others to improve team work.[5]

6. Team Work

Doctors are expected to perform in teams. Learning to work in teams is one of the important soft skills to be learnt. Each team has a leader while rest have to follow the instructions of the leader. Working in teams improves clinical care. In teams people share and learn from each other's experience. Teamwork significantly reduces the chances of errors through collective wisdom. The team feels much more confident when they work together. Tasks are divided hence the assignment is completed easily. A positive rapport with team members results in improved patient care. In teams, people learn much faster than learning in isolation.[6]

7. Presentation Skills

Presentations are part and parcel of medical profession. To be an effective professional, one needs to learn these and they make a lot of difference. Good presentation skills are backbone of multidisciplinary management of patients, because to convey your point and convince your colleagues for a plan you do need a convincing presentation style. This soft skill needs to be learnt and practiced again and again.[7]

8. Leadership

Every doctor has to learn to be a leader. A leader motivates his team members so that they can work to the best of their capabilities. A leader is expected to discuss with his team members and improve the quality of care through feedback. Frequent interactions as a leader result in improved confidence of the team.[8] Some are born leaders but most have to be made through formal courses like MBA and MPH. Doctors intending to be in leadership roles should undertake such courses and will enable them to perform better. This is true both for health care administrators and specialists.

9. Reflection & Feedback

Mastering the arts of reflection and feedback improves the performance of doctors. Reflection is an everyday learning tool of doctors. It helps in gaining new insights into our daily experiences. A reflective diary is great help for others as well. Being observed and getting feedback triggers reflection in action skills modification. Feedback improves knowledge, skills and above all attitude of doctors. Effective feedback has to be timely, specific and focused on objective behaviours. These soft skills are essential to develop early on.[9]

10. Growth Mindset

Anticipating, accepting and preparing for change is the biggest challenge in all professions. This comes from a growth mindset. One can only enjoy the change if the professional has adequately covered the 1st three steps before change. Growth in all spheres of professional and personal life is essential. But a very important growth is that a doctors should add on to humility as they grow in their profession. This will not only make them bigger in the eyes of others but will also enhance the impression of the profession.[10]

Conclusion

As the human beings grow, they develop certain skills naturally. Learning continues in all professions. Like technical skills, soft skills could also be learnt and polished. Enabling doctors to develop certain soft skills make their journey through the profession easier. A will to improve and inculcation of growth mindset would help doctors in striving to be better professionals and human beings. So, keep growing! keep learning!.

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EPIDEMIOLOGICAL FACTORS OF THALASSEMIA IN PATIENTS REPORTING TO THE THALASSEMIA CENTRE IN ISLAMABAD

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ABSTRACT

Objective: *To identify the epidemiological factors of thalassemia in patients reporting to the thalassemia center of Islamabad.*

Design: *Descriptive cross-sectional study.*

Place and Duration: *The study was carried out in the thalassemia center of PIMS, Islamabad, from February to November 2022.*

Materials and Methods: *A descriptive cross-sectional study was carried out on 200 patients reporting to the thalassemia center of PIMS Islamabad, with the help of a self-structured questionnaire. The sampling technique used was non-probability convenience sampling.*

Results: *In this study, 74% of patients were found to be the products of cousin marriage and 77% had a trend of consanguinity in their families. The most common blood group was B+ (36%), followed by O+ (28%). Awareness about risk factors of thalassemia was unknown to 42% of the parents. While 91% of parents had no knowledge about prenatal and premarital screening before the conception of the affected child.*

Conclusion: *Consanguinity and lack of awareness about the disease were the two major risk factors of thalassemia. These risk factors are inescapable due to low socioeconomic position and lack of information about premarital and prenatal screening.*

Keywords: *Consanguinity, Risk Factor, Screening, Thalassemia*

INTRODUCTION

Thalassemia is a set of hereditary hemoglobinopathies caused by abnormalities in the autosomal recessive inheritance of the globin chain of hemoglobin. Unbalance in formation of the globin chain impairs the generation of healthy hemoglobin A and reduces erythropoiesis.[1] Various kinds of this illness exist, the most common among these variants are alpha and beta.[2] In Pakistan, ß- thalassemia is one of the most prevalent hemoglobinopathies with 5.4% carrier frequency. Between 1.5% and 7.5% of people have ß-thalassemia. The Khyber Pakhtunkhwa (KP) province, which is close to the Afghan border, the southern areas of the country, and the region along the coast of the Arabian Sea all have high rates of disease.[3]

Approximately, 1.5% of the total world population, are thalassemia carriers. In Southeast Asia, rates of thalassemia carriers are comparatively high as well as it is prevalent in most parts of the region. Historically, the prevalence of thalassemia in the Middle East has been high due to the higher thalassemia carrier rate as well as the inclination for consanguineous marriages. However, numerous nations, in the past decade, have introduced and implemented preventive measures thus diminishing the prevalence of thalassemia in the region.[1]

One significant non-biomedical element that causes thalassemia families, to experience severe social, economic, and psychological issues is the lack of information and knowledge about the condition.[4] The two most frequently mentioned biomedical risk factors

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for thalassemia are high-risk marriages i.e., couples possessing genetic abnormalities, and consanguineous marriages. According to a study, it is advised that young adults should be targeted and made more aware of thalassemia and its effects to reduce marriages among carriers and the prevalence of such diseases. In Saudi Arabia, consanguineous marriage is a major risk factor for the occurrence of thalassemia. However, prevention is less expensive than therapy in the long run, therefore following actions are potential parts of the preventative strategy. Most important is to identify disease carriers as well as educate those thalassemia carriers regarding the perils of having a child with thalassemia and how to lessen it, which would reduce the number of afflicted childbirths and deaths. Secondly, prenatal diagnosis of couples carrying afflicted children, advising them of the 25% chance of recurrence and encouraging them to minimize family size, which may lower the incidence of births. Along with this, the third important action is the screening of potential carriers across the board. Population screening is beneficial in nations having a relatively higher percentage of consanguineous marriages since it is affordable.[5]

Results of a study showed that cultural risk factors (religious restrictions regarding disease prevention and screening, a strong emphasis on consanguinity), socioeconomic risk factors (lack of social and financial support, sympathetic attitude of doctors and paramedics), and disease-related risk factors (lack of blood and medicine availability, inadequate healthcare system) are among the main risk factors associated with beta-thalassemia major. The study suggests placing a lot of focus on raising parental knowledge of the value of patient screening and counseling. Major beta thalassemia is seen as a susceptible hazard, typically for those from lower socioeconomic backgrounds. Pakistan was ranked 113th out of 120 countries in a 2012 UNESCO study on education, which amplified the poor state of education in our nation. The main barrier to thalassemia awareness and counseling has resulted from this. The inability of the general public to comprehend the technical terms used by health specialists and researchers, language barriers, a lack of access to technologies, and a lack of knowledge of medical information are all barriers to successful communication.[6] This research paper assesses the risk factors associated with thalassemia.

METHODOLOGY

A descriptive cross-sectional study was carried out on patients reporting to the thalassemia center of the Pakistan Institute of Medical Sciences (PIMS), Islamabad from February 2022 to November 2022, after receiving permission from the ethical review board of the institution. The sample size was 200, calculated by Epi Info. The sampling technique was non-probability convenient sampling. Participants of the study were the parents/guardians of patients. Parents of diagnosed thalassemia cases who reported to the thalassemia center PIMS and duly answered the questions were included. Those with interposed language barrier, who refused to participate and incomplete questionnaires formed part of exclusion criteria. The content of questions was verbally explained and oral consent was taken from everyone who participated. The participants were assured of the confidentiality of their responses. A self- structured questionnaire containing 16 questions was used as data collection tool. The questions were asked individually to each participant in such a way that a layman can understand and answer according to his/her knowledge and answers were simultaneously written on the questionnaire. SPSS version 25 was used for data analysis. Mainly descriptive statistics have been reported.

