Indian Journal of Forensic Medicine and Pathology

Indexing Information: NLM catalogue & Locator Plus, USA; Google Scholar; Index Copernicus, Poland; EBSCO Publishing`s Electronic Databases, USA; Academic Search Complete, USA; Academic Search Research & Development, USA; ProQuest, USA; Genamics JournalSeek USA.

Corresponding address

Red Flower Publication Pvt. Ltd.

48/41-42, DSIDC, Pocket-II, Mayur Vihar Phase-I

Delhi - 110 091(India)

Phone: 91-11-22754205, 45796900, Fax: 91-11-22754205

E-mail: info@rfppl.co.in, Web:www.rfppl.co.in

The Indian Journal of Forensic Medicine and Pathology (IJFMP) (pISSN: 0974–3383, eISSN: 0974-3391, Registered with registrar of newspapers for India: DELENG/2008/30937) is a major new multidisciplinary print & electronic journal designed to support the needs of this expanding community. **The Indian Journal of Forensic Medicine and Pathology** is a peer-reviewed and features original articles, reviews and correspondence on subjects that cover practical and theoretical areas of interest relating to the wide range of forensic medicine. Subjects covered include forensic pathology, toxicology, odontology, anthropology, criminalistics, immunochemistry, hemogenetics and forensic aspects of biological science with emphasis on DNA analysis and molecular biology. Submissions dealing with medicolegal problems such as malpractice, insurance, child abuse or ethics in medical practice are also acceptable. Letters to the Editor that relate to material published recently in the Journal or comment on any aspects of the Journal are welcomed. This publication also features authoritative contributions describing ongoing investigations and innovative solutions to unsolved problems.

Subscription Information

Institutional (1 year) INR16000/USD1250

PAYMENT METHOD

By cheque/Demand Draft:

Cheque should be in the name of **Red Flower Publication Pvt. Ltd**. payable at Delhi.

By Bank Transfer/TT:

Complete Bank Account No. 604320110000467
Beneficiary Name: Red Flower Publication Pvt. Ltd.
Bank & Branch Name: Bank of India; Mayur Vihar
MICR Code: 110013045
Branch Code: 6043
IFSC Code: BKID0006043 (used for RTGS and NEFT transactions)
Swift Code: BKIDINBBDOS

Send all Orders to: Subscription and Marketing Manager, Red Flower Publication Pvt. Ltd., 48/41-42, DSIDC, Pocket-II, Mayur Vihar Phase-I, Delhi - 110 091(India), Phone: 91-11-45796900, 22754205, 22756995, E-mail: sales@rfppl.co.in.

Indian Journal of
Forensic Medicine and Pathology

January - March 2019
Volume 12 Number 1

Contents

Original Articles

Revised Rates for 2019 (Institutional)

Title of the Journal	Frequency	India(INR) Print Only	India(INR) Online Only	Outside India(USD) Print Only	Outside India(USD) Online Only
Dermatology International	Semiannual	5500	5000	430	391
Gastroenterology International	Semiannual	6000	5500	469	430
Indian Journal of Anatomy	Quarterly	8500	8000	664	625
Indian Journal of Anesthesia and Analgesia	Bi-monthly	7500	7000	586	547
Indian Journal of Cancer Education and Research	Semiannual	9000	8500	703	664
Indian Journal of Communicable Diseases	Semiannual	8500	8000	664	625
Indian Journal of Dental Education	Quarterly	5500	5000	430	391
Indian Journal of Diabetes and Endocrinology	Semiannual	8000	7500	597	560
Indian Journal of Genetics and Molecular Research	Semiannual	7000	6500	547	508
Indian Journal of Hospital Administration	Semiannual	7000	6500	547	508
Indian Journal of Hospital Infection	Semiannual	12500	12000	938	901
Indian Journal of Medical & Health Sciences	Semiannual	7000	6500	547	508
Indian Journal of Pathology: Research and Practice	Bi-monthly	12000	11500	938	898
Indian Journal of Preventive Medicine	Semiannual	7000	6500	547	508
International Journal of Neurology and Neurosurgery	Quarterly	10500	10000	820	781
International Physiology	Triannual	7500	7000	586	547
Journal of Cardiovascular Medicine and Surgery	Quarterly	10000	9500	781	742
Journal of Global Medical Education and Research	Semiannual	5900	5500	440	410
Journal of Global Public Health	Semiannual	12000	11500	896	858
Journal of Microbiology and Related Research	Semiannual	8500	8000	664	625
Journal of Organ Transplantation	Semiannual	26400	25900	2063	2023
Journal of Orthopedic Education	Triannual	5500	5000	430	391
Journal of Pharmaceutical and Medicinal Chemistry	Semiannual	16500	16000	1289	1250
Journal of Practical Biochemistry and Biophysics	Semiannual	7000	6500	547	508
Journal of Radiology	Semiannual	8000	7500	625	586
New Indian Journal of Surgery	Bi-monthly	8000	7500	625	586
Ophthalmology and Allied Sciences	Triannual	6000	5500	469	430
Otolaryngology International	Semiannual	5500	5000	430	391
Pediatric Education and Research	Quarterly	7500	7000	586	547
Physiotherapy and Occupational Therapy Journal	Quarterly	9000	8500	703	664
Urology, Nephrology and Andrology International	Semiannual	7500	7000	586	547
Indian Journal of Maternal-Fetal & Neonatal Medicine	Semiannual	9500	9000	742	703
Indian Journal of Obstetrics and Gynecology	Quarterly	9500	9000	742	703
Indian Journal of Emergency Medicine	Quarterly	12500	12000	977	938
Indian Journal of Trauma and Emergency Pediatrics	Quarterly	9500	9000	742	703
Journal of Emergency and Trauma Nursing	Semiannual	5500	5000	430	391
Indian Journal of Forensic Medicine and Pathology	Quarterly	16000	15500	1250	1211
Indian Journal of Forensic Odontology	Semiannual	5500	5000	430	391
Indian Journal of Legal Medicine	Semiannual	8500	8000	664	625
International Journal of Forensic Sciences	Semiannual	10000	9500	781	742
Journal of Forensic Chemistry and Toxicology	Semiannual	9500	9000	742	703
Community and Public Health Nursing	Triannual	5500	5000	430	391
Indian Journal of Surgical Nursing	Triannual	5500	5000	430	391
International Journal of Pediatric Nursing	Triannual	5500	5000	430	391
International Journal of Practical Nursing	Triannual	5500	5000	430	391
Journal of Gerontology and Geriatric Nursing	Semiannual	5500	5000	430	391
Journal of Nurse Midwifery and Maternal Health	Triannual	5500	5000	430	391
Journal of Psychiatric Nursing	Triannual	5500	5000	430	391
Indian Journal of Ancient Medicine and Yoga	Quarterly	8000	7500	625	586
Indian Journal of Law and Human Behavior	Semiannual	6000	5500	469	430
Indian Journal of Medical Psychiatry	Semiannual	8000	7500	625	586
Indian Journal of Biology	Semiannual	5500	5000	430	391
Indian Journal of Library and Information Science	Triannual	9500	9000	742	703
Indian Journal of Research in Anthropology	Semiannual	12500	12000	977	938
Indian Journal of Waste Management	Semiannual	9500	8500	742	664
International Journal of Political Science	Semiannual	6000	5500	450	413
Journal of Social Welfare and Management	Triannual	7500	7000	586	547
International Journal of Food, Nutrition & Dietetics	Triannual	5500	5000	430	391
Journal of Animal Feed Science and Technology	Semiannual	7800	7300	609	570
Journal of Food Additives and Contaminants	Semiannual	5000	4500	391	352
Journal of Food Technology and Engineering	Semiannual	5000	4500	391	352
Indian Journal of Agriculture Business	Semiannual	5500	5000	413	375
Indian Journal of Plant and Soil	Semiannual	6500	6000	508	469

Terms of Supply:

1. Agency discount 12.5%. Issues will be sent directly to the end user, otherwise foreign rates will be charged.
2. All back volumes of all journals are available at current rates.
3. All Journals are available free online with print order within the subscription period.
4. All legal disputes subject to Delhi jurisdiction.
5. Cancellations are not accepted orders once processed.
6. Demand draft / cheque should be issued in favour of "**Red Flower Publication Pvt. Ltd.**" payable at **Delhi**
7. Full pre-payment is required. It can be done through online (http://rfppl.co.in/subscribe.php?mid=7).
8. No claims will be entertained if not reported within 6 months of the publishing date.
9. Orders and payments are to be sent to our office address as given above.
10. Postage & Handling is included in the subscription rates.
11. Subscription period is accepted on calendar year basis (i.e. Jan to Dec). However orders may be placed any time throughout the year.

Order from

Red Flower Publication Pvt. Ltd., 48/41-42, DSIDC, Pocket-II, Mayur Vihar Phase-I, Delhi - 110 091 (India),

Mobile: 8130750089, Phone: 91-11-45796900, 22754205, 22756995 E-mail: sales@rfppl.co.in, Website: www.rfppl.co.in

Original Article

Indian Journal of Forensic Medicine and Pathology
Volume 12 Number 1, January - March 2019
DOI: http://dx.doi.org/10.21088/ijfmp.0974.3383.12119.1

Study of Incidental Histopathological Findings in Medico Legal Autopsies

Manjula K.[1], Srinivas Reddy P.[2], Kalyani R.[3]

Abstract

Background: Autopsy literally means to see for one self. Medico legal autopsy are performed to identify the cause of death, time of death, determine or confirm medical diagnosis that remained unknown or unclear prior to the patient's death. Various histopathological finding not related to the cause of death are observed in the routine histopathological examination of medico legal autopsies. These findings are important learning tools for the pathologist and forensic expert and have imminence academic and research value.

Method: This retrospective descriptive study was conducted on medico legal autopsies for ten years from 2007-2017 in the department of pathology. A total of 425 cases were included in the study. In each case available clinical details (age, sex, clinical diagnosis, cause of death, post mortem findings), gross and microscopic findings noted from autopsy records and analyzed. Available Gross specimens and slides were reviewed.

Results: Out of 425 cases, 310 (72.9%) were males and 115 (27.05%) were females. Commonest age group was 21-30 (22.11%) followed by 31- 40 (19.05%). Normal histopathological changes were seen in 110 (25.88%) cases. The most common significant histopathological findings was pulmonary edema (13.41%) followed by atherosclerosis (12.23%), lobar pneumonia (6.11%), and acute tubular necrosis (7.52%). Interesting incidental histopathological findings accounted to 20.23%, varied from granulomatous inflammation to malignancy.

Conclusions: Incidental histopathological findings may not contribute to the cause of death, but they are of academic interest. We found various rare incidental findings (20.23%), neoplastic lesions were less compared to non-neoplastic lesions.

Keywords: Autopsy; Incidental Findings; Histopathology; Medico Legal.

How to cite this article:
Manjula K., Srinivas Reddy P., Kalyani R. Study of Incidental Histopathological Findings in Medico Legal Autopsies. Indian J Forensic Med Pathol. 2019;12(1):5-8.

Introduction

Autopsy literally means to see for one self. Medico legal autopsy are performed to identify the cause of death, time of death, determine or confirm medical diagnosis that remained unknown or unclear prior to the patient's death [1-4]. Autopsy remains a valuable contributor to medical education in understanding limitations of medicine and serves as an important quality assurance indicator of clinical and diagnostic and therapeutic services [5-8]. In spite of advances in medical diagnosis, there is still a high discrepancy rate between the clinical and autopsy diagnosis. Various histopathological finding not related to the cause of death are observed in the routine histopathological examination of medico legal autopsies [9,10]. These findings are important leaning tools for the pathologist and forensic expert and have imminence academic and research value and help in the understanding the limitations of medicine [2,3,6].

Material and Methods

After collecting ethical clearance from the

Authors Affiliation: [1]Additional Professor, Dept. of Pathology [2]Professor and Head, Dept. of Farensic Medicine [3]Professor and Head, Dept. of Pathology, Sri Devaraj Urs Medical College, Tamaka, Kolar, Karnataka 563101, India.

Corresponding Author: Manjula K., Additional Professor, Sri Devaraj Urs Medical College, Tamaka, Kolar, Karnataka 563101, India.

E-mail: gkpmanju966@rediffmail.com

Received on 25.11.2018, **Accepted on** 02.02.2019

institutional ethical committee, this retrospective descriptive study was conducted on medico legal autopsies for ten years from January 2007- December 2017 in the department of pathology, Sri Devaraj Urs Medical College, attached to SDUAHER. A total of 425 cases were included in the study. In each case available clinical details (age, sex, clinical diagnosis, cause of death, post mortem findings) were collected from hospital records. Gross and microscopic findings were noted from autopsy records, tabulated and analyzed. Available gross and microscopic slides were reviewed.

Inclusion criteria: all medico legal autopsies

Exclusion criteria: autolysed specimens

Results

This study included 425 medico legal autopsies where histopathological findings were available. Out of 425 cases, 310 9 72.9%) were males and 115 (27.05%) were females with male to female ratio of 2.6:1. Commonest age group was 21-30 years (22.11%), followed by 31-40 years (19.05%) and 41-50 (15.05%). Table 1, shows age distribution of medico legal autopsies.

Table 1: age distribution of medico legal autopsies

Age group	No of cases	Percentage
0-10	34	8%
11-20	53	12.47%
21-30	94	22.11%
31-40	81	19.05%
41-50	64	15.05%
51-60	60	14.11%
61-70	30	7.05%
71 and above	09	2.11%

Detailed analyses of gross and microscopic features of medico legal autopsies were done. Normal histopathological changes were seen in 110 (25.88%) cases. The significant incidental histopathological findings were grouped into most common, common and rare findings. The most common histopathological finding was pulmonary edema (13.41%), followed by atherosclerosis (12.23%), lobar pneumonia (6.11%), and acute tubular necrosis (7.52%). Table 2 shows various histopathological findings observed in medico legal autopsies.

Table 2: various histopathological findings observed in medico legal autopsies (most common and common incidental findings)

Histopathological findings	Number of cases	Percentage
Normal histopathology	110	25.88
Pulmonary edema	57	13.41
Atherosclerosis	52	12.23
Acute tubular necrosis	32	7.52
Lobar pneumonia	26	6.11
Myocardial infarction	17	4.00
Cirrhosis	15	3.52
Chronic hepatitis	14	3.29
CVC lung	13	3.05
Chronic pyelonephritis	10	2.35
CVC Spleen	10	2.35
Bronchiectasis	10	2.35
bronchitis	9	2.11
Kidney cyst	9	2.11
Tuberculosis lesion	8	1.88
Fatty liver	8	1.88
Miscellaneous	25	5.88

Common and rare incidental findings observed in this study accounted to 20.23%. Table 3 explains the details of rare incidental findings

Table 3: Clinical details of rare incidental findings

S. No.	Age and sex	Indication for Autopsy	Incidental findings
1	57/M	Sudden death	Cardiomyopathy
2	43/M	Accidental fall	Lung infarction
3	60/M	Collapsed in ICU	Bronchoalveolar carcinoma
4	34/M	OP poisioning	Gas gangrene
5	35/M	Vomited blood	Congestive splenomegaly with esophageal varices with thrombi
6	45/M	RTA	Meningothelialiomatus meningioma mixed
7	42/M	Sudden death	Penetrating ulcer found on the greater curvature with a bleeding vessel, ulcer measured 2.5cm
8	19/M	assault	Diffuse infiltration of atypical lymphocytes in lymph nodes, spleen, liver-ALL

Table 4: comparison of present study histopthological findings with other studies

Histopathological findings	Present study	Arunalatha et al. [10]	Kanwardeep et al. [1]	Puri A et al. [9]	Patel S et al. [3]
Normal histopathology	25.88%				
Pulmonary edema	13.41%	17%		16%	12.37%
Atherosclerosis	12.23%	18%	3.20%	24.8%	27%
Acute tubular necrosis	7.52%	7%	22%	12%	10.89%
Lobar pneumonia	6.11%	5%	4.80%	4.8%	3.46%
Myocardial infarction	4.00%	5%	8.8%		
Cirrhosis	3.52%	5%	5.6%	4%	2.97%
Chronic hepatitis	3.29%	2%	5%		
CVC lung	2.58%	10%			
Chronic pyelonephritis	2.35%	5%	0.8%		
CVC Spleen	2.35%	4%			0.46%
Bronchiectasis	2.35%				
bronchitis	2.11%				
Kidney cyst	2.11%				
Tuberculosis lesion	1.88%	1%	1.60%	4.8%	3.46%
Fatty liver	1.88%	24%		22.4%	19%
Miscellaneous	5.88%	15%			2.97%

Discussion

Autopsy remains a valuable contributor to medical education in understanding limitations of medicine and serves as an important quality assurance indicator of clinical and diagnostic and therapeutic services. Despite intensive recent diagnostic tools, autopsy has revealed major antemortem diagnostic errors in 30% of cases [11, 12]. Histopathological examination of autopsy has enormous valve in improving clinical assessment, and has helped in identifying etiology of more than 80 diseases [13,14]. It also a useful tool to assess the mortality statistics which play a role in health and treatment planning [15].

Present retrospective study was done on medico legal autopsies to find out previously undiagnosed medical conditions, where histopathological findings are available. Out of 425 cases, 310 (72.9%) were males and 115 (27.05%) were females. Male to female ratio was 2.6:1. This finding was similar to study done by Arunalatha P et al. [10] Most of the deceased were from the 3rd decade followed by 4th decade, similar to other studies [2-4]. Jhaji et al. reported highest incidence in 4th decade. 1 Table 4 compares the present study histopathological findings with other studies.

From our study we found that maximum incidental findings were noted in the in the cardiovascular system, most common incidental finding was atherosclerosis (12.23%). This correlates with study done by Sulegaon R et al., Arunalatha et al., Patel S et al. and Puri et al. the second most common incidental finding was myocardial infarction (4%). In other studies percentage varies from 5-8.8%. [1,4]. We had 3 cases of cardiomyomapthy, other studies have reported 2 to 3 cases. Individuals with cardiomyopathy are usually aymptomatic and diagnosis may be incidental or identified during investigation for other diseases [10].

In respiratory system the most common incidental finding was pulmonary edema (13.41%). In other studies incidence varied from 12.37-17%. [3,9,10,15]. Next common incidental finding was lobar pneumonia (6.11%). Incidence in other studies varied from 3.46-5%. Most important rare incidental finding was bronchoalveolar carcinoma in a 60 year male who admitted with history of breathlessness and collapsed in the ICU and one case of fibrocavitary tuberculosis in 52 year male.

In renal system the most common incidental finding was acute tubular necrosis accounting to 7.52%. In other studies incidence varies from 7-22% [1,3,9,10]. Next common incidental finding was chronic pyelonephritis accounted to 2.32%. In other studies it varied from 0.8 to 5% [1,10].

In hepatobiliary system, the most common

incidental finding was cirrhosis (3.52%) followed by chronic hepatitis similar to a study done by Selvam et al. [16] and Ratisiu V et al. [17]. Incidence of cirrhosis in other studies varied from 2.97 to 5.6% [1,3,9,10] chronic hepatitis accounted to 3.29%, in other studies it was 2% and 5%. Fatty liver finding was seen in 1.88%, which is in discordance with other studies [3,9,10].

Neoplastic incidental finding in our study was only 0.47% which is very low compared to other studies [3,18,19].

Conclusion

Histopathological examination of autopsy is the gold standard to ascertain cause of death. It remains an important tool for quality assessment of clinical diagnosis. From present study we conclude that the most common incidental finding was pulmonary edema followed by atherosclerosis. Neoplastic lesions were less compared to non-neoplastic lesions. This study also highlights various rare incidental cases in medico legal autopsies which are of academic interest.

Source(s) of support: Nil

Presentation at a meeting: Nil

Conflicting Interest

(If present, give more details): Nil

References

1. KaurJhaji K, Nibhoria S, Sandhu SK, BamraNS, Padda P. A study of histopathological examination in medico legal autopsies in Fardkot, Punjab. Indian Journal of forensic medicine and toxicology. 2013; 1:76-80.
2. Sulegaon R, Kulkarni D, Chuulki S. Medico legal autopsies- Interesting and incidental findings. Int J Forensic SciPathol. 2013;3:156-60.
3. Patel S, Rajalakshmi BR, Manjunath GV. Histopathological findings in autopsies with emphasis on interesting and incidental findings- A pathologist's perspective. JCDR. 2016;10:8-12
4. Pathak A, Mangal HM. Histo pathology examination in medico legal autopsy Pros and Cons. J Indian Acad Forensic Med. 2010 June;32(2):128-31
5. Marshall HS, Milikowski C. Comparison of clinical diagnosis and autopsy findings – six year retrospective study. Arch Pathol Lab Med. 2017; 141:1262-6
6. Connor AE, Parry JT, Richardson DB, Jain S, Herdson PB. Comparison of the antemortem clinical diagnosis and autopsy findings for patients who die in the emergency department. Academic emergency medicine. 2002;9:957-959
7. Barendregt WB, De Boer HH, Kubat K. Autopsy analysis in surgical patients: a basis for clinical aduit. Br J Surg. 1992;79:1297-9
8. Landefeld CS, Goldman L. The autopsy in quality assurance: history, current status, and future directions. Qual Rev Bull. 1989;15(2):42-8
9. Puri A, Garg P, Tayal I, Singh N, Joshi R. Uncommon and fluke pathological discoveries during examination of viscera in postmortem cases- a retrospective study. J Adv Med Dent Scie Res. 2017;5:121-23.
10. Arunalatha P, Sangeetha A, Sumitradevi NR. Spectrum of histopathological findings in autopsies- highlighting the interesting and incidental findings. IJCMAAS. 2017;15:61-66
11. Tavora F, Crowder CD, Sun CC, Burke AP. Discrepancies between clinical and autopsy diagnosis; a comparison of university, community, and private autopsy practices. Am J Clin Pathol. 2008;129:102-9
12. Spiliopoulou C, Papadodima S, Kotakidis N, Koutselinis A. Clinical diagnosis and autopsy findings; a retrospective analysis of 252 cases in Greece. Arch Pathol Lab Med. 2005;129:102-09.
13. RoulsonJ, Benbon EW, Haselton PS. Discrepancies between clinical and autopsy diagnosis and the value of post mortem histology; a meta-analysis and review. Histopathology. 2005;47:551-9
14. Hill RB, Anderson RE. The autopsy- medical practice and public policy. Stoneham, MA: Butterworth Publishers 1988.
15. Kandy NC, Pai MR, Philipose RT. Role of Histopathology on autopsy study: An audit. SAS J. Med. 2015;1(1):7-15
16. Selvam V, Thamil Selvi R, Subramaniam PM, Vijayanath V. Prevalance of common ciseases in lungs and liver: A Histopathological a study. JPBMS 2011;12(9).
17. Ratziu V, Bonyhoy L, Martno D, Charlotte F, Carvallaro L, Tainturier SMH et al. liver failure and hepatocellular carcinoma in obesity- related cryptogenic cirrhosis. Hepatology. 2002;35:1485-93
18. Burton EC, Troxclair DA, Newman WP. Autopsy diagnosis of malignant malignant neoplasms: how often are clinical diagnosis incorrect? JAMA. 1998; 280:1245-48
19. Sens MA, Zhou XD, Weiland T, Cooley AM. Unexpected neoplasia in autopsies.Potential Implications for tissue and organ safety. Arch Pathol Lab Med. 2009;133:1923-31.

Original Article

Indian Journal of Forensic Medicine and Pathology
Volume 12 Number 1, January - March 2019
DOI: http://dx.doi.org/10.21088/ijfmp.0974.3383.12119.2

Seroprevalence of Transfusion-Transmissible Infectious Diseases at a Tertiary Care Hospital (Blood Bank) in Udaipur: A Three Year Retrospective Study

Megha Pandey[1], Ashish Pandey[2], S.N. Chawla[3], Jitendra Panchal[4]

Abstract

Background: Blood is life. Blood transfusion service (BTS) is an integral and indispensable part of the healthcare system. The priority objective of BTS is to ensure safety, adequacy, accessibility and efficiency of blood supply at all levels. Inspite of this large number of well-known complications are associated with blood transfusion like transfusion-transmissible infections, such as HIV, hepatitis B, hepatitis C and VDRL.

Aims & Objective: To study seroprevalence of HIV, HBV, HCV and syphilis in blood donors at tertiary care hospital.

Material & Methods: This was a retrospective study, where the data was procured from blood bank of the tertiary care hospital, Udaipur. All the blood donors in the records over a period of three years were included in the analysis. A through search of records revealed that total 3893 donors had been screened over period of 3 years. All the samples were screened for prevalence of HIV, HBsAg, HCV and syphilis. All the seropositive donors were further divided into voluntary and replacement donor categories.

Result: Of the total 3893 donors, 1405 were voluntary and 2488 were replacement donors. The seropositive rates amongst voluntary and replacement donors were 2.6% and 2.4% respectively. The overall prevalence of seropositivity for HIV, HBsAg, HCV and VDRL were 0.12%, 0.84%, 0.07% and 1.4% respectively.

Conclusion: On comparing the data of three years an increasing trend in seroprevalence of HBsAg, anti-HCV, VDRL and decreasing trend for HIV was observed.

Keywords: Transfusion-Transmissible Infectious Dieases; HIV; HBsAg; VDRL & HCV.

How to cite this article:
Megha Pandey, Ashish Pandey, S.N. Chawla et al. Seroprevalence of Transfusion-Transmissible Infectious Diseases at a Tertiary Care Hospital (Blood Bank) in Udaipur: A Three Year Retrospective Study. Indian J Forensic Med Pathol. 2019;12(1):9-12.

Introduction

Blood safety begins with a healthy donor. Blood is one of the most complex fluids and equally valuable for the existence, but this blood is also a very efficient means of transmitting infections [1]. The complications associated with blood transfusion vary from only trivial to potentially life threatening, demanding for meticulous pretransfusion testing and screening particularly for transfusion transmissible infections (TTI) [2]. The magnitude of the TTI varies from country to country depending on the load of TTI in that particular population from where blood units are sourced [3]. India has approximately 2.5 million human immunodeficiency virus (HIV) positive, 43 million HBV positive and 15 million HCV positive persons. The risk of transfusion related transmission of these viruses may be alarming due to high sero-prevalence of HIV (0.5%), anti-HCV (0.4%), and HBsAg (1.4%) among blood donors [4]. WHO recommends that all blood donations should be screened for infections prior touse. Screening

Authors Affiliation: [1]Associate Professor [2]Assistant Professor [3]Professor, [4]Bsc MLT, Blood Bank Technical Supervisor, Department of Pathology, American International Institute of Medical Sciences, Near Transport Nagar, Airport Road, Bedwas, Udaipur, Rajasthan 313001, India.

Corresponding Author: Ashish Pandey, Department of Pathology, American International Institute of Medical Sciences, Near Transport Nagar, Airport Road, Bedwas, Udaipur, Rajasthan 313001, India.

E-mail: ashishpandey_789@yahoo.com

Received on 23.02.2019, Accepted on 06.03.2019

should be mandatory for HIV, hepatitis B, hepatitis C and syphilis [1].

Thus The priority objective of blood transfusion services is to ensure safety, adequacy, accessibility and efficiency of blood supply at all levels [5]. It not only screens TTIs but also gives a clue about the prevalence of these infections in healthy populations [6].

Aims & Objectives

To screen all the blood donors for selective diseases HIV, HBV, HCV and VDRL, transmissible by bloodtransfusion during the 3 years period from 2016-2018. To compare and evaluate seroprevalence of selected blood transmissible diseases in voluntary and replacement blood donors. To estimate and compare the blood donors by type of donor and gender.

Methods

Retrospective study was conducted over a period of 3 years at hospital blood bank of American International Institute of Medical Sciences, Udaipur. The study was conducted on both voluntary and replacement blood donors who came to our blood bank and during voluntary blood donation camps. All the blood donors, donating blood in the blood bank wereconsidered as the study population. The family members, friends or relatives of the patients were categorized as replacement donors. People who donate blood without expecting any favor in return or in voluntary blood donation camps were classified as voluntary blood donors. Donors were screened by the standard criteria for donor fitness. They were carefully selected for donation by trained personnel after medical examination and a detailed pre donation questionnaire form, which included the donor register form, information regarding risk factor such as history of surgery, previous illness, hospitalization, and blood transfusion. The donors were included in the study after obtaining informed consent.

Results

Of the total 3893 donors, 1405 were voluntary and 2488 were replacement donors. On comparing the data of three years, the number of blood donors are increasing ever year (Table 1). In this three yeas study seropositive rate for males markedly outnumbered females (Table 4). Overall seropositive rates amongst voluntary and replacement donors were 2.6% (Table 2)and 2.4% (Table 3) respectively. The seropositive rate were almost same for 2 years i.e. 2016 and 2018. The overall prevalence of seropositivity for HIV, HBsAg, HCV and VDRL were 0.12%, 0.84%, 0.07% and 1.4 % respectively (Table 5)

Table 1: Annual distribution of blood donor types & seropositive reactions. (3 years)

Year	No. of donors	Voluntary	Replacement	HIV	HBV	HCV	VDRL	Total % Seropositive
2016	914	393	521	02	07	01	17	2.9
2017	1298	506	792	03	08	00	14	1.9
2018	1681	506	1175	00	18	02	25	2.6

Table 2: Seropositive rates among voluntary donors (3 years)

Voluntary no.	HIV	HBV	HCV	VDRL	Total % seropositive
1405	01	12	02	22	2.6

Table 3: Seropositive rates among replacement donors (3 years)

Replacement no.	HIV	HBV	HCV	VDRL	Total % seropositive
2488	04	21	01	34	2.4

Table 4: Seropositive rates: Male versus female blood donors.

Total number of donation	Male	Female
3893	96	01

Table 5: Overall prevalence of seropositive cases for 3 years.