RESULTS

Out of 200 patients, 105 (53%) were males and 95 (47%) were females in age group of 10 ($\pm$ 4) years with mean hemoglobin levels of 6.3 gm/dl ($\pm$ 1.3). According to the data collected, majority of the parents were from Punjab (52%) and KP (23%). Fathers of 42% of the patients had private jobs, 33% being self-employed and rest of them having government jobs or running a business. Thalassemia was found to be more prevalent in people of lower socioeconomic status (82%) of the cases. Refer to (Figure 1).
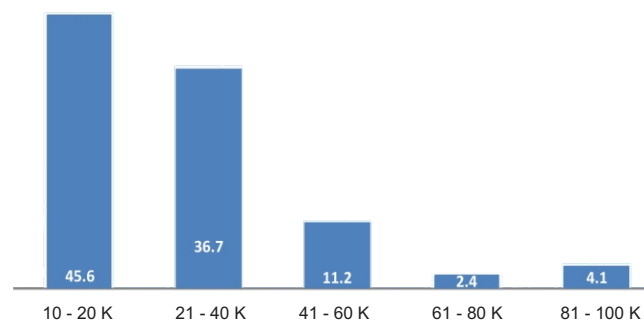
Figure 1: Monthly income of father (PKR)

Consanguinity was proven to be the major risk factor of thalassemia as 148 (74%) of the parents recorded were in cousin marriages out of which (77%) were having trend of cousin marriages in their families (Figure 2). In the current study, family history of thalassemia was found to be 28%. (Table I and II).
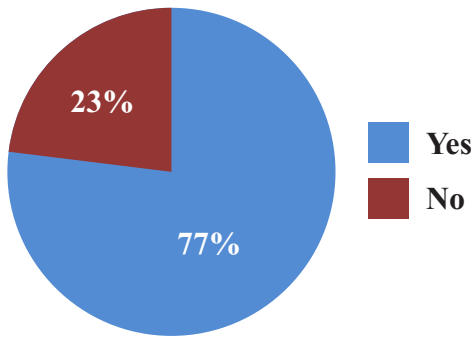
Figure 2: Trend of cousin marriage

Table I: Maternal Family History of Thalassemia

Response	Frequency	Percent
Yes	56	28.0
No	144	72.0
Total	200	100.0

Table II: Paternal Family History of Thalassemia

Response	Frequency	Percent
Yes	54	27.0
No	146	73.0
Total	200	100.0

Thalassemia showed prevalence in particular blood groups, being more common in B+ blood group, 72 out of 200 (36%) and O+ blood group, 57 out of 200 patients (28%). Refer to (Figure 3).
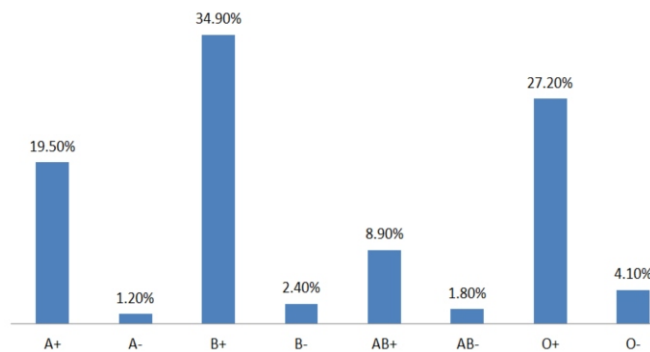
Figure 3: Blood group of the patient

Majority of the parents having low education status had no knowledge about screening of thalassemia prior to conception (Table I and II). Parents, not having awareness about any one of the risk factors of thalassemia, accounted for 42% of the total with 91% of them having no knowledge about premarital and prenatal screening.

Table III: Education of father and awareness about screening of thalassemia before conception

Variable		Did you know about screening of thalassemia before conception?		
		Yes	No	Total (%)
Education of father	Illiterate	4	32	18
	Primary	2	54	28
	Secondary	11	80	45.5
	Bachelors	1	12	6.5
	Masters	0	4	2
Total (%)		9	91	100

Table IV: Education of mother and awareness about screening of thalassemia before conception

Variable		Did you know about screening of thalassemia before conception?		
		Yes	No	Total (%)
Education of mother	Illiterate	7	67	37
	Primary	5	57	31
	Secondary	6	43	24.5
	Bachelors	0	12	6
	Masters	0	4	1.5
Total (%)		9	91	100

DISCUSSION

Globally, thalassemia is a severe public health concern, particularly in South Asian nations where illnesses like thalassemia are not prioritized by the health systems due to their inefficiency and lack of usable resources. This study focuses on investigating the risk factors of thalassemia in patients reporting to the thalassemia center in Islamabad. Consanguineous marriages increase the birth prevalence of autosomal recessive disorders like thalassemia.[7] In our study of 200 participants consanguinity has shown to be a substantial risk factor for thalassemia, with 148 (74%) of the parents being recorded in cousin marriages, and 77% of them having a family trend of cousin marriages. These results are in line with another study where-in 81.7% of patients were the outcome of consanguineous marriages.[8]

The parent's literacy level has a beneficial influence on how they handle the illness or utilize prenatal screening to determine the risk of thalassemia in pregnancy. In this study, 91% of parents did not have knowledge of premarital and prenatal screening and these findings are comparable to another study from university in Ajman, UAE which revealed that 92.7% participants acknowledged the significance of screening tests.[9] Since parents have the role of guardians and care providers therefore, they are the ones to have all the information and knowledge about the prevention, causation,

diagnosis, progression and management of the disease concerned. The most crucial role in this context is played by parents who must possess sufficient knowledge about the causation and progression of thalassemia. According to several surveys, Pakistan's low literacy rate is the biggest barrier to population awareness.[10]

The disease under discussion is very much common in rural areas and in low socioeconomic class which could be due to the fact that people of these areas are not literate as compared to urban areas and hence they do not know much about public health practices and preventive measures offered and available to urbanized communities. Consistently researches have emphasized the importance of education and pointed out that due to lack of it, people remain uninformed about the manner of causation of diseases. This study found that 82% of parents belonged to low socio-economic class and similar prevalence of thalassemia in rural areas was shown by study conducted in Pakistan which revealed that out of 317 surveyed parents, 196 (69%) were from rural areas.[11]

CONCLUSION

Consanguinity and lack of awareness about the disease were the two main risk factors of thalassemia. Thus, there is a dire need to educate the general public about the disease, its risk factors and the significance of premarital and prenatal screening. This study will help health policymakers to mitigate the risk factors of thalassemia and raise awareness about screening tests available for the disease.

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VALIDATION OF THE COVID-19 SCREENING TOOL AND CLINICAL-EPIDEMIOLOGICAL CHARACTERISTICS OF CONFIRMED COVID-19 PATIENTS AT FAUJI FOUNDATION HOSPITAL RAWALPINDI

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ABSTRACT

Objectives: *To assess clinical and epidemiological features of COVID-19 patients at Fauji Foundation Hospital and to validate COVID-19 case definition devised by WHO.*

Study design: *Cross Sectional Validation.*

Study Place: *Fauji Foundation Hospital Rawalpindi.*

Study Duration: *June 2020 to January 2021.*

Sample Technique & Size: *Purposive sampling of 836 COVID-19 suspected cases as per definition.*

Methodology: *Clinical and epidemiological features of COVID-19 positive patients were assessed along with validation of case definition of COVID -19.*

Results: *Four hundred and ninety-two (58.9%) of study population were females, 507(60.7%) were non health care workers. Hypertension and diabetes were a comorbidity in 184(22%) and 507(60.7%) of patients respectively. The WHO questionnaire validation revealed 63.6% sensitivity and specificity of 56.6%. After screening , positive predictive value of 75.7% and negative predictive value of 42.2% was attributed to the screening tool.*

Conclusion: *Keeping in view the high prevalence as well as variety of clinical symptoms of COVID 19 and its unpredictable fatality behaviour in Pakistani population; the WHO tool left much to be changed in case definition to improve the sensitivity and specificity besides predictive value of its recommended current screening tool.*

Keywords: *Case Definition, COVID-19 Screening, Validation*

INTRODUCTION

A century after the Spanish flu caused mayhem by fatally affecting one third of the world's population, infecting five hundred million people in four sequential waves,[1] the world is once again under the rampage of another global pandemic. COVID-19, originating from Wuhan, China in December 2019 spread far and wide via infected respiratory droplets; the viral disease was considered initially to have been transferred to humans from the horseshoe bat.[2]

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Worldwide, the number of cases surged, having touched the 680,206,721 mark in February 2023; with over 653,025,677 recoveries and more than 6,801,721 deaths.[3] The recorded number of patients of COVID-19 in USA were more than 190,340,817 with people dying due to disease being over 1,012,461.[4] Till date there are 44,686,879 cases of COVID-19 reported from India with 530,772 deaths.[5]

Pakistan is a developing country of 224,206,949 population with minimal resources. The burden of COVID-19 cases has been over 922,824, with nearly 20,850 deaths till 12th June 2022.[3]

Clinical criteria for diagnosis of this novel virus is set to be typical presentation of flu like symptoms with fever, cough, sore throat, breathlessness, generalized body

aches and fatigue, while atypical symptoms being diarrhea and fever. Common neurological symptoms include loss of taste and smell. According to CDC Clinical Criteria for COVID-19 is sudden onset of fever and cough. Epidemiological criteria includes those living / working in high risk areas, especially health care settings, closed office spaces like banks with high public interactions and temporary domiciliary settings like camps and those who are in contact with cases within incubation time.[4,5]

Many asymptomatic cases fall short of epidemiological criteria. People who are contacts without any symptoms having positive SARS-CoV-2 Antigen-RDT are considered as cases/carriers.[6,7]

Due to unavailability of definitive treatment, the most potent way to control this pandemic is accepted to be early detection of COVID-19 disease and speedy isolation of cases.[8] The reverse transcription polymerase chain reaction (RT-PCR) or gene sequencing from blood and nasal or pharyngeal secretions are the diagnostic methods recommended by the Chinese government for the confirmation of COVID-19 infection. The entire positive RT-PCR rate of these throat swab samples is approximately 30% to 60% legitimate while there are shortcomings in sample collection, transportation, and kit performance.[9] Low sensitivity of RT-PCR is leading to under diagnosis of COVID-19 patients, who may not receive proper management in time. Diagnosed patients are tip of iceberg and these subclinical patients contribute a huge risk for infecting more people. Under scarce resources, physicians have a large burden to treat this heavy number of patients for COVID-19 screening. For early diagnosis and prompt treatment, screening test should be cost-effective.[10]

Due to the shortage of testing kits, trained personnel, and Personal Protective Equipment (PPE), it is difficult to test every approaching person having flu-like symptoms for COVID-19.[11] The procedure of selecting suspected cases for investigating COVID-19 can be simple to prevent a financial catastrophe at health centers.[12] To reach this goal, the screening process is continuously being revised and is diverse in different countries.