Serology test	Percentage
HIV	0.12
HBsAg	0.84
HCV	0.07
VDRL	1.4

Discussion

According to WHO, safe blood is a universal right. To improve blood transfusion safety, it recommends an integrated strategy including establishment of well-organized blood transfusion services, prioritization of blood donation from voluntary non-remunerated donors,screening of donated blood for at least the four major TTIs such as HIV, Hepatitis B, Hepatitis C and Syphilis with quality-assured assays, rational use of blood and implementation of effective quality control systems (WHO, 2010) [7]. With every unit of blood, there is 1% chance of transfusionassociated problems including TTI [8]. The risk of TTI has declined dramatically in developed countries, but the same may not hold good for the developing countries, as the transfusion services are hospital based and fragmented [2].

Voluntary donors are motivated blood donors who donates blood at regular intervals and replacement donors are usually one time blood donors who donates blood only when a relative is in need of blood [9]. Majority of donors in present study were replacement donors (2488) as compared to voluntary donors (1405), similar to findings of T. Chaliha et al. [10]. Present study observed a slightly higher rate of seropositivity amongst voluntary donors than replacement donors, which in contrast to findings of Khaneta P et al. [1]. The concealment of medical history and lifestyle are the important causes of seropositivity among both the categories of donors [11].

The majority of donors in our study were males with higher prevalence of seropositivity than female, which is in concordance with observations of P. Pallavi et al. [2]

Study by Khaneta P et al. [1] found a decline in the HIV, HBV & VDRL seropositivity rates which is in contrast with our study where a rising seropositivity trend was observed for VDRL (maximum), HBV, HCV and a decline in cases of HIV1.

In this study, the overall prevalence of HIV seropositivity (0.12%) was lower than that of other studies done by Bharat S et al. [12] and Pallavi P et al. [2] in which it was 0.8% and 0.44 % respectively. Our study observed a decrease in the prevalence of HIV seropositivity over the period of three years, which is in concordance with Makroo RN et al.[13].

The prevalence of HBs Agseropositivity (0.84%) was lower than that seen in study by Bharat S et al. [12], where it was 1.8%. An upward rise in the prevalence of HBsAg positivity was observed during the three years of the study period, which is similar to observations done by Bhattacharya P et al. [14].

Anti HCV positivity (0.07%) was lower than that reported by other studies i.e Pallavi P et al. [2] (0.23%), Jain et al. [15]. (1.57%) and Das DK GB et al. [16].

In this study VDRL positivity was 1.4% which was more than study done by Gupta et al. [17], in which it was 0.27%. The positivity for VDRL showed significant upward trend in the presentstudy which is similar to observation of Pallavi P et al. [2].

Conclusion

Blood transfusion is an intergral and lifesaving procedure. In present study we came across that majority of the donors were in the category of replacement donors. Therefore a more aggressive workup is needed to bring awareness among the general population of this region regarding importance of voluntary blood donation. Moreover seropositivity was noted more amongst voluntary donors indicating that there are still many hidden cases in our society which should be addressed immediately through increasing the number of voluntary blood camps, especially in the peripheral areas on this region, where the study had been undertaken. A decline was observed in HIV cases but an increase in cases of HBV, HCV and a marked rise in the number of VDRL cases. This warrants for increase efforts by the concerned.

Source(s) of support: Nil

Conflicting Interest

(If present, give more details): Nil

References

1. Parveen K, Khan AF, Khan AS.The seroprevalence of HIV, hepatitis B, hepatitis C and venereal disease research laboratory test seropositivity in blood donors: a 5-year retrospective comparative study at tertiary care hospital in Mumbai, Maharashtra, India. Int J Res Med Sci. 2017;5:2662-8.

2. Pallavi P, Ganesh C, Jayashree K, Manjunath G. Seroprevalence and Trends in Transfusion Transmitted Infections Among Blood Donors in a University Hospital Blood Bank: A 5 Year Study. Indian J Hematol Blood Transfus. 2011;27:1-6.
3. Dr Mamta Gupta, Dr Pankaj Gupta, et al. Seropositivity of HBs Ag and HCV among blood donors at the blood bank of a tertiary care teaching hospital in Central India. JMSCR. 2018;6(4):529-36.
4. Singh N. NAT: Safe Blood, Safe India. Available at:http://www.expresshealthcare.in/200810/knowledge02.shtml. Accessed on 9 December 2011.
5. Islam MB. Blood transfusion services in Bangladesh. Asian J TransfSci. 2009;3:108–10.
6. Khan ZT, Asim S, Tariz Z, Ehsan IA, Malik RA, Ashfaq B et al. Prevalence of Transfusion transmitted infections in heal-thy blood donors in Rawalpindi District, Pakistan–a five yearstudy. Int J Pathol. 2007;5:21–25.
7. WHO guidelines on Screening donated blood for transfusion transmissible infections. Geneva: World Health Organization; 2010. Available at http://www.who.int/bloodsafety/Screening TTI.pdf/ Accessed on 20-02-2018.
8. Arora D, Arora B, Khetarpal A. Seroprevalence of HIV,HBV, HCV and syphilis in blood donors in Southern Haryana.Indian J PatholMicrobiol. 2010; 53:308–09.
9. Matee MJ, Magesa PM, Lyamuya E. Seroprevalence ofhuman immunodeficiency virus, hepatitis B and C viruses andsyphilis infections among blood donors at the Muhimbili National Hospital in Dar ES Salaem, Tanzania. BMC Public Health. 2006;6:21.
10. Tirthachaliha, Bidhan Ch. Das. A study on trends of infective seropositivity among blood donors at the blood bank of a tertiary care centre. Indian journal of research. 2017;6(4):1-2.
11. Dhar G, Sarkar AP, Sen S, Ghosh S, Mukhopadhyay BB, Ghosh TK. Patterns of infective sero positivity among blood donors in a rural Medical College Regional Blood Transfusion centre: A retrospective study. Nepal Journal of Medical Sciences. 2013;2(1):3-8.
12. Bharat S, SantPrakash K, Ravish G. Infectious markers in blood donors of East Delhi: prevalence and trends. Indian J PatholMicrobiol. 2004;47:477-9.
13. Makroo RN, Salil P, Vashist RP, Shivlal. Trends of HIV infection in the blood donors of Delhi. Indian J PatholMicrobiol. 1996;39:139-42.
14. Bhattacharya P, Chandra PK, Datta S, Banerjee A, Chakraborty S, Rajendran K, et al. Significant increase in HBV, HCV, HIV and syphilis infections among blood donors in West Bengal, Eastern India 2004-2005: exploratory screening reveals high frequency of occult HBV infection. World J Gastroenterol. 2007;13:3730-3.
15. Jain A, Rana SS, Chakravarty P, Gupta RK, Murthy NS, Nath MC, et al. The prevalence of hepatitis C virus antibodies among the voluntary blood donors of New Delhi, India. Eur J Epidemiol. 2003;18:695-7.
16. Das BK GB, Aditya S, Chakrovorty SK, Datta PK, Joseph A. Seroprevalence of Hepatitis B, Hepatitis C, and human immunodeficiency virus among healthy voluntary first-time blood donors in Kolkata. Ann Trop Med Public Health. 2011;4:86-90.
17. Gupta A, Tsering D, Bhatta D, Sharma D, Adhikari L, Pal R. Infectious disease markers in blood donors at central referral hospital, Gangtok, Sikkim. Asian J Transfus Sci. 2010;4:41-2

Original Article

Indian Journal of Forensic Medicine and Pathology
Volume 12 Number 1, January - March 2019
DOI: http://dx.doi.org/10.21088/ijfmp.0974.3383.12119.3

Regression Equation Analysis on Inter-Acromial Length for Stature Estimation in South India Population

B. Vasant Nayak[1], Nishat Ahmed Sheikh[2]

Abstract

Background: Stature of Humans has acted as symbol for the authority, also physical prowess and there had been dominance of stature over other living things. Identity of individual or skeleton remains especially the stature also the body weight had acted as an important factor in its establishment.

Place of Study: Department of Forensic Medicine Gandhi Medical College Musheerabad, Secunderabad, Hyderabad.

Material and Method: The study is made on the Volunteers. Total 194 subjects were selected irrespective of their caste, religion, dietary habits & socio-economic status at Gandhi Medical College Musheerabad, Secunderabad, Hyderabad.

Observation and Discussion: Stature of Male is highly correlated to Inter-Acromial length (i.e. Correlation coefficient = 0.827) with p-value is 0.000000. Therefore, Regression equation of Male Inter- Acromial length on stature is, Inter-Acromial Length = 0.239 x Stature + 5.4532. Similarly for Female Stature is highly correlated to Inter-Acromial length (i.e. Correlation coefficient = 0.70) with p-value is 0.0000. Therefore, Regression equation of Female Inter- Acromial length on stature is, Inter-Acromial Length = 0.243 x Stature + 3.657 Combined Stature and Inter-Acromial length is highly correlated (i.e. Correlation Coefficient = 0.8163) with p-value is 0.00000. Therefore, the Regression equation of combined Inter- Acromial length on stature is, Inter Acromial Length = 0.2584 x Stature + 1.69481.

Conclusion: The present study has established definite correlation between stature and Inter acromial length and also regression equations have been established.

Keywords: Stature Estimation; Inter-Acromial Length; Regression Equation.

How to cite this article:
B. Vasant Nayak & Nishat Ahmed Sheikh. Regression Equation Analysis on Inter-Acromial Length for Stature Estimation in South India Population. Indian J Forensic Med Pathol. 2019;12(1):13-17.

Introduction

Scientific specialization that has evolved and emerged from the specialty of Forensic Anthropology is Anthropometry, which deals with Identification of Human using the help of Metric Techniques, also it can be coined in other words as anthropometry means the human measurements irrespective of whether living or dead or reduced to skeletal remains[1].

Important parameter in Medico legal forensic examination is an Stature, it is an important element when highly decomposed or sometime highly mutilated bodies or fragmentary remains of the human parts are brought for medico legal examination. In regards with day to day medico legal examination the common queries e.g. age, sex, race, etc, estimation of stature becomes equally important in such cases.

Great diversity in India with different regions, climate and dietary habits of the people including

Authors Affiliation: [1]Assistant Professor, Dept. of Forensic Medicine, Gandhi Medical College, Secunderabad, Hyderabad, Telangana 500003, India. [2]Professor & Head. Dept. of Forensic Medicine, Jaipur National University, Institute for Medical Sciences and Research Center, Jaipur, Rajasthan 302017, India.

Corresponding Author: Nishat Ahmed Sheikh, Professor & Head, Dept. of Forensic Medicine, Jaipur National University, Institute for Medical Sciences and Research Center, Jaipur, Rajasthan 302017, India.

E-mail: drnishatsheikh@gmail.com

Received on 17.12.2018, **Accepted on** 14.01.2019

racial and ethnic variations which do exist in diversified population of different geographical regions of India, hence conclusions cannot be derived from the studies done in single population and shall not be applicable entirely to other group of population [2].

Stature of Humans has acted as symbol for the authority, also physical prowess and there had been dominance of stature over other living things. Identity of individual or skeleton remains especially the stature also the body weight had acted as an important factor in its establishment. In regards with relation to overall weight and height of the individual the calculation and measurement of stature is based on the relative proportion of different body weight. For the stature estimation the multiple researchers had conducted studies and had derived stature from multiple parameters for example percuteneous measurement of various body parts which includes arm, forearm, leg, foot etc. [3-4]. Based on the current scenario, we felt there is a strong need to determine the stature estimation from Inter acromial Length, the current study was undertaken to estimate stature from measurement of Inter Acromial length.

Our aim of the study was to derive linear regression formulae from correlation of Inter acromial length and stature and later have a comparison of correlation between stature and Inter acromial length with the studies made by earlier researchers.

Aim and Objective

Current study had been conducted on the consenting volunteers whose ages fall between a range of 22 to 42 years to establish the relation of stature and inter acromial length along with regression formula in relation.

Material and Method

The study is made on the Volunteers total 194 subjects were selected irrespective of their caste, religion, dietary habits & socio-economic status at Gandhi Medical College Musheerabad, Secunderabad, Hyderabad. Sufficient permissions and consents are procured before the measurements of the volunteers are taken and clearance from the Institutional Ethical committee is obtained in advance. Stature; using the stadio-meter, the subject was made to stand barefoot in the standard standing position on its baseboard. Both feet are in close contact with each other and head oriented in Frankfurt's plane. The height was then recorded in centimeter from the standing surface to the vertex in the weight bearing position of foot. The Inter acromial length was measured with the help of spreading caliper and self-retracting measuring tape. Inter-acromial length was measured with the person sitting in the erect position. Inter-acromial length is the distance between two bony landmarks, i.e. acromial process of scapula on each side.

The volunteers were made to sit erect and his arms hanging freely at the sides. Volunteer's posture was looked from behind to make sure that the shoulders are not too far nor back not forward, and it was observed that there need to be a noticeable curvature in lower back. Later the volunteers were asked to hold the breath for few seconds, so as the lateral border of acromial process can be located after following scapula out to the arm until it makes a sharp turn and thus it was marked on each shoulder.

A spreading caliper with blunt end was placed gently in between thumb and forefinger that allowed palpating the bony ridges with other fingers. Spreading calipers arms were later placed on the skin directly next to the lateral border of each acromial process and adjustable pressure was applied so as to compress the soft tissue over on the acromial process, enough precaution were taken not to hurt the volunteers. In entire course of the study for each volunteers measurement was taken twice, that is once with the spreading caliper and second with a self retracting measuring tape. To avoid diurnal variations and to eliminate any discrepancies both measurements were taken in a time slot between 1:00 to 15:30 hours of the day. Value of the constant and regression coefficient was calculated using SPSS Version 19 program.

Inclusion criteria

All volunteers, both Male and Female were selected, irrespective of their socio-economic standards. The ages of these volunteers are falling between 22 years and 42 years.

Exclusion criteria

Volunteers morphologically showing the congenital malformations, Dwarfism / Achondroplasia, features of nutritional deficiencies and injuries to extremities are not included in the present study.

Data Analysis

Data thus collected was analyzed using SPSS version 19. The mean values and the standard deviations were calculated for stature and Inter acromial length. Correlation of the Inter acromial length with the stature was assessed. Regression co-efficient and constant was calculated for estimating stature through regression equation from Inter acromian length. The effectiveness of regression equation was tested by significance Z test.

Observation

As per Table 1 Total 194 Subjects were measured in various age groups starting from 22 years to 42 years Females and Males both were 97 each. Heights of individual are varying irrespective of age and sex.

Table 1: Sex-wise and combined Distribution of statures and inter-acromial Lengths (cm)

Characters	Male	Female	Combined (M + F)
Maximum Age	42	40	42
Minimum Age	22	22	22
Maximum Stature	190	180	190
Minimum Stature	137	132	132
Max. Inter-Acromial Length	51.2	47.2	51.2
Min. Inter-Acromial Length	33.4	29.3	29.3

Table 2: Distribution of Stature and Inter-acromian Length in cm for both sex and combined

Variables		Mean	Std. Dev.	Confidence Interval
Age	Male	30.8	6.22	30.8 ± 1.251
	Female	31.14	6.28	31.14 ± 1.2624
Stature	Male	169.83	14.164	169..83 ± 2.85
	Female	156.26	11.776	156.26 ± 2.37
Inter-Acromial Length	Male	46.029	4.094	46.029 ± 0.823
	Female	41.63	4.099	41.63 ± 0.8243

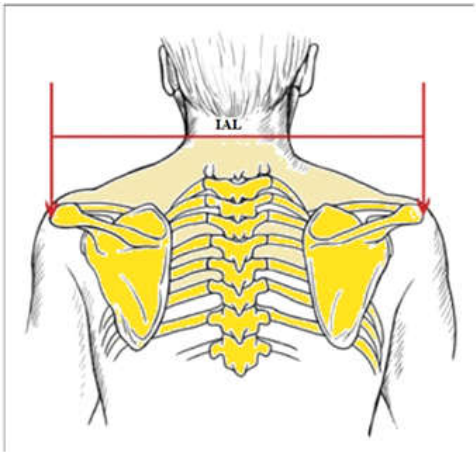

Fig. 1: Inter-acromial Length

Fig. 2: Stadio-meter and Spreading Caliper

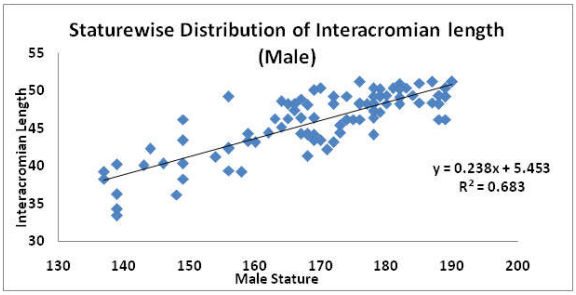

Fig. 3: Stature wise distribution of Inter-acromian Length in Males

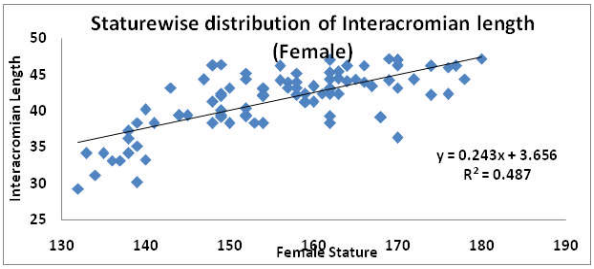

Fig. 4: Stature wise distribution of Inter-acromian Length in Females

Stature of Male is highly correlated to Inter Acromial length (i.e. Correlation coefficient = 0.827) with P-value is 0.000000. Therefore, Regression equation of Male Inter-Acromial length on stature is,

Inter-Acromial Length = 0.239 x Stature + 5.4532.

Similarly for Female Stature is highly correlated to Inter-Acromial length (i.e. Correlation coefficient = 0.70) with p-value is 0.0000. Therefore, Regression equation of Female Inter- Acromial length on stature is,

Inter-Acromial Length = 0.243 x Stature + 3.657

Combined Stature and Inter-Acromial length is highly correlated (i.e. Correlation Coefficient = 0.8163) with P-value is 0.00000. Therefore, the Regression equation of combined Inter- Acromial length on stature is,

Inter-Acromial Length = 0.2584 x Stature + 1.69481

Table 3: Relation between Stature (X) and Inter-Acromial Length (Y)

Characters	Regression Formulae	Correlation Coefficient (r)	P- Value
Male	Y = 0.239*X + 5.4532	0.827	0.00000
Female	Y = 0.243*X + 3.657	0.70	0.00000
Combined (M + F)	Y = 0.2584*X + 1.695	0.8163	0.00000

Discussion

The study was conducted on volunteers at Musheerabad Hyderabad GMC, belonging to various religious and regions were studied. Our attempt was to devise the linear regression equations as well as multiplication factors for estimation of stature from Inter acromial length in both the genders. In this study Inter acromial length is found to be good parameter for predicting stature in both the genders. The linear regression equation derived from Inter acromial length for estimation of stature showed a statistically significant relationship in both the genders. As such Estimation of stature, as part of identification process, has a long history in physical anthropological studies. Stature plays a very important role in the description of a human population, for physical, anthropological, and biomechanical research.

In comparison a relatively less amount of work had been done as well use of statistical methods to calculate the stature from Inter acromial Length. In our current study the observation shows that there is high degree of positive correlation in case of males and females as well combined. Regression equation of Male Inter- Acromial length on stature is, Inter-Acromial Length = 0.239 x Stature + 5.4532. Similarly for Female Stature is highly correlated to Inter-Acromial length (i.e. Correlation coefficient = 0.70) with p-value is 0.0000. Therefore, Regression equation of Female Inter-Acromial length on stature is, Inter-Acromial Length = 0.243 x Stature + 3.657. The males had longer inter-acromial lengths. In comparison to females, Males tend to develop broader shoulder from puberty, and this may be a reason for the higher inter-acromial length, our findings are in accordance with conducted by Koulapur VV et al. [5].

Ozaslan A. et al, conducted a study to estimate stature from bi-acromial and biiliocristal measurements on Turkish Population and he opined in his study that In males the best possible correlation was observed for Bi-Acromial Breadth (r=0.42) and In females (r=0.26), but for Bi-Ilio Cristal Breadth observation was relatively very weak correlation in both males (r=0.21) and females (r=0.19) [6]. There were multiple studies wherein other parameters were used to determine the stature like in Jasuja et al. [7] derived multiplication factors for Punjabi Jat males for estimation of stature; 6.88 and 6.44 for right and left foot length respectively.

Similarly Giles et al. [8] did suggest that foot length displays a biological correlation with height and can be estimated from foot length. As well Nishat Ahmed Sheikh et al. [9] estimated stature from forearm length, the ratio fall between 3.49 and 3.88 for boys with a mean of 3.67 and SD+0.090; and between 3.45 and 3.88 for girls with a mean of 3.68 and SD 0.093. The stature had been found to have significant positive correlation with the Inter acromial length. Whether the regression equation was effective in estimating stature from the Inter acromial length, the estimated values were compared with the measured values. No significant difference was found between the measured and estimated stature. From this result inference could be drawn that the stature of an individual can be estimated from Inter acromial length.

This method of stature estimation can be used by law enforcement agencies and forensic scientists. The only precaution which must be taken into consideration is that these formulae are applicable to the population from which the data have been collected due to inherent population variations in these dimensions, which may be attributed to genetic and environmental factors like climate, nutrition etc. The results obtained in our study correlates with the previous studies.

Conclusion

The present study has established definite correlation between stature and Inter acromial length and also regression equations have been established. Tremendous help can be seek in medico legal cases in establishing stature and identity of an individual when only some remains of the body

are found. There is a need to conduct more studies among people of different regions & ethnicity so that stature estimation becomes more reliable & identity of an individual is easily established. We conclude that the obtained formulas are specific to that study populations therefore application of these by the other populations might cause incorrect results. Thus necessity in creation of specific equations peculiar to populations should be taken into account by researchers.

Source of funding: Nil

Competing Interests: Authors have declared that no competing interests exist.

Acknowledgement

Authors acknowledge the immense help received from the scholars whose articles are cited and included in references of this manuscript. The authors are also grateful to authors/editors/ publishers of all those articles, Journals and books from where the literature for this article has been reviewed and discussed.

References

1. Krishan K. Anthropometry in forensic medicine and forensic science-forensic anthropometry. Internet J for Sci. 2006;2:1-8.
2. Siddiqui MA and Shah MA. Estimation of stature long bones of Punjabis. Indian J Med Res. 1944;32; 105-8.
3. Patel M P and Joshi NB. Regression equation of height on ulnar length. Ind Jour Medical Res. 1964; 52(10);1088-91.
4. Ozaslan A, Iscan MY, Ozaslan I, Tugch H and Koc S. Estimation of stature from body parts. Forensic Sci Int. 2003;132(1):40-5.
5. Koulapur V.V., Agarwal S.S., Mestri S.C. Estimation of Stature by Anthropometric Measurements of Inter-Acromial Length. JIAFM. 2010;32(2):101-03.
6. Ozaslan A., Karadayi B., Kolusayin M.O., Kaya A. Stature estimation from bi-acromial and bi-iliocristal measurements. Rom J Leg Med. 2011; 19(3):171-76.
7. Jasuja OP, Singh J, Jain M. Estimation of stature from foot and shoe measurements by multiplication factors: a revised attempt. Forensic Sci Int. 1991;50: 203-15.
8. Giles E, Vallaneligham PH. Height estimation from foot and shoe print length. J Forensic Sci. Jul 1991; 36(4):1134-51.
9. Nishat Ahmed Sheikh et al. Stature Estimation from Forearm Length. Indian journal of Forensic Medicine and Pathology. 2014 April-June;7(2):59-64.

Instructions to Authors

Submission to the journal must comply with the Guidelines for Authors.

Non-compliant submission will be returned to the author for correction.

To access the online submission system and for the most up-to-date version of the Guide for Authors please visit:

http://www.rfppl.co.in

Technical problems or general questions on publishing with IJFMP are supported by Red Flower Publication Pvt. Ltd's Author Support team (http://rfppl.co.in/article_submission_system.php?mid=5#)

Alternatively, please contact the Journal's Editorial Office for further assistance.

Editorial Manager

Red Flower Publication Pvt. Ltd.

48/41-42, DSIDC, Pocket-II

Mayur Vihar Phase-I

Delhi - 110 091(India)

Mobile: 9821671871, Phone: 91-11-22754205, 45796900, 22756995

E-mail: author@rfppl.co.in

Original Article

Indian Journal of Forensic Medicine and Pathology
Volume 12 Number 1, January - March 2019
DOI: http://dx.doi.org/10.21088/ijfmp.0974.3383.12119.4

Efficacy of Motor Control and Endurance Exercises in Neck Pain: A Pilot Study

Rajalaxmi V.[1], Jibi Paul[2], M. Manoj Abraham[3], M. Sasirekha[4]

Abstract

Background of the Study: A neck pain complaint was found to be one of the most emerging musculoskeletal complaints and requires attention of the health professionals. Our objective was to determine the efficacy of the motor control and endurance exercise over conventional exercise in subjects with non-specific neck pain.

Methodology: A Prospective cohort study, with Pre-post test series compared the outcomes among two intervention groups and a conventional group conducted in the Outpatient Physiotherapy department of ACS Medical College for the duration of 12 weeks. 18 Patients with non-specific neck pain were recruited and randomized into three groups. VAS, endurance, CCFT score were measured at baseline, 4th, 8th and 12th week follow up. NDI and SF-12 scores were obtained at baseline and 12th week follow up.

Result: Comparison of VAS, NDI, SF-12, endurance, CCFT score within the group at the baseline, 4th, 8th, and 12 week follow up, the subjects in the MCT group demonstrated a significant progressive change from baseline throughout the 12th week than the endurance and conventional training group in all the outcomes. The endurance training group also showed significance difference from the baseline to 12th week follow up, however not significant than the MCT group when compared between the group

Conclusion: Motor control exercise has high impact on neck pain and led to marked relief in pain intensity, disability and in improving the endurance of the neck muscle. Endurance training has also showed a statistically significant improvement, however lesser the significant than the motor control exercise group. In contrast, the conventional exercise has found to reduce the pain and disability, although there was no significant improvement in the endurance of the muscle.

Keywords: Motor Control Exercise; Non-Specific Neck Pain; Activation Pressure Score; Highest Pressure Score; Jull's Technique.

How to cite this article:
Rajalaxmi.V., Jibi Paul, M. Manoj Abraham et al. Efficacy of Motor Control and Endurance Exercises in Neck Pain: A Pilot Study. Indian J Forensic Med Pathol. 2019;12(1):19-24.

Introduction

Neck pain is one of the major public health problems which have a greater effect on both the individual and the society in terms of pain and suffering, lost work day and health care cost [1]. Within the general and work population, the annual prevalence is 30-50 percent [2], while the lifetime prevalence of neck pain is about 70% [1]. In a relatively recent report on the global burden of disease, where 291 conditions were studied, neck pain was ranked 21st in terms of overall burden and fourth when measured by years lived with disability [3]. Neck pain can be very disabling and the individual may have difficulty with a wide range of activities such as driving, turning the head and working at a desk [4]. Neck pain is often characterized by exacerbations, and more than one third of patients will develop chronic symptoms lasting more than six months [5]. Integration of evidence-based practice with clinical expertise and patients' preferences, that aim to reduce pain and improve function, is of paramount importance for

Authors Affiliation: [1,2]Dr. M.G.R. Educational & Research Institute University, Velappanchavadi, Chennai, Tamil Nadu 600077, India. [3]Professor, Faculty of Medical and Health Sciences, Universiti Tunku Abdul Rahman, Malaysia. [4]Professor and Head, Dept. of Anatomy, ACS Medical College and Hospital Velappanchavadi, Chennai, Tamil Nadu 600077, India

Corresponding Author: V. Rajalaxmi, Professor, Faculty of Physiotherapy, Dr. M.G.R. Educational & Research Institute University, Velappanchavadi, Chennai, Tamil Nadu 600077, India.

E-mail: rajalaxmi.physio@drmrgdu.ac.in

Received on 16.01.2019, Accepted on 06.03.2019

increasing the quality of life and maintain the work capacity of individuals with neck pain [6]. Exercise is one of the most common treatment choices for non-specific neck pain, but evidence regarding its effectiveness innon-specific recurrent patient group is scarce, especially for those with neck pain [7]. Conservative management of neck disorders includes both passive and active therapies, neither of which has been shown to be effective [8]. While several studies have demonstrated that pain can to some extent be reduced by endurance training [9,10]. But some studies have found no effect on non-specific neck pain [9]. A recent review showed limited evidence for the efficacy of exercise in the treatment of symptoms of the neck and shoulder due to the lack of high quality research [11]. Prospective studies have suggested that patients with chronic neck pain have weak neck muscles, and loss of motor control [12,13]. The motor control exercises are the therapeutic approach which mainly focuses on motor control, activation of deep cervical muscles, and aims to retrain the optimal control and co-ordination of the cervical muscles [14,15]. The MCE are usually established under supervision and it has been shown to increase the motor control and reduce the pain and disability in patients with neck pain [16]. The exercise targets the deep flexor muscles of the upper cervical region, the longus capitis and longus colli muscles, rather than the superficial flexor muscles, the sternocleidomastoid and anterior scalene, which flex the neck but not the head [17,18]. During the endurance training program of the cervical flexor group, flexion movement is performed at the lower cervical segment in supine and prone with proper head support to the train the flexor group of muscles in the neck [19]. The primary aim of the study was to compare the effectiveness of motor control exercise and endurance exercise over conventional exercise on pain, disability and endurance in patients with non-specific neck pain.

Materials and Method

Design: A Prospective cohort study, experimental design with Pre-post test series compared the outcomes among two intervention groups and a conventional group conducted in the Outpatient Physiotherapy department of ACS Medical College for the duration of 12 weeks.