Only testing people with respiratory symptoms such a fever, dry cough, shortness of breath, or a history of virus exposure was advised by the Centre for Disease Control and Prevention (CDC). Based on statistics of community transmissions, the CDC modified its recommendations on March 4, 2020, allowing anyone with respiratory symptoms to get tested with a doctor's approval.[12]

According to the World Health Organisation (WHO), a patient with severe acute respiratory illness (fever and at least one sign/ symptom of respiratory disease, such as cough, shortness of breath requires hospitalization. Travel history to an area with a high number of COVID-19 patients, asymptomatic patients with history of contact are all risk factors for COVID-19.[13, 14]

The aim of this study was to validate the COVID-19 assessment forms used by hospitals in Pakistan to filter COVID-19 patients. This is ultimately expected to lead to confirming the utility and reliability of case definitions used for suspected cases while reducing need for resource intensive lab tests for Preliminary diagnosis of COVID-19.

This would also help explore clinical and epidemiological features of confirmed COVID-19 patients reporting to tertiary care hospital in Rawalpindi to assess the local clinical profile of confirmed COVID-19 cases in Pakistan.

METHODOLOGY

Purposive sampling was used to conduct a validation study on suspected COVID-19 patients who visited the Fauji Foundation Hospital between June 2020 and January 2021.

A sample size of 836 was estimated using a screening tool's sensitivity of 76%, specificity of 68%, and local COVID-19 prevalence of 6%. Based on the case definition published by the Government of Pakistan on March 27, 2020, a questionnaire was created to screen out patients who may have COVID-19 infection.

Seventeen nasopharyngeal swabs from patients who were suspected of having COVID-19 were sent for PCR analysis, and the results were then followed up. Patients were divided into asymptomatic, mild, moderate, severe, or critical cases on a clinical basis, and the choice to admit them was made in accordance with this clinical categorization.

Epidemiological characteristics of COVID-19 PCR positive patients were also studied.

Clinical feature included presence of fever, cough, chest pain, shortness of breath, diarrhea, smell taste loss, sore throat, flu and pneumonia.

Data analysis was done in SPSS 26. Sensitivity, specificity, positive and negative predictive values of case definition were calculated and ROC curve was drawn to assess validity.

RESULTS

Data of 836 COVID-19 PCR positive patients were included in final analysis. Epidemiological features of these patients are given in Table I:

Table I: Epidemiological features of COVID-19 patients

EPIDEMIOLOGICAL FEATURES	N (%)
Age (Mean +/- SD	43.42 ± 17.58
Gender	
Male	344(41.1%)
Female	492(58.9%)
Job description	
Health care worker	329(39.3%)
Non Health care worker	507(60.7%)
Contact history with known patients	
Hospital	184(22%)
Home	162(19.4%)
Workplace	129(15.4%)
No history	361(43.2%)
Co morbids	
Hypertension	184(22%)
Diabetes	178(21.3%)
Ischemic heart disease	108(12.9%)
Cancer	84(10%)
Kidney disease	62(7.5%)
Asthma/COPD	64(7.7%)
Tuberculosis	60(7.2%)

1. Four hundred ninety nine (59.7%) patients were found to be positive on screening test. Cases were classified according to severity into asymptomatic, mild, moderate and severe COVID-19 as given in Table II. Among COVID-19 positive patients majority, 614(73.4%) were sent for home isolation.

Table II: Frequency of COVID 19 clinical Severity in total PCR positive patients

CLINICAL SEVERITY CLASSIFICATION	N (%)
Asymptomatic	481(57.5%)
Mild COVID-19	266(31.8%)
Moderate COVID-19	78(9.3%)
Severe COVID-19	10(1.2%)
Severe COVID-19 with complications	1(0.2%)

Clinical features of patients considered for evaluation as falling on the COVID-19 case definition spectrum were varied . These are given in table III.

Table III: Clinical features of COVID-19 positive patients

Clinical features	N (%)
Fever	
Afebrile	403(48.2%)
Low grade	388(46.4%)
High grade	45(5.4%)
Cough	
Present	472(56.5%)
Flu	
Present	391(46.8%)
Sore throat	
Present	379(45.3%)
Myalgia	
Absent	348(41.6%)
Mild	473(56.6%)
Severe	15(1.8%)
Diarrhea	
Present	252(30.1%)
Pneumonia	
Mild	86(8.3%)
Severe	10(1.2%)
Headache	
Present	183(21.8)
Chest pain	
Present	379(45.3%)
Shortness of breath	
Absent	614(73.5%)
Mild	201(24%)
Moderate	15(1.8%)
Severe	6(0.7%)
Vomiting	
Present	444(53.1%)
Loss of taste	
Present	427(51.1%)
Loss of smell	
Present	409(48.9%)

2. Case fatality rate was found to be 9.5%. Among 80 deaths 51.2% (41) were males. Case fatality rate was found to be highest in age group 65-75 years (32.5%) followed by 30% in 55-65 years of age range.

3. For validation of the clinical criteira used as primary screening tool vs PCR test used as gold standard, sensitivity of screening questionnaire was 63.6% and specificity being 56.6%. It came with a positive predictive value of 75.7% and negative predictive value

of 42.2%.

When plotted on ROC, area under the curve was 0.399(0.35-0.44) pointing at poor screening capability of clinical questionnaire for COVID-19. This validity is especially important to be raised for cost effective and safe screening tool of a rapidly progressive and fatal disease especially in filter clinics.
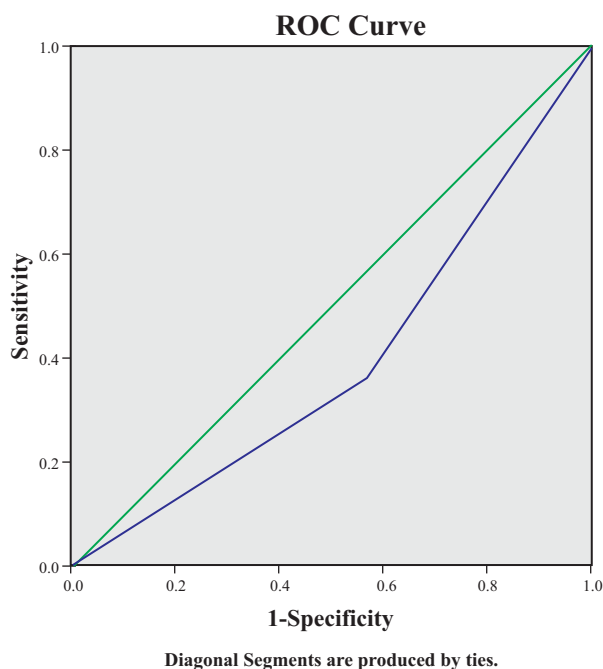

Fig 1: ROC curve for the clinical criteria based screening tool for COVID-19

DISCUSSION:

COVID-19 affected Pakistani population rapidly. The disease quickly spread to multiple countries in the world causing serious illness, and constant human-to-human transmission made it a worldwide Public Health Emergency of International Concern.[19]

Globally COVID-19 caused tremendous burden on the healthcare system. For timely implementation of effective public health response measures and surveillance , natural history of disease must be studied completely.[20]

Our study primarily focuses on clinical and epidemiological features of COVID-19 and validation of screening questionnaire in Pakistani context. Demographic profile of study population showed females to have been affected more than males(58.9% Vs 41.1%). This is almost reverse of findings of a research from Wuhan, China, which found that 56% of COVID-19 patients were men.[21] and another study by

Tahir in East Karachi showing 64.6% males were affected.[22] This gender differential was more obvious in a study done by Ahmed M et al on multicenter retrospective data showed male predominance (80.9%).[23] Another study done by Farrukh G in Rahim Yar Khan showed 58% males are affected by COVID-19.[24] Males are naturally assumed to be at risk for severe disease and deaths due to COVID-19 owing to their exposure outside home.[25]

Out of 836 cases, approximately 614(73.4%) were sent for home isolation as compared to study by Tahir[22] in East Karachi, were 58% were sent for home isolation. That might be due to more asymptomatic patients in our study population which were 57% of total sample while there were only 9.0% (n=37) asymptomatic patients in the study at Karachi.