Participants: 18 Patients with non-specific neck pain were recruited from physiotherapy outpatient department in ACS Medical College and Hospital, and randomized into three groups. The inclusion criteria were both male and female, aged 20 to 45 years, Idiopathic neck pain with duration > 2 weeks, Pain Numeric Rating Scale [VAS] 3 and above will be selected, NDI score < 15 and should be an Outpatient from ACS Medical college and hospital.Patients were excluded if undergone a Neck or upper extremity surgery, medical red flags suggesting a non-musculoskeletal origin (spine fracture, cervical myelopathy), Neurological disease of genetic, infectious, or neoplastic origin, Patients who are under anticonvulsants, antidepressants, psychotropic medication, Intellectual disability i.e severe mental illness, intoxication, severe sleep deprivation, Alzheimer's disease, Systemic or diagnosed chronic disease, including diabetes, stroke and neurological diseases, that may influence motor control and neck pain or ability to perform tests, Positive spurling test for neurological radiating arm pain, VBI symptoms, Pregnancy and whiplash injury.

Randomization: Patients were randomly allocated into three groups with 6 patients in each group by using a computer generated minimization method taking into account age, gender, and degree of disability result from the neck pain. A computerised program for randomization was used and the program automatically allocated the grouping of the patient. As these computers based randomization helps to establish allocation concealment. Informed consent was obtained from all subjects before inclusion. All the participants received an explanation about the procedures corresponding to their group.

Outcome: Before the exercise session, participants rated their level of neck pain intensity at rest on VAS, a 10cm scale, extremes were 'no pain' and 'worst pain', NDI- self reported Neck Disability Index, using Pressure Bio-feedback [chattanooga], endurance were measured by Jull's technique, neck control by cranio-cervical flexion test (CCFT), SF-12 to measure the impact of neck pain on their quality of life. An independent investigator assigned to each group and the researcher taking the measurement was blinded to subject group for the outcome assessment and statistical analyses. The patients were assessed at baseline 4th, 8th and 12th week follow up by an independent assessor who was blinded to the grouping.

Exercise Regimen: The exercise regimens were conducted over a 12-week period and subjects in each group receive exercises for 1 session per day for 3 days a week for 6 weeks. Subjects were asked not to receive any other specific intervention for the neck pain. Patients were randomized into

motor control training, endurance training and a Conventional exercises group. Group A received the Motor control exercises, group B received the Endurance exercises, and group C received the Conventional exercises. The exercise program began with one set of activation of the deep neck muscles to enhance its ability for active stabilization of the cervical spine. Then the patient was asked to perform flexion and extension of the neck for 15 repetitions as a warm up exercise for the superficial torque producing muscles.

Motor control exercise

Training of the craniocervical flexor muscles followed the protocol described by Jull et al20. The exercise is a low-load exercise, specifically train the deep cervical flexors, which occurs in a head lift exercise. The exercise used an air-filled pressure sensor (Stablizer), which was placed sub-occipitally and the subject was guided by the feedback from the pressure sensor to reach the five pressure targets in 2–mmHg increments from 20 mm Hg - 30 mm Hg. The subjects were instructed to "gently nod their head as though they were saying 'yes'." Then the therapist identifies the target level that the subject could hold for 10 seconds. Training was commenced at the target level that the subject could achieve with a slow and controlled craniocervical flexion movement. For each target level, the contraction duration was increased to 10 seconds, and trained to perform 10 repetitions [using Pressure Bio-feedback, chattanooga]. Isometric hold with chin tucks in supine position with head and neck of the table. Quadruped track with book on the back of head and neck added with arm and leg movements.

Endurance exercises

The endurance training regimen consisted of progressive resistance exercise for the neck flexors in two separate stages. Stage 1 was of 2 weeks duration, patients performed supine head lift exercises in upper cervical neutral (12–15 repetitions) with weight (12 repetition maximum determined on first visits). In Stage 2 was of 4 weeks - three sets of 15 repetitions starting at 12 repetitions maximum (Falla et al.). Ball squeeze - The patient can hold a small ball (or his/her fist) between the chin and the chest and squeeze. Sets of isometric contractions can build deep flexor endurance for 6 sec hold and 6 repetitions. Forehead Ball roll - The deep flexors can be activated and endurance can be built by having the patient use his/her forehead to roll a small ball up and down against a wall, using short nodding movements. Once a patient has good active range of motion, diagonals can be added to this exercise [8-10 repetitions].

Conventional exercises: The conventional training regimen consisted of Supervised Isometric exercises for neck muscles and supervised stretching and active exercises at the cervical region.

Data Analysis

Analysis was performed using SPSS for windows, version 16.0. Nominal background variables (age, height, weight, BMI) at baseline were collected in all the groups and generated a descriptive statistics represented in the Table 1. For the ordinal and non-normally distributed variables (VAS, NDI, SF-12), the comparison between the intervention group were performed by Mann-Whitney U-test, whereas the changes within the group were analyzed by Wilcoxon test. As the endurance, CCFT Score was assessed and data were normally distributed, paired t-test was to analyze the change within groups and difference in between the groups were analyzed by one way analysis of variance (ANOVA). Post hoc multiple comparison test with Tukey was used to identify the difference among the group.

Table: 1: Demographic Details

Baseline Characteristics	Motor Control Exercise	Endurance Training	Conventional Exercise
Age	32.0±7.26	43.6±1.75	40.8±4.87
Height	163±7.27	157±4.57	159±4.76
Weight	57.1±8.70	67.5±11.3	54.3±3.26
Bmi	21.39±2.11	27.2±6.01	21.35±1.83
Gender (Female/Male)	(1/5)	(2/4)	(1/5)

Table 2: Pre and Post test values with the follow up for VAS for all three groups

Variable	Motor Group	Control	Endurance Group		Conventional Group		Significance Between Group
Vas (0-10Cm)	Mean±Sd	Significance Within Group	Mean±Sd	Significance Within Group	Mean±Sd	Significance Within Group	
Baseline	5.66±1.03		5.83±0.75		6.16±1.16		0.725
4Th Week	5.16±0.98	0.083	5.0±0.89	0.09	5.60±1.03	0.08	0.461
8Th Week	4.16±1.16	0.06	4.1±0.75	0.02*	5.50±1.37	0.04*	0.149
12Th Week	2.16±0.75	0.02*	3.1±0.98	0.02*	5.1±1.16	0.03*	0.003*

*-p-value is significant < 0.05 level

Table 3: Pre and Post test values with the follow up for NDI and SF12for all three groups

Variables		MCTG	EG	CG	Significance Between The Group
NDI					
	Pre	29.16±6.85	26.5±9.18	28.5±7.14	0.582
	Post	15.6±4.22	17.0±5.93	20.0±2.52	0.216
	Significance Within Group	0.02*	0.02*	0.04*	
SF-12					
PCS	Pre	32.57±5.49	31.89±3.27	31.02±3.29	0.930
	Post	49.30±4.35	43.07±2.57	38.65±9.06	0.02*
Significance Within Group		0.02*	0.02*	0.116	
MCS	Pre	31.29±3.24	28.24±7.26	29.77±7.40	0.657
	Post	48.90±6.81	53.83±2.24	37.41±10.7	0.01*
Significance Within Group		0.02*	0.02*	0.46	

*p-value is significant < 0.05 level

Table 4: Pre and Post test values with the follow up for Jull's and CCFT for all three groups

Variable	Motor Group Control		Endurance Group		Conventional Group		(Anovo) Between Group	
	Mean±Sd	Significance Within Group	Mean±Sd	Significance Within Group	Mean±Sd	Significance Within Group	F	Signifi -Cance
Endurance (Sec)	14.0±1.41		13.83±2.13		13.6±1.50		0.057	0.945
Baseline								
4Th Week	17.16±1.47	0.001**	16.6±1.75	0.001**	14.16±1.32	0.203	6.64	0.009*
8Th Week	23.5±1.76	0.000**	21.0±2.75	0.003*	18.83±3.37	0.023*	4.44	0.03*
12Th Week	25.5±1.64	0.000**	23.3±2.73	0.001**	18.5±3.27	0.028*	11.07	0.001*
CCFT Score								
Activation Pressure Score	3.0±1.09		2.66±1.09		2.6±1.03		0.405	0.674
Baseline								
4Th Week	4.3±1.5	0.001**	3.3±1.50	0.02*	3.0±1.09	0.363	6.04	0.012
8Th Week	6.3±1.26	0.001**	4.66±1.03	0.001**	3.3±1.78	0.02*	10.26	0.002*
12Th Week	8.3±1.5	0.000**	6.6±1.02	0.000**	4.6±1.09	0.001**	26.98	0.000**
Highest Pressure Score	23.0±2.09		24.3±2.33		24.0±2.82		0.485	0.625
Baseline								
4Th Week	23.6±1.50	0.175	24.3±1.50	1.000	23.5±2.07	0.296	0.396	0.680
8Th Week	25.0±1.09	0.04*	25.5±1.76	0.287	24.0±2.60	1.000	0.946	0.410
12Th Week	26.6±1.03	0.01*	25.3±1.03	0.415	24.3±2.42	0.175	3.083	0.07*

Result

Comparison of VAS, NDI, SF-12, endurance, CCFT score within the group at the baseline, 4th, 8th, and 12 week follow up, the subjects in the MCT group demonstrated a significant progressive change from baseline throughout the 12th week than the endurance and conventional training group in all the outcomes. The endurance training group also showed significance difference from the baseline to 12th week follow up, however not significant than the MCT group when compared between the group. Within the group comparison, all the groups demonstrated a change from the baseline, but the motor control and endurance training showed a statistically significant difference from the baseline to the 4th, 8th, 12th week measurements. The VAS score at the baseline to the 12th week follow up represented in the Table 2, the NDI, SF-12 were represented in the Table 3, endurance and CCFT score in the Table 4.

Discussion

This study was designed to determine the efficacy of motor control and endurance exercises over conventional exercises in non-specific neck pain. This study provides an evidence of the effect

of motor control, endurance and conventional exercises on the variables measured in the neck in subjects with neck pain. An intervention of Motor control exercise effective in improving the neck control shown in CCFT score, and the endurance measured using Jull's technique, reduction in neck pain intensity, while the endurance training group and conventional group also showed a proportion of changes in the CCFT score, pain and disability, but not as effective as the MCT (Motor control training) group. There was a greater increase in the endurance of the neck muscle (MCT {pre: 14.0±1.41- 12th wk-25.5±1.64}, ET {pre-13.83±2.13- 12th wk-23.3±2.73}), in association with the improvement in the activation pressure (MCT {pre: 3.0±1.09- 12th wk-8.3±1.5}, ET {pre-2.6±1.09- 12th wk-6.6±1.02}) and in the highest pressure score(pre: 23.0±2.09 - 12th wk-26.6±1.03}, ET {pre-24.3±2.33- 12th wk-25.3±1.03}). This may reflect that the greater proportion of showed characteristics of the activation of deep cervical flexors following Motor control exercises than the endurance exercises. In contrast, the conventional group showed a significant change in the neck pain intensity and disability, and only a lesser proportion of change in the CCFT score, endurance of the cervical muscles followed by the intervention. Statistically difference were found for 12th week follow up CCFT score revealing difference for a group interaction (AP:F=26.98; Sig 0.000**), (HP:F=3.083; Sig 0.07*). Pre and post intervention differences were also observed in activation and highest pressure score in all the three groups. Both the MCT and endurance exercise training group showed an improvement in the endurance, CCFT score due to the enhanced pattern in activation of deep and superficial muscles of the cranio-cervical region. Although, both the subjects in the intervention group and the conventional group with neck pain demonstrated a progressive change in the VAS throughout the duration of 12 weeks. In subjects with neck pain, a single exercise may affect both the structural and functional change that present in the neck muscles [21]. The mode of exercise protocol applied determines the exercise induced changes in the motor performance [22]. The deep neck flexor training using the CCF exercise has been shown to produce improvement in the deep and superficial neck flexor neuromuscular co-ordination, though negligible effect on flexor muscle strength [23,22]. In accordance, the current study showed that the improvements in all the variables of motor performance (CCFT score, endurance), other than those in the endurance and conventional exercise training group. However, the improvements in the performance of CCFT following the intervention, both the MCT and endurance training group showed a greater proportion of activation of the deep cervical flexor muscle performance. Levoska et al. found that there is a significant reduction in the pain intensity and occurrence following the intervention, but the effect was transitory and in most of the cases, the pain had already returned by the 3rd and 12th month follow ups [24]. Waling et al, showed that the neck pain intensity decreased immediately following the endurance training duration of 10 weeks, but there is no significant difference were seen between the training group and the control group at the 8th month and 3 year follow up [9,25]. The conclusion that can be drawn from the previous studies is that effect followed by the short term intervention for a few weeks or months does not produce effects long lasting on chronic neck pain.

Conclusion

The results of the current study shows that motor control exercises produced statistically significant changes in all the variables of the neck region in the post-intervention measurement than the endurance and conventional training group. Although the endurance training group also showed a statistically significant improvement from the baseline to the 12-week follow up than the conventional group. However, the changes in the endurance training are statistically less significant than the motor control training group.

Acknowledgements

I would like to thank the authorities of Dr. MGR Educational and Research Institute, University and the Principal Faculty of Physiotherapy for providing me with facilities required to conduct the study.

Ethics approval and consent to participate: The study is approved by the ethical committee of ACS Medical College and Hospital.

Competing interests: There is no financial and non-financial competing interest among the authors

Funding: The study is funded by the first author

References

1. René Fejer Kirsten Ohm Kyvik, and Jan Hartvigsen1. The prevalence of neck pain in the world population: a systematic critical review of the literature. Eur

Spine J. 2006 Jun;15(6):834–48. doi: 10.1007/s00586-004-0864-4.

2. Haldeman S, Carroll L, Cassidy JD. Findings from the bone and joint decade 2000 to 2010 task force on neck pain and its associated disorders. J Occup Environ Med. 2010 Apr;52(4):424-7. doi: 10.1097/JOM.0b013e3181d44f3b. PMID:20357682
3. Hoy D, March L, Woolf A, Blyth F et al. The global burden of neck pain: estimates from the global burden of disease 2010 study. Ann Rheum Dis. 2014 Jul;73(7):1309-15. doi: 10.1136/annrheumdis-2013-204431. Epub 2014 Jan 30.
4. Manchikanti L, Singh V, Datta S, Cohen SP, Hirsch JA; Comprehensive review of epidemiology, scope, and impact of spinal pain. Pain Physician. 2009 Jul-Aug;12(4):E35-70. PMID:19668291
5. Cote´ P, Cassidy JD, Carroll LJ, Kristman V. The annual incidence and course of neck pain in the general population: a population-based cohort study. Pain. 2004;112:267–73.
6. Sackett DL, Rosenberg WM, Gray JA, Haynes RB, Richardson WS. Evidence based medicine: what it is and what it isn't. BMJ. 1996 Jan 13;312(7023):71-2.
7. Suni JH, Rinne M, Tokola K, et al. Effectiveness of a standardised exercise programme for recurrent neck and low back pain: multicentre, randomised, two-arm, parallel group trial across 34 fitness clubs in Finland. BMJ Open Sport Exerc Med. 2017;3:e000233. doi:10.1136/bmjsem 2017-000233.
8. Gross AR, Aker PD, Goldsmith CH, Peloso. Conservative management of mechanical neck pain disorders: A systematic overview and meta-analysis. Online J CurrClin Trials. 1996;Jul 30;200-201.
9. Waling K, Sundelin G, Ahlgren X, et al. Perceived pain before and after three exercise programs. A controlled clinical trial of women with work related trapezius myalgia. Pain. 2000;85:201–207. [Medline] [CrossRef]
10. Ylinen J, Takala E, Nykanen M, et al. Active neck muscle training in the treatment of chronic neck pain in women: a randomized controlled trail. JAMA. 2003;289:2509–2516. [Medline] [CrossRef]
11. Verhagen AP, Karels C, Bierma-Zeinatra SM, et al. Exercise proves effective in a systematic review of work-related complaints of the arm, neck or shoulder. J ClinEpidemiol. 2007;60:110–17. [Medline] [CrossRef]
12. Rodriquez AA, Bilkey WJ, Agre JC. Therapeutic exercise in chronic neck and back pain. Arch Phys Med Rehabil. 1992;73:870–5.
13. Silverman JL, Rodriquez AA, Agre JC. Quantitative cervical flexor strength in healthy subjects and in subjects with mechanical neck pain. Arch Phys Med Rehabil. 1991;72:679–81.
14. O'Sullivan PB, Phyty GD, Twomey LT, et al. Evaluation of specific stabilizing exercise in the treatment of chronic low back pain with radiologic diagnosis of spondylolysis or spondylolisthesis. Spine. 1997;22:2959–67.
15. Hodges PW. Core stability exercise in chronic low back pain OrthopClin N Am. 2003;34:245–54.
16. Amanda Hidalgo-peréz, ÁngelaFernández-garcía, IbaiLópez-de-uralde-villanueva et al. Effectiveness Of A Motor Control Therapeutic Exercise Program Combined With Motor Imagery On The Sensorimotor Function Of The Cervical Spine: A Randomized Controlled Trial. The International Journal of Sports Physical Therapy. 2015 Nov;10(6): 877.
17. Falla D, Bilenkij G, Jull G. Patients with chronic neck pain demonstrate altered patterns of muscle activation during performance of a functional upper limb task. Spine. 2004;29:1436–40.
18. Falla D, Jull G, O'Leary S, Dall'Alba P. Further evaluation of an EMG technique for assessment of the deep cervical flexor muscles. J Electromyogr Kinesiol. 2006;16:621–28.
19. Deborah Falla, Gwendolen Jull, Trevor Russell : Effect of Neck Exercise on Sitting Posture in Patients with Chronic Neck Pain. PhysTher. 2007;87:408-17.
20. Jull G, Falla D, Treleaven J, et al. A therapeutic exercise approach for cervical disorders. In: Boyling JD, Jull G, eds. Grieve'sModern Manual Therapy: The Vertebral Column. 3rd ed. Edinburgh, United Kingdom: Elsevier; 2004
21. Falla D, Farina D. Neuromuscular adaptation in experimental and clinical neck pain. J Electromyogr Kinesiol. 2008;18:255–61.
22. O'Leary S, Jull G, Kim M, Uthaikhup S, Vicenzino B. Training mode-dependent changes in motor performance in neck pain. Arch Phys Med Rehabil 2012;93:1225–33.
23. Falla D, Jull G, Hodges P, Vicenzino B. An endurance-strength training regime is effective in reducing myoelectric manifestations of cervical flexor muscle fatigue in females with chronic neck pain. ClinNeurophysiol. 2006;117:828–37.
24. Levoska S, Keinanen-Kiukaanniemi S. Active or passive physiotherapy for occupational cervicobrachial disorders? A comparison of two treatment methods with a 1-year follow up. Arch Phys Med Rehabil. 1993;74:425-30.
25. K. Waling, B. Jarvholm, G. Sundelin. Effect of training on female trapezius myalgia- An intervention study with a three year followupperiod, Spine (Phila Pa 1976). 2002 Apr 15;27(8):789-96.

Original Article

Indian Journal of Forensic Medicine and Pathology
Volume 12 Number 1, January - March 2019
DOI: http://dx.doi.org/10.21088/ijfmp.0974.3383.12119.5

Autopsy Profile of Sudden Cardiac Deaths Reported in Mumbai Region of Maharashtra

Sanjay D. Gaiwale[1], Madhusudan R. Petkar[2], Vandana S. Gundla[3], Ashwinikumar B. Sapate[4], Ajay L. Ghangale[5]

Abstract

The study was conducted with an aim to find out the prevalence of cardiac pathology with its correlation to age, gender, occupation, risk factors and survival time in sudden cardiac deaths. 112 cases of sudden natural deaths due to cardiac and coronary pathology were reported, out of which 75% were male and 25% were female of which 45.5% were occupied with sedentary work. 42.0% cases were of lower middle class, followed by the upper middle class i.e. 29.5%. Peak incidence of sudden cardiac death was seen in the age group of 51-60 years. Maximum number of sudden deaths due to cardiac and coronary pathology were seen in obese individuals i.e. 55.4%. In these sudden deaths hypertension was seen in 29.5% cases, followed by Diabetes mellitus and Smoking in 25% and 9.8% cases respectively. Majority of sudden deaths i.e. 63.4%, occurred within 6 hours of onset of symptoms, 28% occurred within 6-12 hours and in 4% cases death occurred within 12-24 hours of onset of symptoms. Histroy of previous myocardial infarction was present in 31.2% cases. Sudden deaths due to cardiac and coronary pathology showed that 90 % of cases died due to coronary artery disease out of which 44.64% had acute coronary insufficiency while 33.9 % succumbed due to acute coronary insufficiency with Old Myocardial Infarction and 11.6 % due to Acute Myocardial Infarction.

Keywords: Sudden Cardiac Death; Coronary Pathology; Acute Myocardial Infarction; Hypertension**.**

How to cite this article:
Sanjay D. Gaiwale, Madhusudan R. Petkar, Vandana S. Gundla et al. Autopsy Profile of Sudden Cardiac Deaths Reported in Mumbai Region of Maharashtra. Indian J Forensic Med Pathol. 2019;12(1):25-28.

Introduction

Sudden death is a death which is not known to have been caused by any trauma, poisoning or violent asphyxia, and wheredeath occurs all of a sudden or within 24 hours of the onset of the terminal symptoms [1]. Incidence of sudden cardiac death (SCD) has been increasing day by day through ought the world,specifically in the urban population [2,3]. In India incidence of ischemic heart disease has increased, to about 10 percent [4]. As per autopsy findings, majority of sudden deaths resulteddue to cardiovascular disease [5, 6]. Sudden cardiac death is commonly defined as an unexpected natural death due to cardiac cause within ashort time period (usually within one hour) with or without onset of symptoms and without any prior conditions that would appear fatal [7]. Some prodromal symptoms like palpitation, chest pain and dyspnea may suggest a cardiovascular etiology[8,9].

The present study was carried out with an aim to study the prevalence of cardiac pathology with its correlation to age, gender, occupation, risk factors and survival time in sudden cardiac deaths.

Material & Methods

The present study is a prospective cross-sectional study conducted for a period of two years in tertiary health care Centre, Mumbai, India.

The study included cases of sudden deaths

Authors Affiliation: [1]Assistant Professor [2]Associate Professor [4]Professor [5]Professor and Head, Forensic Medicine and Toxicology, Dr. D.Y. Patil Medical College, Hospital & Research Centre, Pimpri, Pune, Dr. D.Y. Patil Vidyapeeth, Pune, Maharashtra 411018, India. [3]Clinical Practice, Obstetrics and Gyanecology, Self Employed, Pimpri, Pune, Maharashtra 411018, India.

Corresponding Author: Madhusudan R. Petkar, Associate Professor, Forensic Medicine and Toxicology, Dr. D.Y. Patil Medical College, Hospital & Research Centre, Pimpri, Pune, Dr. D.Y. Patil Vidyapeeth, Pune, Maharashtra 411018, India.

E-mail: drmadhupetkar@gmail.com

Received on 26.02.2019, Accepted on 06.03.2019

with post-mortem interval less than 24 hours to avoid artefacts due to early or late decomposition changes. Cases presenting as sudden unexpected deaths with history suggestive of heart disease were studied in detail. Detailed history as to the circumstances leading to death, any past history of myocardial infarction, or symptoms suggestive of heart disease like, breathlessness, chest pain, collapse, were obtained from the relatives, inquest papers and wherever possible from the hospital records. The cases presenting as sudden death were either the patient was found dead or was declared as "brought dead" in the hospital and hospital admitted patientswho died within 24 hours of admission. All the cases were subjected to medico legal autopsy after completion of Police/Magistrate Inquest. Final cause of death was ascertained after histopathological examination and Triphenyl Tetrazolium Choride (TTC) staining.

Results

Table 1: Age and sex distribution

Age (yrs.)	Male (%)	Female (%)	Total	Percentage
21-30	3 (3.57)	1(0.89)	4	3.57
31-40	4 (4.76)	5 (17.85)	9	8.0
41-50	13 (14.17)	11 (39.20)	24	21.42
51-60	36 (42.85)	10 (35.72)	46	41.0
61-70	26 (30.95)	1 (3.57)	27	24.10
71-80	2 (1.38)	00 (0)	2	1.78
Total	84 (100)	28 (100)	112	100

Total number of cases of sudden natural deaths due to cardiac and coronary pathology was 112. The minimum age was 21 years and maximum 72 years. Peak incidence of sudden cardiac death was seen in the age group of 51-60 years. Out of the total 112 cases 75% were male and 25% were females. However the observed difference in age groups between male and female cases was not found to be statistically significant (Table 1).

Table 2: Distribution of Occupation

Occupation	Frequency	Percentage
House Wife	9	8.0
Sedentary Workers	51	45.5
Govt.Service	7	6.3
Unemployed	9	8.0
Hard Workers	33	29.5
Not Known	3	2.7
Total	112	100

Out of total cases 45.50% were occupied with sedentary work (Small scale business, shopkeeper, others working in private sector like mill, industries etc) followed by 29.5% of the cases were doing a occupation of heavy work such as labourer, street vendor, taxidrivers and in 3 cases occupation status was not known (Table 2).

The socioeconomic status was assessed by Kuppuswamy's socioeconomic status scale [10].

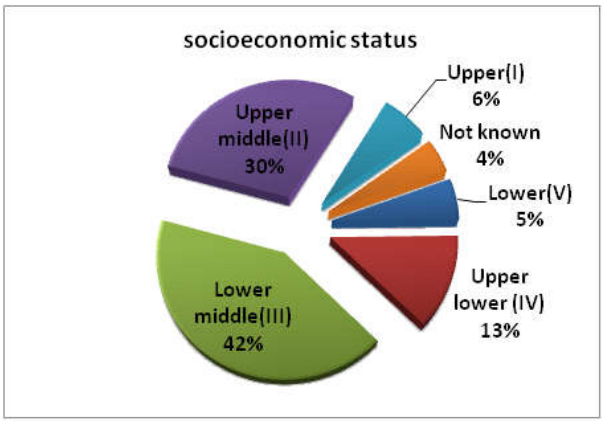

Fig. 1: Socioeconomical status

The above figure 1 shows that about 47 (42.0%) cases were of lower middle class, followed by the upper middle class 33 (29.5%), upper lower class 14 (12.5%), upper class 7 (6.3%),lower class 6 (5.4%) and in 5 (4.5%) cases status was not known (Fig. 1).

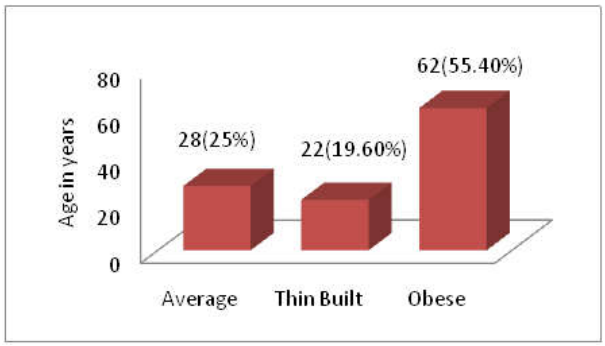

Fig. 2: Nourishment

In present study maximum number of cases of sudden deaths due to cardiac and coronary pathology were seen in obese individualsi.e. 62 cases (55.4%) and least number of deaths due to cardiac causes were seen in Thin built individuals i.e. 22 cases (19.6%) (Fig. 2).

Table 3: Distribution of Risk Factors for Sudden Cardiac Death

Risk Factors	Frequency	Percentage
Hypertension	33	29.5
Diabetes mellitus	28	25.0
Hypertension + Diabetes mellitus	10	8.9

Smoking	11	9.8
Tobacco chewing	4	3.6
Smoking + Tobacco chewing	6	5.4
Smoking + alcohol consumption	1	0.9
Smoking + Tobacco chewing+ alcohol consumption	3	2.7
No risk factor	16	14.3
Total	112	100

It was observed that out of 112 cases of sudden cardiac deaths, hypertension was seen in 33 (29.5%) cases, followed by Diabetes mellitus and Smoking in 28 (25%) and 11 (9.8%) cases respectively (Table 3).

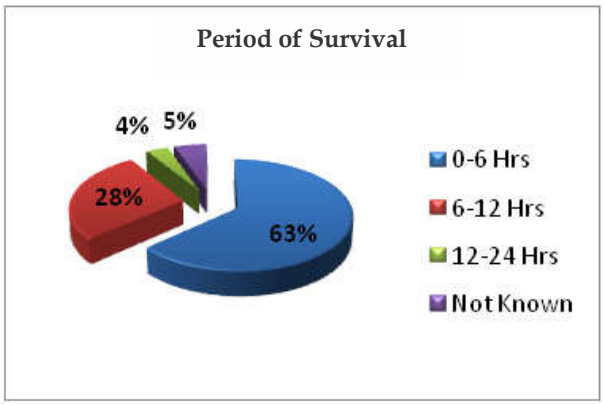

Fig. 3: Period of survival

In present study maximum number of sudden deaths occurred within 6 hours of onset of symptoms i.e. 71 (63.4%), 31 sudden deaths (28.0%) occurred within 6-12 hours and in 4% cases death occurred within 12-24 hours of onset of symptoms (Fig. 3).

Table 4: History of Previous Myocardial Infarction (MI)

MI	Frequency	Percentage
Present	35	31.2
Absent	77	68.8
Total	112	100

In present study, out of 112 cases, histroy of previous myocardial infarction was present in 35 (31.2%) cases and detail history was not available in rest of the cases (Table 4).

Table 5: Comparison of Cause of Death

Sex		Male	Female	Total	Percentage
Coronary artery disease (CAD)	A.C.I.	34	16	50	44.64
	A.C.I with O.M.I	34	4	38	33.9
	A.M.I.	10	3	13	11.6
Cardiac tamponade		1	0	1	0.9
Mitral stenosis		3	2	5	4.46
Dilated cardiomyopathy		2	3	5	4.46
Total		84	28	112	100

As per table 5 sudden deaths due to cardiac and coronary pathology showed that 90 % (101cases) ofcases dieddue to coronary artery disease out of which 44.64% had Acute Coronary Insufficiency (ACI) while 33.9 % cases had acute coronary insufficiency with Old Myocardial Infarction (OMI) and remaining 11.6 % died due toAcute Myocardial Infarction (AMI). Rest of the 11 cases died due to various cardiac pathology other than coronary insufficiency like cardiac tamponade, dilated cardiomyopathy and mitral stenosis (Table 5).