The clinical signs of COVID-19 range from asymptomatic or mild symptoms to severe illness and/or death. Most common presentation were myalgia 58%, cough 56.5%, vomiting 53%, fever 51.8%, loss of taste 51%. In contrast with study by Huang et al and Zheng Y et al in which most common presentation was fever (96%, 86%).[26,27] Pakistani population responded to infection through a wider range of clinical symptoms.

Approximately half of study population 361(43.2%) gave no history of contact and 184(22%) reported hospitals as contact history while in study by Tahir[23] about 89.3% of patients in study had positive history of exposure to cases and study by Zheng Y et al showed 49% gave history of contact with COVID-19 positive patient.[27]

Comorbidities such as diabetes, heart disease, hypertension, or other chronic conditions might make the patient's presentation and sequelae more problematic[23] most common co morbid condition reported in this study were hypertension 22% and diabetes 21%. Tan S C in China[20] found 51% patients were hypertensive and 21% were diabetic among those screened for COVID-19. Diagnosis of false positive in COVID-19 can cause useless self-isolation and can lead to mental and financial issues. Diagnosis of false negative in COVID-19 can result in spread of virus. The reference standards for evaluating the accuracy of screening strategies may include viral detection tests, such as standard RT PCR and clustered regularly interspaced short palindromic repeat.[28]

In present study, definition of suspected case initially given by WHO and then adopted by Government of Pakistan was validated as screening tool for filtering of

patients. This comprises of clinical features of COVID-19 including fever, chest pain, shortness of breath, cough etc. with history of travel. This approach is similar to Epidemiological and clinical factors being used by EPICOVID study in Italy; to test COVD-19. The two-phase EPICOVID19 study, which began in April 2020, involved a convenience sample of 201,121 Italian individuals. With the help of 38 questions, the Phase I questionnaire looked into six different domains, including socio-demographic factors, clinical evaluation, personal characteristics, and health status. It also asked about housing conditions, lifestyle, and behaviours after the lockdown.[15]

For adults aged 18-84 years, the cutoff score was 2.56 (sensitivity:76.56%; specificity:68.24%) for Nasopharayngeal swab positive subjects as compared to our study in which sensitivity was 63.6%, specificity of 56.6%.[15] Sensitivity of current study was much less than previous study that might be due to increased influx of asymptomatic patients out of fear only.

Conclusion:

COVID-19 clinical case definition poorly screened all COVID-19 positive patients due to the multiple and varied clinical features in our study population. Clinical agreement needs to be sought to adapt the case definition locally for cost effective screening.

Limitations:

Small sample size and limited scope ,due to single centre study so results can not be generalized.

Funding disclosure:

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NOVEL HEMATOLOGICAL MARKERS NEUTROPHIL TO HEMOGLOBIN LYMPHOCYTES RATIO AND PLATELETS TO LYMPHOCYTES RATIO AND ITS ASSOCIATION WITH THE DISEASE ACTIVITY IN RHEUMATOID ARTHRITIS

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ABSTRACT

Objective: This study was done to find out the role of two new markers Neutrophil to Hemoglobin and Lymphocytes ratio (NHL) and the Platelet Lymphocytes ratio (PLR) in ascertaining the activity of disease in rheumatoid arthritis.

Design: A retrospective cross sectional study.

Place and Duration: The study was carried out on 290 patients in the Rheumatology outpatient department of Federal Government Polyclinic Hospital, Islamabad. The data under study was taken from Dec 2020 till June 2021.

Methodology: DAS28-ESR was calculated using the DAS28-ESR calculator and NHL & PLR were calculated.

Results: There were 238(82.1%) female and 52 (17.9%) male participants. The mean age of patients was 45.2± 12 years. Out of the 290 participants, 22.8% had inactive disease (<3.2 DAS28 score) while 77.2% had active disease (>3.2 DAS 28ESR). The spearman's rho analysis found a significant positive correlation between the disease activity score and the NHL and PLR (p<0.001). The receiver operating curves (ROC) for the NHL was 0.736 (95% Confidence Interval (CI):666–0.807, p < 0.001) , 0.672(95% CI:0.597-0.747, p < 0.001) for PLR and 0.756(95% CI: 0.687-0.824, p < 0.001) for ESR respectively.

Conclusion: Both NHL ratio and PLR can be used as a cheap and easily measurable tool for disease severity assessment in rheumatoid arthritis patients.

Keywords: Rheumatoid Arthritis (RA), Neutrophil to Hemoglobin and Lymphocyte Ratio (NHL), Platelet to Lymphocyte Ratio (PLR), Disease Activity score ESR (DAS28-ESR)

INTRODUCTION

Rheumatoid arthritis is a common yet one of the most disabling disease amongst the autoimmune inflammatory diseases. Being an inflammatory disease it is bound to cause long term morbidity to the patients if not treated promptly and properly.[1] The degree of severity of inflammation is commonly assessed by the markers like sedimentation rate of the erythrocytes (ESR) and C-reactive protein (CRP) in day to day routine, but they alone are not sufficient to label the person as having high disease activity. Clinical assessment of painful, tender and swollen joints alongside the inflammatory markers is used to assess Disease activity score-28 (DAS28 CRP/ESR) and is used commonly as a severity index to monitor the disease and modify treatment accordingly.[2]

There is inclination towards identifying newer and cheaper biomarkers for the measurement of the disease activity. A lot of research is being done on utilizing simple blood complete picture and the different hematological indices for assessment of disease severity. The most commonly used ones are neutrophils to lymphocyte ratio (NLR)[3] red cell distribution width (RDW)[4] and the mean platelet volumes (MPV)[4] in

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different studies done throughout the world. The chronic inflammatory process in rheumatoid arthritis leads to changes in the neutrophils, lymphocytes and platelet counts as well as anemia of chronic disease. So, utilizing these simple entities can help in assessing the disease severity.

Platelets are pro inflammatory and they interact with leukocytes to bring about systemic as well as joint inflammation.[5] Platelet to lymphocyte ratio is obtained by dividing the platelet count by the lymphocyte count and it has been used as an inflammatory marker in rheumatoid arthritis as well as in other diseases like ankylosing spondylitis,[6] Systemic lupus erythematosus,[7] other inflammatory disorders like Crohn's disease, ulcerative colitis[8] and acute disorders like myocardial infarction.[9]

Neutrophils are the most important part of the inflammatory process going on in the body due to any systemic illness including rheumatoid arthritis. They release proteases, products of oxidative stress and prostaglandins thus leading to inflammatory process and ultimately damage the joints. There is relative neutrophilia and lymphocytopenia and thus a disturbed neutrophil to lymphocyte ratio. This was previously studied as a marker of severity of disease evidenced by degree of inflammation.[10] Also anemia because of chronic inflammation is commonly seen in rheumatoid arthritis so recently a new marker neutrophil to hemoglobin and lymphocyte score/ratio (NHL) has been introduced for assessing inflammation in rheumatoid arthritis and there has been only one study so far in Korea using NHL as a marker for rheumatoid arthritis disease actvitiy.[11] So the rationale behind conducting our study was to evaluate the role of NHL and PLR in rheumatoid arthritis and also find its association with disease activity in Pakistani cohort of RA patients. NHL ratio hasn't been used in any study previously in Pakistan.

MATERIALS AND METHODS

This study with a retrospective cross sectional design was carried out at IN/OUT patient department of Rheumatology in Federal Government Polyclinic Hospital Islamabad. The sample size was calculated using WHO formula for sample size in health sciences with a confidence interval of 95% and margin of error at 5%. The overall prevalence of rheumatoid arthritis in the world is 0.5-1% while in Pakistan in previous study in Karachi showed a prevalence of 0.14%.[12] A study done in India using NLR for severity of inflammation in rheumatoid arthritis was taken as the reference study for

sample size estimation.[13] A total of 290 patients were randomly selected.

Inclusion criteria: Patients meeting the ACR /EULAR criteria for RA.

Exclusion criteria: Chronic renal failure, diabetics, anemia of chronic diseases, hematological malignancies, nutritional deficiency anemias, idiopathic thrombocytopenia, systemic lupus erythematosus and other disorders of the connective tissues were excluded from the study.

Disease activity 28 ESR score was calculated by counting the number of tender and swollen joints out of 28 joints (i.e small and large joints of the upper limbs excluding the distal interphalangeal joints and knee joints in the lower limbs), the patients global health on scale of 0 to 100 mm and adding the ESR in to the formula i.e

$DAS28(4)=0.56*sqrt(t28)+0.28*sqrt(sw28)+0.70*Ln(ESR)+0.014*GH$.[14]

The different disease activity categories are as follows.

DAS28-ESR SCORE/ DAS28 SCORE.[15]

DAS28 SCORE	ACTIVITY STATUS OF DISEASE
<2.6	Remission
2.6-3.2	Mild
3.2-5.1	Moderate
>5.1	Severe

Neutrophil to hemoglobin and lymphocyte ratio is a novel biomarker and it is calculated by dividing the neutrophil percentage by the hemoglobin of the patient and the percentage of lymphocytes thus making the unit of measurements g/dl.[11]

Platelets to lymphocyte ratio is calculated by dividing the number of platelets by the number of lymphocytes in the blood.