Discussion

In present study, majority of sudden cardiac deaths occurred in male (75%) which was comparable with the study of Kumar V et al., [11] Sarkioja T et al., [12] Zanjad NP et al., [13] Azmak AD [14] and Garg S et al. [15]. Male predominance is due to the fact that, males have more stress, smoking habits and absence of cardio protective hormone estrogens.

Most common age group involved was 51-60 years which covered 41% of cases which is similar to results of PJ Manvar et al study [16]. Sudden cardiac deaths found to be more in sedentary workers (45.50%) which is similar to results (30.60%) of Kumar et al. [11]. This study revealed that 42% sudden cardiac deaths were seen in Lower middle class population. Kuller L et al. [17] reported similar findings.

In the present study more number of sudden cardiac deaths due to coronary artery disease was associated with risk factors like obesity, hypertension and smoking. Similar findings were observed in study in Finland conducted by Pekka Jousilahti et al. [18].

We found that majority (63%) of patients died within first 6 hours of onset of fatal episodes. Similar findings were found in the study conducted by Spain DM et al. [19] which showed 91% of deaths occurred within one hour of fatal episodes. The present study revealed that 90.14% sudden cardiac deaths occurred due to coronary artery disease. Similar findings were observed by Papadodima SA et al., and Chandrakala Joshi [20,21].

Conclusion

The study concluded that 51-60 years age group was commonly involved and succumbed due to sudden cardiac death. People with low socioeconomic status and sedentary workers were more vulnerable compared with other class. Risk factors like Hypertension, Diabetes, Obesity and Smoking contributed to sudden cardiac deaths. Maximum deaths occurred within first 6 hours of onset of symptoms, indicating the fatality of the Coronary artery disease.

Authors of the study recommend that persons with age above 35 years with obesity and habits of smoking, engaged in sedentary occupation should carry out regular health checkup and modify their diet and lifestyle. They should engage themselves in regular physical activity and be at mental peace to lead a stress free life.

References

1. Apurba Nandy. Principles of Forensic Medicine including Toxicology. 3rd Edition, New Central Book Agency (P) Ltd: Kolkata, 2010.pp.226-29.
2. Goldberger JJ, Basu A, Boineau R, Buxton AE, Cain ME, Canty JM. et al. Risk stratification for sudden cardiac death a plan for the future. Circulation. 2014;129(4):516-26.
3. Harmon KG, Asif IM, Klossner D, Drezner JA. Incidence of sudden cardiac death in national collegiate athletic assoc-iation athletes. Circulation. 2011;123(15):1594-600.
4. Reddy KS. Cardiovascular disease in non-Western countries. N Engl J Med. 2004 June 10;350:2438-40.
5. Pouleur AC, Barkoudah E, Uno H, Skali H, Finn PV, Zelenkofske SL, et al. Pathogenesis of sudden unexpected death in a clinical trial of patients with myocardial infarction and left ventricular dysfunction, heart failure, or both clinical perspective. Circulation. 2010;122(6):597-602.
6. Sapate AB, Petkar MR, Ghangale AL, Arora PK, Datir SB. Autopsy profile of natural causes of sudden deaths and survival time. International J. of Healthcare and Biomedical Research. 2015;3(4):126-134.
7. Goldstein S. The necessity of a uniform definition of sudden coronary death: witnessed death within 1 hour of the onset of acute symptoms. Am Heart J. 1982;103(1):156-9.
8. Matoba R, Shikata I, Iwai K, Onishi S, Fujitani N, Yoshida K, et al. An epidemiologic and histo-pathological study of sudden cardiac death in Osaka Medical Examiner's office. JpnCirc J. 1989;53(12):1581-8.
9. World Health Organization. Myocardial infarction community registers: results of a WHO international collaborative study coordinated by the Regional Office for Europe. Public Health in Europe 5. Copenhagen: Regional Office for Europe, World Health Organization, 1976.
10. Kuppuswamy B. Manual of socioeconomic status (Urban), 1st ed. Delhi: Manasayan; 1981.pp.66-72.
11. Kumar V, Abbas AK, Fausto N, Aster, Robbin's and Cotran. Pathological basis of disease. 7th ed. Noida: Elsevier, Health sciences Education, Marketing: 2008.
12. Sarkioja T. Hirvoven J. Causes of sudden unexpected deaths in young and middle aged persons. FSI 1984;24(4):247-261.
13. Zanjad NP, Nanadkar SD. Study of Sudden Unexpected Deaths In Medico-Legal Autopsies. JIAFM. 2006;28(1):27-30.
14. Azmak AD. Sudden deaths in Edirne, Turkey, from 1984 to 2005. Med. Sci. Law 20007;47(2):147-155.
15. Garg S, Hasija S, Sharma P, Kalhan S, Saini N, Khan A. A histopathological analysis of prevalence of various heart diseases: an autopsy study.Int J Res Med Sci. 2018 Apr;6(4):1414-1418
16. PJ Manvar, DK Vadgama, HM Mangal, PR Varu, RD Vaghela. Autopsy study of coronary artery atherosclerosis in Rajkot Region. Indian Journal of Forensic and Community Medicine, 2016 Oct-Dec;3(4):251-253
17. Kuller L, Lilienfeld A, Fisher R,Sudden and Unexpected Deaths in Young Adults An Epidemiological Study. JAMA. 1966;198(3):248-252.
18. Jousilahti P, Vartiainen E, Tuomilehto J, Puska P. Sex, Age, Cardiovascular Risk Factors, and Coronary Heart Disease A Prospective Follow-Up Study of 14786 Middle-Aged Men and Women in Finland. Circulation. 1999;99(9):1165-72. PMID:10069784
19. Spain DM, Bradess VA, Matero A, Tarter R. Sudden Death Due to Coronary Atherosclerotic Heart Disease: Age, Smoking Habits, and Recent Thrombi. JAMA. 1969;207(7):1347–49.
20. Papadodima SA, Sakelliadis EI, Kotretsos PS, Athanaselis SA, Spiliopoulou CA. Cardiovascular disease and drowning: autopsy and laboratory findings.Hellenic J Cardiol. 2007 Jul-Aug;48(4):198-205.
21. Joshi C. Postmortem study of histopathological lesions of heart in cases of sudden death - an incidental findings. J Evid Based Med Healthc. 2016;3(6):184-86.

Original Article

Indian Journal of Forensic Medicine and Pathology
Volume 12 Number 1, January - March 2019
DOI: http://dx.doi.org/10.21088/ijfmp.0974.3383.12119.6

Pattern and Prevalence of Congenital Malformation of Fetus: Autopsy Based Study

Seemant Kumar Saini[1], Matariswa Samanta[2], DR Mathur[3], Anna Purna Mathur[4]

Abstract

Introduction: Autopsy is an important aspect of clinical service, providing clinicians with critical feedback regarding diagnostic accuracy, therapeutic efficacy, and medical complication [1]. Rajasthan has reportedly the second Indian state having highest number of child marriages in the country with more than 60 percent of girls getting married before 18 [1]. The practice of child marriage is common in Rajasthan. Along with cultural incest marriage leads to one most important causes of fatal anomalies. Early diagnosis of life threatening congenital malformation can pave the way for surgical correction or palliation of these infants [1].

Material and Method: We studied 217 cases of fetal autopsies from January 2017 to October 2018 duration of one year retrospective study. Purpose of study is pathological and legal correlation in aspect of M:F ratio, age of termination of pregnancy, fetal anomalies & its pattern In Pacific Institute of Medical Sciences (PIMS) and M.R. Medical College, Gulbarga, Karnatka.

Results: Total fetal autopsies done are 217, out of which 51 are anomalous.Among them 22 are male and 28 are female babies and 1 sex is not determined {ambiguous}. In our study M:F ratio is 1:1.35. Most common cause of death found in autopsy examination is meconium aspiration in male fetus and placental insufficiency in female fetus. And mean age of gestation is 29 week and 30 weeks respectively. Mean age of the mother is 29 years.

Conclusion: Fetal autopsies provide us an important information about pattern of anomalies, their incidence and cause of death in relation with sex and age of fetus, maternal age, along with socio-economical status. Legal implications regarding fetal autopsies is still a field of interest.

Keywords: Fetal Autopsy: Fetal Anomalies: Legal Aspects.

How to cite this article:
Seemant Kumar Saini, Matariswa Samanta, DR Mathur, et al. Pattern and Prevalence of Congenital Malformation of Fetus: Autopsy Based Study. Indian J Forensic Med Pathol. 2019;12(1): 29-36.

Introduction

Fetal autopsy includes external, internal and histopathological examination of dead fetus along with placental examination [2].

Authors Affiliation: [1]Senior Resident, Dept. of Pathology Pacifice Institute of Medical Sciences, Udaipur, Rajasthan 313015, India. & Former Resident of Mahadevappa Rampure Medical College, Kalaburagi, Karnataka 585105, India. [2]Assistant Professor [3]Professor & Head, Dept of Pathology [4]Professor & Head, Dept of Gyanecology & Obstrectics, Pacifice Institute of Medical Sciences, Udaipur, Rajasthan 313015, India.

Corresponding Author: Matariswa Samanta, Assistant Professor, Pacifice Institute of Medical Sciences, Udaipur, Rajasthan 313015, India.

E-mail: seemanth.saini@gmail.com

Received on 27.11.2018, **Accepted on** 28.12.2018

There are two types of fetal autopsy.

1. Medico-legal autopsy
2. Academic autopsy

Medico legal Autopsy– is conducted on requisition of police under section Crpc -174 to know the cause of death, age, sex and viability of fetus for which police inquest& panchnama is required [2].

Academic Autopsy / Clinico-pathological Autopsy– is conducted on request of obstetrician, pediatrician, radiologist or family members of fetus to know the cause of congenital malformation if any and cause of repeated abortions, where in the detail pre and post natal history of mother and consent of parents /relatives with the collaboration of concerned department is necessary [2]. Placental examination is done to know the cause of death to certain extent and placental pathology explains the cause of prematurity.

In our study we performed 217 cases of fetal autopsy to rule out cause of death and associated anomalies, which is helpful in future family planning for couples and improvement of management of anomalous babies

Etiological diagnosis in unexplained fetal deaths is possible with detailed evaluation of fetus. Fetal autopsy is confirmative in 28.6-89%, diagnostic in 10-38%; it provided additional information in 3.9-24% cases; it changed the predicted probability in 18% cases In addition, the data pertaining to demography, socio-economic status, and maternal health is helpful to pinpoint the factors behind the occurrence of fetal loss.

Congenital anomalies were estimated to be the fifth largest cause of neonatal deaths in India after preterm births (34.7%), intrapartum complications (19.6%), pneumonia (16.3%) and neonatal sepsis (15%) Despite this ranking, in absolute numbers, congenital anomalies were estimated to contribute to 60699 neonatal deaths in India in 2013, which accounted for the highest global burden of neonatal mortality due to congenital anomalies India lacks national birth defects surveillance, indicating that there is no data on the magnitude of congenital anomalies in the country [7,8]. Thus, systematic data on the magnitude of congenital anomalies, the most prevalent types of congenital anomalies, their healthcare impact and their impact on neonatal health are required, especially as India has announced a program me for the management of children born with selected birth defects like cleft palate lips etc. [9,10].

Materials and Method

We studied 217 cases The present study of congenital anomalies in fetal and neonatal deaths was done at PIMS. Study conducted over a time period of 8 month from January 2017 to october 2018. Consent for autopsy in requested compassionately, respectfully and was fully informed. Autopsy was within the scope of the autopsy permit and all the legal requirements are met before it is conducted. The dissecting instruments required for fetal and neonatal (perinatal) autopsy are small scissors and forceps and scalpels. The autopsy protocol was including space for recording specific measurements and norms for particular gestational ages.

Measurements

The crowns heal length (CHL) and crown rump (CRL) length determined to the nearest 0.5 cm. Chest and abdominal circumferences were taken at the level of the nipple and umbilicus respectively. Both limb measurements has been taken. The metric documentation of changes in the face is often a valuable component of the autopsy. So the distances between the inner canthi and outer canthi, nasal height and width, philtrum height, mouth width and ear length are obtained and compared with published norms. Weights: Scales accurated to 0.1 gm.in perinatal specimens. All major organs weighed (i.e. thymus, heart, lungs, liver, spleen, kidney, adrenal glands, brain and placenta) and the date recorded in the autopsy protocol along with expected values. Photographs were taken which provide indisputable evidence of findings and study of dysmorphic face images, for important diagnostic information [3].

Inclusion and exclusion criteria

The present study included dead fetus and neonates with gestational age 18 to 40 weeks of intra uterine life. All fetuses of gestational age <12 weeks and all neonates above 7 days of age were excluded from the study. Autopsy was performed by standard technique adopted by Edith L. Potter.

Procedure

1-External examination

Done for inspection of cyanosis, injuries and maceration, skin lesions, all major and minor developmental anomalies were described. The y shaped incision was taken which extend from the anterior aspect of each shoulder to the xiphoid process. Umbilical vein examined for signs of inflammation, vernix, rupture (or) thrombus. The two umbilical arteries are examined and inspected in their entirety. The arteries and urachus examined for patency and the arteries for hemorrhage (or) thrombosis. Single umbilical artery was an important anomaly noted. The autopsy protocol included the removal of thoracic, cervical, abdominal and pelvic organs en block and subsequently dissected into organ blocks [3].

2- Internal examination

All internal organs position and size and weight were examined. The internal genitalia are inspected. As the testis will be undescended in younger fetuses, are removed with abdominal contents. Prior to opening of the pleural cavities

the possibility of pneumo thorax is ruled out. on entering the chest each cavity inspected for fluid. Each lung was examined for developmental changes carefully. The integrity and tension of the pericardium are ascertained and the pericardial cavity is looked for the presence of free gas (or) fluid and fibrinous deposition. Heart examined in situ, while anatomic relationship with structures were intact, inspected externally and internally, in a systematic fashion that follows the flow of blood. All major veins and arteries were examined. The diagnosis of premature closure of foramen ovale if any are noted. The configuration of tricuspid valve, right ventricle, and main pulmonary artery were studied. The endocardium, myocardium, and configuration of trabeculae, pectinate and papillary muscles and chordae tendineae were examined. After opening the left part of heart, the interior of the left atrium [3] pulmonary venous orifices, mitral valve and left ventricle were inspected, followed by examination of the aortic valve and ascending aorta All other organs were removed en bloc by the rokitansky methods of evisceration. Neck structures trachea and esophagus were examined. The scalp, fontanels, and cranial sutures were examined by palpation and any changes were documented. The fontanels, sutures, and glia were examined and any changes were documented. brain has been exposed and examined in situ. Then the brain was removed and examined on all sides and placed in fixative. Attention to the cranial base and dural sinuses was given [3].

3- Dissecting the viscera

Examination begins with the most posterior structures and moved anteriorly layer by layer. Aorta, inferior vena cava, adrenal glands and posterior surface of the urinary system exposed and examined. Adrenal glands, kidneys, ureters and urinary bladder were examined. The vagina and uterus were opened in the anterior midline and examined. The liver, gallbladder and structures of the porta hepatis, portal vein, hepatic artery and common bile duct were identified and dissected as indicated [3].