Previously a study was conducted in our department on association of RDW and NLR as markers of disease severity for RA done from December 2020 till June 2021 after getting approval from Ethical Review Board of our hospital. This study was done on the same data set and so no new approval was sought. Ethical approval was issued in the 76th meeting of ethical committee No. FGPC.1/12/2020. Data were entered on to the SPSS 23 version and then the analysis was done. NHL and PLR were calculated according to the formula described. DAS28-ESR score was calculated using the

DAS28-ESR calculator. Descriptive analysis was done and frequencies, percentages and where necessary standard deviations and mean values were calculated. The association between the DAS28-ESR score of the participants and the value of NHL and PLR was found out using the chi square tests. Spearman correlation analysis was done to find the significance and strength of relationship between abnormally distributed data among groups. The significant *p*-value was <0.05 in all the tests done. Among other important tests Mann Whitney U test was performed for both the variables in association with the DAS28-ESR activity. Receiver operator curves were also generated for the tested variables to define the sensitivity and specificity for NHL ratio and the PLR in reference to ESR of the patients.

RESULTS

There were total of 290 patients in the study. Among 290 patients, 238(82.1%) belonged to the female gender while male was 52 (17.9%). The mean age of patients was 45.2 ± 12 years. Out of the 290 participants, 8.9% were in remission of disease, 10% with low, 55.9% with moderate while 25.2% had high activity of disease based on the DAS28-ESR score.

DAS28-ESR SCORE

- <2.6 Remission
- >2.6 to<3.2 Low disease
- >3.2 to 5.1 Moderate
- >5.1 high
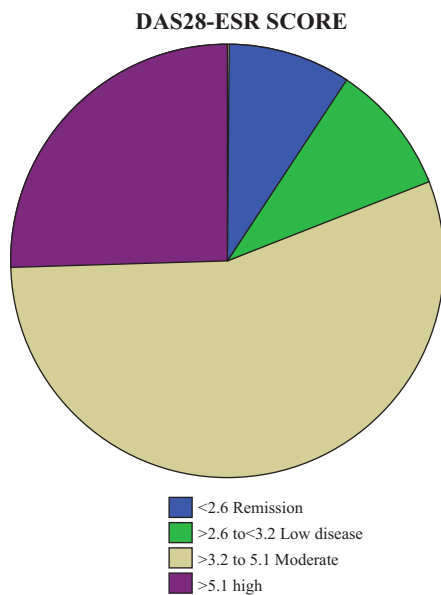
Fig 1: Percentage of the patients in different disease categories based on DAS28-ESR score

Baseline demographics of the study sample is shown in table I while table II shows the differences in the parameters of both the active and the inactive rheumatoid arthritis based on the DAS28 score with 3.2 being taken as a cut off to divide into active and inactive disease.

Table III shows the Spearman's rho correlation analysis, which suggests that there is significant positive correlation between the neutrophil to hemoglobin and lymphocytes ratio as well as the platelets to lymphocytes ratio (p<0.001).

Table I: Baseline Demographics of the study population

Variables	Minimum	Maximum	Mean ± Standard Deviation
Age (years)	16	75	45.02 ± 12.5
DAS28-ESR	1.20	8.34	4.29895 ± 1.26
ESR (mm/hr.)	5	110	33.75 ± 20.6
WBC (4000-11000/mm^3)	3700	16510	8630.48 ± 2342.45
Hemoglobin(12-14 g/dl)	9.50	16.60	12.41 ± 1.38
Platelets (150,000-400,000/mm^3)	120000	651000	310620.83 ± 99183.17
Neutrophils (40-70%)	40.00	87.0	66.84 ± 9.03
Lymphocytes (20-40%)	1.7	48.00	25.96 ± 8.10
Neutrophil to hemoglobin and lymphocytes ratio (NHL)	0.06	0.75	0.24 ± 0.11
Platelet to lymphocyte ratio (PLR)	23.29	698.63	157.67 ± 78.65

Table II: Comparison of characteristics in patients with inactive and active RA.

	INACTIVE RA (LOW AND REMISSION)	ACTIVE RA (MODERATE TO HIGH DAS28)	*p*-VALUE
Age,years+	43.29 ± 10.91	45.53 ± 12.90	
ESR (mm/h)	22.35 ± 12.50	37.62 ± 20.96	<0.001
WBC COUNT (x10^9/L)	8214.39 ± 2094.31	8753.08 ± 2401.29	0.122
Neutrophil %	61.69 ± 10.15	68.41 ± 8.01	<0.001
Lymphocyte% DAS28-ESR	31.12 ± 8.04	24.50 ± 7.35	<0.001
Platelet counts (x10^9/L)	292335.45 ± 90113.5	316008.48 ± 101260.7	0.153
Neutrophil to hemoglobin and lymphocytes ratio (NHL)	0.18 ± 0.10	0.26 ± 0.11	<0.001[a]
Platelet to lymphocyte ratio (PLR)	128.98 ± 55.05	166.7 ± 82.29	<0.001[a]
N (%)	66(22.76%)	224(77.24%)	

[a] Mann Whitney U test.

Table III: Spearman's rho correlation between DAS28-ESR and the Neutrophil to hemoglobin lymphocyte ratio (NHL), Platelets to lymphocytes ratio and ESR.

Factors		Spearman's Rho Correlation Co-efficient (r) and *p*-value
Neutrophil to hemoglobin lymphocyte ratio(NHL)	Spearman's rho Correlation Co-efficient	0.343
	p-value	<0.001
Platelets to lymphocyte ratio	Spearman's rho Correlation Co-efficient	0.250
	p-value	<0.001
ESR	Spearman's rho correlation coefficient	0.252
	p-value	<0.001

The receiver operator curves were also generated for NHL and PLR ratio to look at the sensitivity and specificity of these tests and identify the area under curves for each variable. Figure 2 and Table IV shows the ROC curves for these variables.
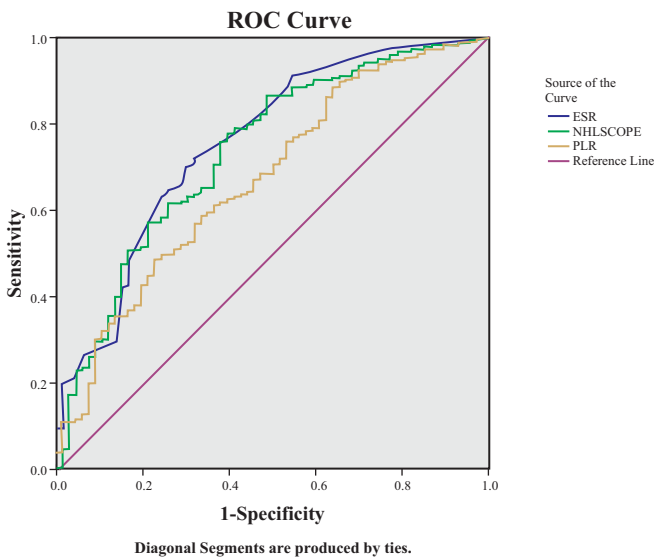

ROC Curve

Source of the Curve
— ESR
— NHLSCOPE
— PLR
— Reference Line

Diagonal Segments are produced by ties.

Fig 2: Showing ROC curves for the variables NHL, PLR and ESR.

Table IV: Showing Receiver operating curve characteristics for NHL , PLR and ESR in active and inactive RA. P<0.05 is significant.

Factors	Spearman's Rho Correlation Co-efficient (r)	*p*-value
Neutrophil to hemoglobin lymphocyte ratio (NHL)	0.343	<0.001
Platelets to lymphocytes ratio (PLR)	0.250	<0.001
ESR	0.252	<0.001

Table V: Difference in NHL And PLR Based On Patients Disease Activity using the Mann Whitney U test.

Variables	Outcome Disease activity	Median	IQR	Mean Rank	Test Statistics	*p*-Value
NHL	Inactive RA=66 Active RA=224	0.21	0.13	92.6 161.09	3900.5	<0.001
PLR	Inactive RA=66 Active RA=224	138.14	78.66	106.97 156.85	4849	<0.001

DISCUSSION

Rheumatoid arthritis is the commonest joint disease of inflammatory origin which involves the joints symmetrically i.e small and large joints of the body with a particular predilection for the small joints of the hand except the distal interphalangeal joint.[16] Joint inflammation is assessed by different parameters i.e DAS28-ESR, Simple Disease Activity Index(SDAI), Clinical Disease Activity Index (CDAI) scores and inflammatory markers like ESR and CRP have been extensively studied as predictor of inflammation.[17] As CRP and ESR are affected by certain confounding factors like anemia, hypergammaglobulinemia, gender of the patients, levels of fibrinogen and the changes in the viscosity of the blood so there is need to identify new relatively stable and cheaper biomarkers which could serve the function for assessing the disease activity in rheumatoid arthritis.[4]

The new markers are derived from the cells that are involved both in the coagulation and inflammatory cascade i.e platelets, lymphocytes, neutrophils and the effect on hemoglobin as a result of the chronic inflammatory process. These new biomarkers are Platelet lymphocyte ratio[4] and the neutrophil to hemoglobin and lymphocytes ratio. Although previously Neutrophil to lymphocyte ratio had been studied as a marker alongside platelet lymphocyte ratio but we in our study wanted to utilize this new marker.

Literature has shown that platelet lymphocyte ratio is higher in those having rheumatoid arthritis than the non-rheumatoid arthritis patients as shown by studies done by Erre et al in 2019 [18] and by Tarun khan et al in India 2022.[19] In our study, we found that there is a positive correlation between the disease activity in rheumatoid arthritis and the value of platelet lymphocyte ratio as evidenced by significant *p*-value on the spearman's rho correlation analysis. Those having active rheumatoid arthritis (moderate to high disease activity) had a higher value of PLR i.e 166.7 ± 82.29 vs inactive disease i.e (remission to low disease activity) 128.98 ± 55.05 with a *p*-value of <0.001. Findings similar to our study were

found in study done by Yingying Zhang et al in 2016 which showed a mean PLR of 142.6 for the active RA compared to 138.8 for inactive RA.[20] Similar findings were also observed in several other studies done by Rehab et al in which the group with active RA had a higher PLR while those with inactive RA had lower PLR.[21,22]

The area under the curve by ROC for the Platelet to lymphocyte ratio in our study was 0.672 which is almost similar to JY Choe et al's study (0.581)[11] and study done by Tarun Khan et al (0.651).[20] The ROC curve values though not very high but still did suggest the role in assessing the disease activity.

The other biomarker that was studied in our study with particular emphasis was neutrophil to hemoglobin and lymphocyte ratio/ score, a novel marker only previously been used once in study done by JY Choe et al.[11] in 2022. The findings in our study were comparable to that in the reference study showing mean values of 0.18 ± 0.10 for the inactive group while 0.26 ± 0.11 for those with active rheumatoid arthritis with a p-value of <0.001 on the Mann Whitney u test while that in the reference study were $0.188 (0.112 - 0.238)$ for the low disease activity vs $0.192 (0.127 - 0.276)$ for those with moderate to high disease activity on Kruskal-Wallis test. Similarly the area under curves and ROC values for the NHL was 0.736 which were roughly similar to the parent study which showed a value of 0.705 for NHL score.[11] The findings thus suggest that NHL score/ ratio can be used as a novel biomarker which is cheap and has a relatively greater area under the curve compared to the PLR and almost similar to that found for the ESR group in our study population which had an area under curve of 0.756, which is the most common tool for assessing the inflammation in the joints in rheumatoid arthritis patients alongside the clinical assessment and an integral part of the DAS28-ESR score.

Thus using these two new biomarkers alongside assessment of the patients clinically, we can actually identify patients having high disease activity by only looking at the complete blood picture report of the patients and getting an idea about the degree of inflammation going on in the joints.

The study had a few limitations like the study was done retrospectively. Secondly the effect of steroids leading to slight rise in the neutrophil counts was not removed which could have contributed a bit higher values in those who were having high disease activity. The effect of different DMARDS patients were taking were not

separately evaluated. The response to treatment after a follow up with repeat assessment was not done.

More studies are needed on the role of neutrophil to hemoglobin and lymphocyte ratio in future. It can also be used in other autoimmune disorders as well as a marker of disease activity. Prospective studies can be done to actually see the impact of various DMARDs on the NHL and PLR values and the change in disease activity with treatment.

CONCLUSION

Several hematological indices can be used as marker of inflammation in rheumatoid arthritis. In this study we used two new biomarkers i.e NHL score/ ratio and PLR as the markers of severity of disease activity in RA. And it showed that Neutrophil to hemoglobin and lymphocytes ratio and the platelets to lymphocytes ratio can be used as potential cheap but reliable markers of inflammation and thus reflect the disease activity in rheumatoid arthritis patients.

Ethical Statement: This study was undertaken after taking approval from the institution based ethical review board in the 76th meeting of the ethical committee. All the participants gave a written consent for inclusion in the study.

Conflicts of interest: None.

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DETERMINATION OF BARRIERS IN BREAST FEEDING PRACTICES AMONG FEMALE HEALTH CARE PROVIDERS WORKING IN THE TERTIARY CARE HOSPITALS OF ISLAMABAD

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ABSTRACT

Objectives:

1) *To determine the barriers to breastfeeding practices among female doctors and nurses working in selected tertiary care hospitals of Islamabad.*

2) *To determine the statistical significance of workplace breastfeeding facilities provided to doctor and nurse mothers working in selected tertiary care hospitals of Islamabad.*

Design: *This was a cross-sectional institution-based, descriptive study.*

Duration: *The study was conducted over a period of six months from November 2021 to April 2022 at Paksitan Institute of Medical Sciences (PIMS) and Federal government Hospital (FGH).*

Materials and Methods: *Study was conducted on female healthcare workers of PIMS and FGH Islamabad. Study population was married female doctors and nurses with ages between 25 and 45 years who have at least one child less than 5 years of age. Ethical Approval was taken from Institutional Review Board (IRB) of Health Services Academy (HSA), Islamabad. Data were collected by using a pre-structured self-administered questionnaire. Simple random sampling technique was used for the collection of data from selected hospitals. Data were analyzed using Statistical Package for the Social Sciences (SPSS) software, version 25. Descriptive statistics were computed by running frequencies and cross-tabulations on SPSS.*

Results: *Seventy two percent of the respondents were doctors and twenty eight percent were nurses. Fifty seven percent of healthcare workers began breastfeeding less than two hours after childbirth. Sixty seven percent of healthcare workers had availed twelve weeks of paid maternity leave. There was a significant association between reasons for stopping breastfeeding and socio-demographic variables e.g., age, education, designation, and department. The association between initiation of breastfeeding and department of the respondent was also found to be significant. The duration of breastfeeding was subject to flexible break times and provision of private space for breastfeeding.*

Conclusion: *Many mothers who returned to work after 12 weeks of paid maternity leave stopped or reduced breastfeeding because they did not have enough break time, flexible work options, onsite facilities, private space for breast feeding or pumping during their working hours.*

Keywords: *Breast feeding, Health car providers, Institutional practice*

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INTRODUCTION

Breastfeeding is an intuitive process having multiple benefits for the newborn and mother. World Health Organization (WHO) recommends that infants should be exclusively breastfed for the first six months of life to achieve optimal growth, development and health. This

recommendation for breastfeeding holds true across the globe irrespective of socio-economic, cultural or ethnic boundaries.[1] Research evidence has established the important immunological, developmental, nutritional, psychological, environmental, social, and economical benefits of breastfeeding for babies. It protects babies from diarrhea, acute respiratory infections; malnutrition enhance response to vaccinations, boosts their immune systems and reduces neonatal mortality.[1] Likewise, many researchers have established the advantages of breastfeeding for mothers as well, which include lactational amenorrhea, more rapid uterine involution, decreased postnatal bleeding; faster weight reduction after delivery of baby, and less chances of ovarian and breast cancer.[2] Although majority of the children are breastfed around the world but working mothers face a lot of problems in breastfeeding their children. Barriers at the workplace have been cited as the main reason for delay in breastfeeding by working mothers.[3] Returning to work was often the main reason to the cessation of breastfeeding in working mothers. Many work-related factors such as full-time maternity leave, breastfeeding policies, and lack of breastfeeding rooms, as well as a flexible work schedule in the workplace pose considerable challenges to breastfeeding practices for working mothers at their workplace.[4]

METHODOLOGY

This was a cross-sectional institution-based, descriptive study aiming to determine multiple barriers to breastfeeding practices among female doctors and nurses. Study was conducted on healthcare workers, doctors and nurses working at PIMS and FGH Islamabad, over a period of six months from November 2021 to April 2022. Ethical Approval was taken from Institutional Review Board (IRB) of Health Services Academy, Islamabad. Informed consent was taken from eligible doctor/nurse mothers prior to start of the study. Study population was married female doctors and nurses between ages of 25-45 years who had at least one child less than five years of age. Simple random sampling technique was used in the collection of primary data from selected hospitals. Two third of doctors and nurses were taken from PIMS and one third from FGH Islamabad. The list of female doctors and nurses was taken from medical superintendents of the concerned hospital who are registered under Pakistan Medical Council. The sample size for the study was calculated using the Epi Info version 3. The study population of doctors and nurses of Islamabad and Punjab combined is 163,856. With 40% prevalence of breastfeeding practice

among working mothers, sample size came out to be 360 by using Epi Info. Female doctors and nurses married between ages of 25-45 years, who have babies less than 5 years and initiated breastfeeding before the start of the survey were included in the study. Mothers who have lost their child, advised not to breastfeed due to medical reasons, or have babies with any congenital anomaly or twins babies, were excluded from the studies. Data were analyzed using SPSS software 25. All the data were in categorical format; knowledge of breastfeeding practices, type of breastfeeding facilities, barriers to breastfeeding practices was presented in frequencies and percentages. Descriptive statistics was computed by running frequencies and cross-tabulations on SPSS to obtain percentages and confidence intervals. Chi Square test was applied to all categorical variables.

RESULTS

Among 360 participants, 40.6% participants were equal to and less than 30 years, 31.9% participants were between the age of 31 to 35 years as shown in Table I. 39.2% participants were MBBS degree holder, of whom 30.3% participants had FCPS/MCPS, 25% of the participants were BSN graduates, 2.5% participants were MSN, 0.6% were BDS. Among the participants 72% were doctors, 28.3% were nurses. Medicine was the department of the majority of the respondents (48.6%) whereas 14% of the respondents belonged to the gynecology department. Working hour of 43% of the respondents were 6 hours while 12 hours for 9% of the respondents. 53.3% of the participants breast feed their child, and 41.7% of the participants had fed their baby with breast milk and formula. Ninety seven percent of the participants had knowledge about the importance of Colostrum.

Among the 360 participants, 57.7% of the participants agreed that it was initiated in less than 2 hours, 27.7% of the respondent said it to be more than 2 hours, and the remaining 14.4% of the participants agreed to have initiated it within 96 hours(less than 1 week) moreover, 9.7% of the participants were breastfeeding at the time of collection of data, 80.3% of the participants had previously breastfed and the remaining 10% of the participants never breastfed. 63.3% of the participants claimed that they had availed the paid maternity leave, 82% of the participants claimed that paid maternity leave was separated from other leave. Out of the 360 participants, 8.3% of the participants stated that policy about breastfeeding was written, 78.1% of the participants told that it was not written. Out of the 360 participants, only 2.2% of the participants claimed that

they had seen the written policy of breastfeeding. Reasons for stopping breastfeeding are illustrated in Figure I.

The statistical analysis revealed that reasons for stopping breastfeeding and respondent age, education, department, and designation were correlated, as listed in Table II. Departments of the respondents identified to be significantly associated with the initiation of breastfeeding, association with other variables (age, education, designation) was insignificant. Flexible break times and private space for breastfeeding were identified to be significantly associated with the duration for breastfeeding.

Table I: Association between initiation of breastfeeding and Socio-demographic variables

Socio-demographic variables	Initiation less than 2 hours	Initiation more than 2 hours	*p*-value (<0.05)
AGE			
25-30	95(65%)	51(35%)	0.051
31-35	67(59%)	47(41.1%)	
36-40	29(44.5%)	36(55.5%)	
41-45	17(58.6%)	12(41.4%)	
EDUCATION			
MBBS	83(58.9%)	58(41.1%)	0.077
FCPS/MCSP	56(51.9%)	52(48.1%)	
BSN	57(63.3%)	33(36.7%)	
MSN	8(88.9%)	1(11.1%)	
OTHER	6(75.0%)	2(25.0%)	
BDS	0(0%)	2(100.0%)	
DESIGNATION			
House officer	5(62.5%)	3(37.5%)	0.173
Medical officer	59(57.8%)	43(42.2%)	
PGT	50(57.5%)	37(42.5%)	
Consultant	28(46.7%)	32(53.3%)	
Nurse	68(66.7%)	34(33.3%)	

Table II: Association between Duration of breastfeeding and barriers in breastfeeding

| Barriers In Breastfeeding	Duration for less than 6 months	Duration for more than 6 months	*p*-value (<0.05)
Paid maternity leave			
Yes	127(63.5%)	75(61.5%)	0.571
No	72(36%)	45(36.9%)	
Not sure	1(.5%)	2(1.6%)	
Written policy			
Yes	15(7.5%)	12(6%)	0.114
No	151(75.5%)	100(50%)	
Not sure	34(17%)	11(5.5%)	
Flexible break time			
Yes	36(18%)	48(24%)	*0.000*
No	14(7%)	70(35%)	
Not sure	15(7.5%)	5(2.5%)	
Co-worker support			
Yes	64(32%)	48(24%)	0.347
No	115(57.5%)	66(33%)	
Not sure	21(10.5%)	9(4.5%)	
Private space			
Yes	10(5%)	24(12%)	*0.000*
No	176(88%)	97(48.5%)	
Not sure	14(7%)	2(1%)	
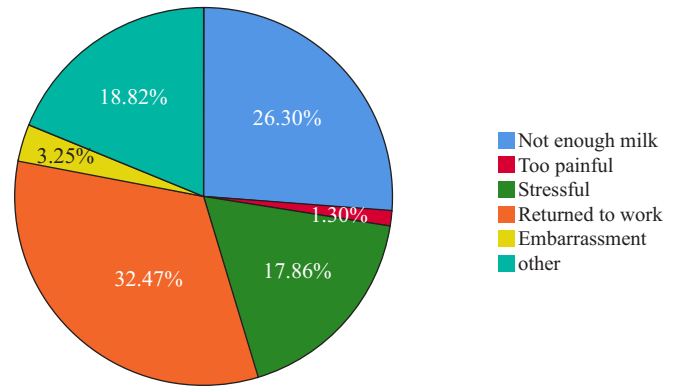
Fig 1: Reasons for stopping breastfeeding among health care workers

DISCUSSION

Despite the numerous health benefits associated with breastfeeding, including improved infant health and reduced risk of maternal diseases, cultural, social, economic and workplace factors often hinder women from exclusively breastfeeding their babies. The results of this study showed that 57% of the healthcare workers began breastfeeding in less than 2 hours of childbirth which is similar with the findings of Mukta et al. while its percentage was 60% for the study conducted by Karnataka et al.[10] In their study, among the respondents 30% claimed to get flexible break times to breastfeed or express breast milk. Mothers rejoining the work were the main reason for stopping breastfeeding which is identical to the findings of the Shah ZN et al that key barrier in breastfeeding is return to work.[9] According to a 2012-13 Pakistan Demographic and Health Survey (PDHS) study, the breastfeeding rate in the first six months of life is 38%, and data show a 2017-18 PDHS was slightly better that is 48%. Breastfeeding by working mothers is also seen as a challenge for women in developed countries. In the United States, 41% of healthcare mothers breastfeed for at least one year.[5] A qualitative study conducted in Pakistan, found that barriers at work are a major cause of premature breastfeeding cessation in working mothers[7], Aroona Sabin et al determined prevalence of exclusive breast feeding (EBF) among working mothers in Pakistan as 41%.[8] Of the respondents 85% claimed that private space for breastfeeding and pumping was not available.

Pakistan is a country with deep-rooted traditional beliefs and practices, where breastfeeding in public is often considered inappropriate or embarrassing. Consequently, working women face societal pressure to refrain from breastfeeding in public spaces, including their workplaces. This cultural barrier discourages

women from breastfeeding and promotes the use of infant formula as an alternative, which is perceived as more convenient and socially acceptable. The findings of the study conducted by Al-Katufi BA, et al.[6] In our study 61% of the respondents breastfed their babies for less than 6 months and main reason for discontinuation of breastfeeding was return to their work. Juggling work demands, long working hours, and a lack of flexible schedules make it difficult for women to find time and privacy to breastfeed or express milk. Consequently, many women opt for formula feeding as a more convenient solution that allows them to fulfill their work obligations. This finding is in contrast with the finding of 41% of US physicians who continued breastfeeding for 1 year after its initiation.[5] To improve breastfeeding rates, it is crucial to create awareness campaigns about the benefits of breastfeeding, provide education and support to women, implement supportive workplace policies including paid maternity leave and lactation facilities, and challenge societal attitudes towards breastfeeding in public. Majority of healthcare workers had availed twelve weeks of paid maternity leave but working environment was not supportive such as flexible break times, private space for breastfeeding and our findings are comparable to the findings of Soomro et al and Mukta et al.[9, 10] The duration of breastfeeding by doctors and nurses of tertiary care hospital of Islamabad was less than six months and this finding was in contrast to the recommendation of twenty-four months breastfeeding of the child by WHO.

CONCLUSION

Many mothers who return to work after 12 weeks of paid maternity leave stop or reduce breastfeeding because they do not have enough break time, flexible work options, onsite facilities, private space for breast feeding during their working hours, no written policy for breastfeeding and support from seniors and co-workers.

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RELATIONSHIP OF FINGERPRINTS WITH INTELLIGENCE QUOTIENT AND EMOTIONAL QUOTIENT AMONG MEDICAL STUDENTS OF HITEC–IMS

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ABSTRACT

Objective: *To determine the relationship of the pattern of fingerprints with Intelligence Quotient (IQ) and Emotional Quotient (EQ).*

Study design: *Cross-sectional study*

Study place: *HITEC Institute of Medical Sciences, Taxila Pakistan.*

Duration of study: *5 months*

Methods: *Study was conducted at department of forensic medicine, HITEC-IMS, Heavy Industries Taxila from November 2021 to March 2022. Students enrolled in this project were given a pre-validated IQ and EQ questionnaire. The IQ questionnaire by Philip carter and Ken Russell and EQ questionnaire by Emily were used. Students were asked to fill it. Following which impression of their right middle finger was taken using plain or dab impression.*

Results: *The Loop is the commonest type of fingerprint seen in 100 students followed by whorls and arches pattern. EQ was then checked and divided as EQ more than 120 and EQ less than 120. IQ of individuals was divided under the headings of excellent, very good, good and average. Those individuals with arches type of pattern constitute 21% of people and majority had EQ > 120, similarly whorls type of pattern which constitute 28% of people also mainly had an EQ of more than 120. While majority of individuals with loops and mixed pattern have an EQ of less than 120. Similarly, most individuals with arches and whorls fall in the category of very good IQ levels as compared to loops and mixed pattern where most individuals fall in good and average IQ levels.*

Conclusion: *This study concluded that despite loops being the most common fingerprint pattern, it is associated mostly with EQ < 120 and average IQ levels.*

Keywords: *Fingerprints, Intelligence Quotient, Emotional Quotient*

INTRODUCTION

One of the most effective methods for identifying a person is fingerprint system (dactylography). Although DNA fingerprinting is thought to be more distinctive than dactylography, it is the fingerprint, not the DNA pattern, that is different in monozygotic (identical) twins. Therefore, dactylography continues to be a crucial identification tool in forensic analysis.[1,2]

Finger print system (Galton System) or Dermatoglyphics is based on the principle that the skin of the balls of the fingers and thumbs is covered with ridges and grooves, the pattern of which varies between individuals and makes absolute identification possible. This was first studied in 1892 by Francis Galton. These ridges on dermis of skin are formed early in the fetal life, approximately in the third month after fertilization and this process completes at birth.[3,4,5] The development of these ridges is not affected by environmental factors or age. There are 4 types of finger print patterns mainly Loops, Arches, Whorls and Mixed.[6]

Emotional quotient (EQ) is the ability to understand, use and manage your own emotions to relieve stress,

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communicate effectively, empathize with others, overcome challenges and defuse conflict.[7]

Intelligence quotient (IQ) is explained as a total score derived from a set of standardized tests or subsets designed to assess human intelligence.[8] It is measured by calculating mental age/ chronological age x 100. This mental age is calculated or assessed by various standardized tests.[9] IQ is considered as a typical value reflecting the thinking ability of an individual at the best of his/her ability. It has been long regarded as an indication of intellectual classification.[10]

OBJECTIVES

To determine the most common type of fingerprint in students of HITEC-IMS and to evaluate the relationship between the type of fingerprint and EQ/ IQ among students of HITEC-IMS.

METHODOLOGY

This cross-sectional study was conducted among the students of HITEC-IMS, Taxila Pakistan. The study duration was from November 2021 to March 2022. Sample size was calculated using OpenEpi software and it came out to be 100. So total of 100 students enrolled in MBBS at HITEC-IMS were included in this study. The technique used for sampling was the random sampling technique. Random number tables were generated using Open Epi software and lists of students were taken from student affairs department. Ethical approval was given by college committee and consent from students was also taken. Numbers were then assigned to students and they were selected using a random number table. All selected students who fulfilled the inclusion and exclusion criteria were included.

Inclusion criteria:

1. Students of all years of MBBS at HITEC-IMS

Exclusion criteria:

1. Those students who had skin condition affecting fingerprints.

2. Those students who didn't give consent.

Students included in the study were then given a pre-validated questionnaire for determining their IQ and EQ. EQ questionnaire used in this study was formulated by Emily A Sterrett[11] which assessed the six fields of Emotional Intelligence. IQ questionnaire used was by Philip Carter and Ken Russell.[12,13] In addition to these questionnaires, their right middle finger prints were collected using the plain and dab method.

DATA ANALYSIS

Data were analyzed using SPSS Version 28. Graphs and bar diagrams were also constructed on the basis of results received and finger print type. Chi square test was applied and p-values were calculated for each digit.

RESULTS

In our study we tried to find out the association between the finger print pattern and IQ/ EQ quotient among students of HITEC-IMS Taxila. We included a total of 100 students with mean age of 21 years. Out of these 100 students 60 were females and 40 male students.

Most common type of fingerprint seen in students was loop pattern, however, most of the students with this pattern showed EQ<120 and average IQ levels. After loop pattern, whorls and then arches were frequently seen and were linked with good EQ and IQ levels.

Table I: Association of different types of finger prints with EQ level

	Frequency of students with different fingerprints n=100	EQ >120	EQ <120	p-value
ARCH	21 (21%)	16 (76%)	05 (24%)	**0.00**
WHORL	28 (28%)	18 (64%)	10 (36%)	**0.06**
LOOP	38 (38%)	16 (42%)	22 (58%)	0.17
MIXED	13 (13%)	06 (46%)	07 (54%)	0.70

Individuals with arches and whorls type of fingerprints mostly had EQ of more than 120 while people with loop and mixed pattern mostly had an EQ of less than 120.

Similarly, an association of different types of finger prints with IQ levels of student are shown in Table II.

Table II: Association of different types of fingerprints with IQ levels

	Count n=100	Excellent IQ	V. good IQ	Good IQ	Average IQ	p-value
ARCH	21(21%)	04(19%)	10(48%)	05(24%)	02(9%)	**0.03**
WHORL	28(28%)	03(11%)	10(36%)	08(28%)	07(25%)	0.15
LOOP	38(38%)	02(5%)	11(29%)	07(19%)	18(47%)	**0.00**
MIXED	13(13%)	01(8%)	04(31%)	05(38%)	03(23%)	0.32

Students with arches and whorls type of finger print mostly had very good IQ levels as compared to loop and mixed type of patterns where most individuals had average and good IQ levels respectively.

DISCUSSION

Our study showed that 21 out of the 100 (i.e. 21%) students had arches as the type of fingerprint. Out of which 16 students had EQ of more than 120 and the remaining 5 students had EQ less than 120. This data showed that most of the students with arch type of fingerprints had a significantly good EQ level and p-value showed that its statistically significant. After arches fingerprints, we had whorls type of fingerprints. Twenty eight (28) students had this finger print type. Out of which, 18 students had EQ more than 120 and only 10 students having less than 120. This also indicated that most people with whorl type had a good EQ. However, after analysis of data using SPSS software, *p*-value was more than 0.05 and thus statistically insignificant.

The third type of finger print out of the four that we had used as fingerprint types, is Loop. In our sample of 100, 38 students of respective finger print were found, out of which 16 students had an EQ of more than 120 while 22 students had EQ of less than 120, this was one finger print where we saw the opposite of what we had observed in arches and whorls. Thus, most students with Loop fingerprint had less EQ as compared to students with the other two types. Mixed finger print was the 4th type of fingerprint. This pattern was seen in only 13 students and it was one of the rare types of fingerprint. We had 6 students with EQ more than 120 and 7 students with EQ less than 120. The *p*-values for these fingerprints were more than 0.05, thus making the data insignificant.

Emotional intelligence and finger print has been studied over years by multiple researchers. Multiple studies have shown strong relationship between dermatoglyphics and EQ because neocortex development time coincides with the formation of finger prints in intrauterine life.[3]

A study conducted in 2019 showed that ulnar loop pattern is commonly seen in medical students, which is comparable to our study. However, in the above mentioned study students had been classified according to EQ levels as EQ>120 and EQ<120. In either of the categories ulnar loop pattern was most recurring one while our study showed high EQ in arches and whorls type of finger prints. This difference is probably because of small sample size.[3]

Another study conducted in India in 2016 showed that there are multiple intelligences and their correlation with dermatoglyphic pattern was seen. Multiple intelligences (i.e logical, spatial, linguistic, kinaesthetic, musical, interpersonal and intrapersonal) when correlated with finger print patterns, showed a weak correlation and it was concluded that every individual has different type of intelligence with different level.[14] Studies have also been conducted in which finger print patterns of young children are seen, which helps them find their inborn potentials and thus enhance these potentials with time.[15]

To check the correlation of fingerprint patterns with intelligence; intelligence was categorized into different categories. When the statistical analysis was done on the students (18 to 26 years of age) regarding their intelligence type and fingerprint patterns, it was seen that the loop fingerprint was commonest among the students that possessed intrapersonal and musical intelligence. The whorl fingerprint was common among students possessing spatial and kinesthetic intelligences, whereas, in the case of Naturalistic and Linguistic intelligences, the arch fingerprint was a common occurrence.[16]

CONCLUSION

The Loop pattern was the most commonest type of fingerprint found among the students of HITEC-IMS. This pattern had no significant association with EQ levels. The majority of the students having loop patterns of fingerprints had average IQ. Students having Arches and Whorls types of fingerprints had an EQ of more than 120. Moreover, participants having Arches and Whorls had very good IQ levels.

LIMITATIONS OF STUDY

All the data collected in this research is taken from a very small sample of 100 students; generalizing it and applying it to the whole population is not recommended. For a better understanding of findings, we need a larger sample size with various age groups and genders to be taken from people of all walks of life.

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