The esophagus was opened in the posterior midline while intact with trachea. In this way a trachea-esophageal fistula can be identified and opened. Next the incision carried into the stomach. After major hilar structures of the lungs have been opened and inspected, attention was turned to the lungs. Lobation and condition of the visceral pleura were presumably ascertained. In case of bladder outlet obstruction, the entire urethra is examined for posterior urethral valves (or) other abnormalities (i.e., anterior urethral valves, mega urethra). Placenta was available in only few cases [3].

4-Histopathological examination

The organs after evisceration and external examination were fixed in 10% formalin. Blocks of tissues for microscopic examination were taken, one block from each lobe of both lungs. One block each from thymus, heart, stomach, liver, spleen, pancreas, small intestine, large intestine, kidneys, adrenals, and any doubtful lesions were taken. Sections were studied in the routine way with Haemato-xylin and Eosin (H&E) stains. Special stains were done whenever necessary and studied. Autopsy findings were compared with ultrasound findings whenever available.

Results

In present study out of 217 patients 213 (98%) were fetal death and 4 (2%) cases of neonatal death were included in present study. Among 217 cases 51 found to anomalous. Relation between maternal age and neonatal death mean age of mother was 29 years. 99 (45.6%) fetal death seen in maternal age group was 20-24 years. While in neonatal death maternal age most commonly involved was 25-29 years.

External anomalies most commonly seen in present study was Neural and spinal malformations that included 77% of external anomalies. While Lymphatic system & Circulatory system involvement was only 5.5% in present study.

In Internal congenital anomalies diaphragmatic hernia (40%) was most common anomaly seen followed by atelectasis of lung i.e. 33% in present study. Cardiac and genitourinary anomalies involvement was 13% respectively.

Relationship between anomalous fetus and weight of fetus reveals that 47 anomalous fetus had weight of 1000 gm, 800 gm & 750 gm respectively while 4 fetus had normal weight range 2.5 to 3.5 kg. And 30-34 year of maternal age involved maximum number of anomalous fetus which was 47% seen in present study.

Anomalous pattern in 22 male fetus involved Neural and spinal Malformation (8 cases) > Pulmonary malformation (6 cases) > cardiac malformations (3 cases) > genitourinary & Renal malformation (1 case) and in miscellaneous 4 cases

2 cases diagnosed as Edwards syndrome. while anomalous pattern in female fetus included no of cases were 28, female fetus it s bit higher incidence as compare to male fetus anomalies ratio of anomalies in study was 1:1.3, Neural and spinal Malformation (8 cases) > Pulmonary malformation (7 cases) > Genitourinary & Renal malformation (6 cases) > cardiac malformations (1 case). In miscellaneous category total number of cases were 6 cases among them 2 cases diagnosed as Klipilfeil Syndrome & 2 cases diagnosed as Achondrodysplasia in present study. Thanatropic dysplasia seen in 1 case (sex was not determined). As we mentioned consensual marriage incidence in our study is 83%, 180 cases had history of consensual marriage a great significance in formation of anomalous fetus pattern and preventable cause by spreading awareness among population subgroups. There is no toxicological study done in present study due to lack of any relevant significance because cause of death known in all cases as malformation.

Table 1: Percentage of fetal deaths (FD) and early neonatal death (END).

Classification	No. of cases	Percentage (%)
Fetal death (FD)	213	98
Neonatal death (ND)	04	2
Total		

Table 2: Relation of maternal age (yrs) with no of fetal/neonatal deaths

Maternal age (years)	fetal death		Neonatal Death	
No.	No	%	No	%
19	3	1.38		
20-24	99	45.6		
25-29	81	37.3	3	1.38
30-34	23	10.5	1	0.5
s35-39	07	3.22		
Total	213		4	

Table 3: External congenital anomalies

System affected	Type of anomaly	No	%
Neural &spinal malformation	Anencephaly	5	28
	Omphalocele	1	5.5
	Meningocele	5	28
	Hydrocephalus	2	11
	acephalus	1	5.5
Lymphatic system	Hamartoma nape of neck	1	5.5
Skeletal system	Achondroplasia	2	11
Circulatory system	Single umbilical artery	1	5.5.
Total		18	

Table 4: Internal congenital anomaly

	Type of anomaly	No.	%
Respiratory system	Atelectasia of lungs	5	33
Genitourinary system	Polycystic kidneys	2	13
Cardiac system	Tetrology of Fallot	1	6.6
	Hypoplastic heart	1	6.6
others	Diaphragmatic hernia	6	40
Total		15	

Table 5: Relation between Maternal age , Fetal weight and fetal anomaly

Total anomaly	Mother Age (Yr)	Fetal anomaly	Fetal weight (Mean wt)	
51 cases			Total no case-47	Total no of case – 04 case
	25-29	20	1000 gm	
	30-34	24	800gm	2.8 kg
	35-39	07	750gm	

* 04 Cases Having Normal Weight Range 2.5 -3.0

Table 6: Fetal Anomaly Pattern According to Sex Distribution Anomaly Pattern in male fetus-22 Cases (Study of 217 Cases)

Sno.	Neural & Spinal Malformation 8 Cases	Cardiac Malformation 3 Cases	Pulmonary Malformation 6 Cases	Genitourinary / Renal Malformation 1 Case	Miscellenous 4 Cases
1	Anencephaly -1	Myocarditis-1	Atelectasis – 3 cases	Poly cystic Kidney -1	Hydrops Fetalis-1
2	Anencephaly with Spinabifida-1	Tetrology of Fallot -1	Diaphragmatic Hernia – 2cases		Chlongiomatous placenta-1
3	Omphalocele-1	Hypoplastic Heart -1	Congenital Adenoid Cystic Malformation-1		Edward syndrome (Trisomy – 18) – 2 cases
4	Meningocele -1				
5	Meningocele-Myelocele-1	-	-	-	-
6	Meningocele Encephocele-1	-	-	-	-
7	Hydrocephalus-1	-	-	-	-
8	Hydrocephalus with Spinabifida-1	-	-	-	-

Table 7: Anomaly pattern in female fetus study of (total 217 cases) – 28 cases

S.No.	Neural & Spinal Malformation -8 Cases	Cardiac Malformation-1 Case	Pulmonary Malformation-7 Cases	Genitourinary / Renal Malformation-6 Cases	Miscellenou-6 Cases
1	Anencephaly – 3cases	Ebstein Anomaly	Partial Atelectasis – 2cases	Uretheral Stenosis	Sacrococcygeal teratoma
2	Anencephaly with Spinabifida- 2case		Diaphragmatic Hernia – 2cases	Extrophy Bladder	Hamartoma of Nape of neck
3	Anencephaly with spinal deformity		Diaphragmatic Hernia with CCAM Type II– 2cases	Winters Syndrome – Renal Dysplasia	Achondrodysplasia – 2cases
4	Acephalous		Congenital Adenoid Cystic Malformation TYPE III	Bilateral Renal Cystic Diseases	Klipilfeil Syndrome – 2 cases
5	Meningocele-occipital			Mermaid – Renal Agenesis	
6				Renal – Hepatic -Splenic Dysplasia	

* Thanatropic dysplasia – 1 case (sex not determined), m:f- 1 :1.3 , Total anomalous – 51 cases

Fig 1: Gross – fetus with short neck (web neck) and meningocele

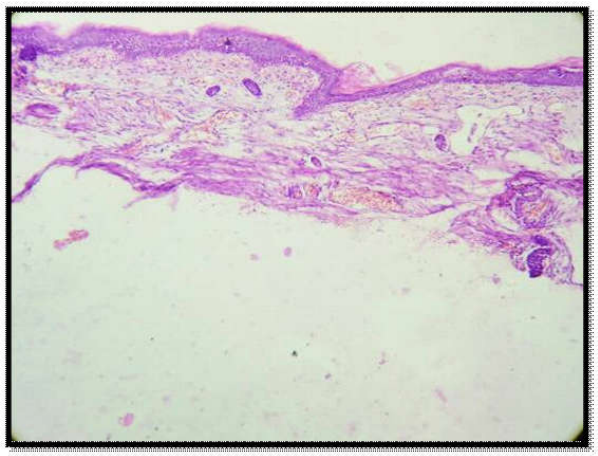

Fig. 2: H & E (400x) section reveals meninigocele-showing kertinized stratified squamous epithelum with neural tissue

Fig. 3. Gross–lung showing multiple cystic lesion

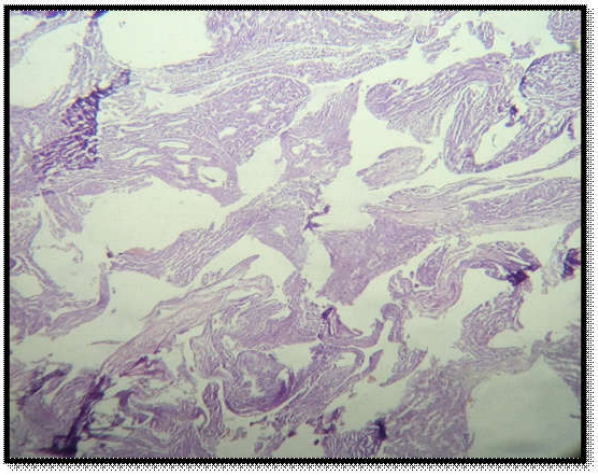

Fig.4: H & E (400x) section showing congnital cystoid malformation type-1

Fig. 5: Gross - fetus showing polycystic kidney &omphelocele

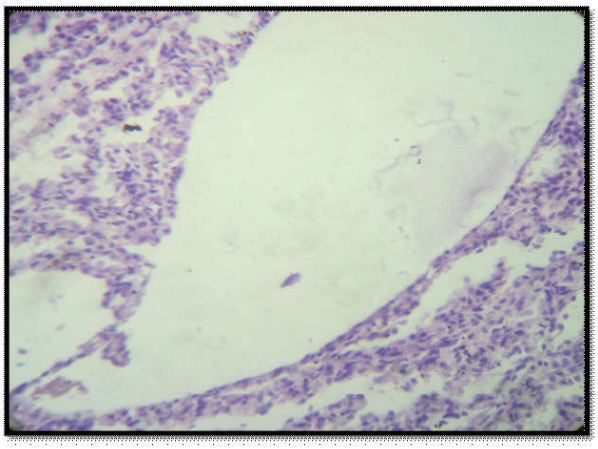

Fig. 6: H&e (400 x) section showing multiple cystic lesion - polycystic kidney

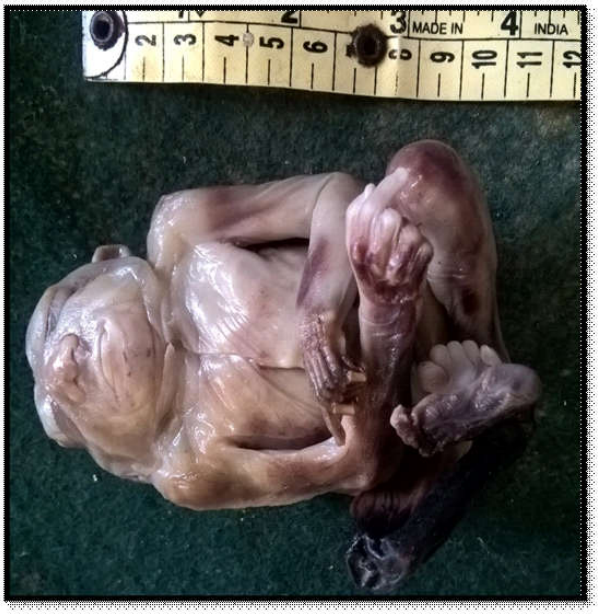

Fig. 7: Gross picture fetus showing microcephaly

Fig. 8: gross picture fetus showing meningocele

Discussion

Fetal autopsy significantly contributes to the diagnosis of intrauterine fetal death and congenital anomalies are a major cause of perinatal death. Congenital malformations in fetal and neonatal deaths vary in different studies. The study of malformations greatly helpful in genetic counseling

and prenatal diagnosis in successive pregnancies1.

In the present study 217 fetal and neonatal autopsies were carried out among 213 fetal and 04 neonatal deaths that occurred in PIMS, during the period from Jan 2018 to Oct 2018. Prevalence of Congenital malformations account for 23.5% of fetal and neonatal deaths. This incidence matches with the study by Rabah M. Shawky, Nermine S. Elsayed

Maternal Factors

In present study, the incidence of congenital malformations were higher in mother's age group of 25 to 39 years. In 25 to 29 years out of 217 fetal and neonatal deaths 20 (9.2%) cases got anomalies. In 30 to 34 years of maternal age group, 24 (11.05%) cases got anomalies. In 35-39 years of maternal age group, 07 (3.2%) cases got anomalies many authors have shown higher incidence of malformations in the babies born to maternal age between 20 to 35 years. The observations in the present study is that 90% of the cases belong to multi gravid and 10% cases belong to primi gravida. In our study the incidence of congenital anomalies were increased with the increase in maternal age

Fetal Factors

In present study, the incidence of congenital malformations were higher among the low birth weight infants (<1500 gm) in comparison to the normal weight accounting for 04 cases. The association of low birth weight and malformations has been well documented. Many studies have documented male predominance amongst congenital malformed babies. However, in the present study we observe 22 male babies and 28 female babies with congenital malformation. In a five year study on major congenital anomalies in Turkey by Tomtair et al., 14 there were 183 cases (2.9/1000) of single (or) multiple congenital Anomalies among 63,159 live births. The most common anomalies were related to the nervous system (31.1%), cleft palate and lip (18.6%), musculoskeletal system disorder (14.2%) and chromosomal anomalies (13.1%). Both genders were found to have greater anomalies related to the nervous system (34.9% of girls and 28.3% of boys) while amongst.

In present study CNS malformation is the most common. (17cases 8%) in 217 cases. Among them most common follows the order Meningocele > Anencephaly > Hydrocephalus. Second most common malformation is pulmonary malformation (13 cases 6%) in 217 cases ,most common is Diaphragmatic Hernia than Atelectasis of Lung. Urogenital malformation (7 cases 3.2%) in 217 cases – with female predominance.

Benefits of Autopsy

The direct benefits of autopsy to parents are not limited to refining the risk of recurrence. Even after autopsy, sometimes a definitive final diagnosis cannot be made and information given to parents may cover a range of possible diagnoses. In such cases the storage of fetal samples for possible future genetic analysis provides the hope of an accurate diagnosis (which may have ramifications for the wider family) at a much later date. In most cases in which the scan findings are confirmed parents can gain comfort that their baby had the prenatally suspected condition. The finding of additional malformations, as well as in some cases changing the diagnosis, may be helpful in targeting tests in a subsequent pregnancy. A wider importance of autopsy is in its value for quality control for prenatal diagnosis, teaching, and research [5].

The decline in autopsy rate and issues surrounding the retention of tissues and organs for diagnostic studies, teaching, and research has been the subject of much debate since the adverse publicity concerning autopsies and organ retention Parents should be provided with full information and not be coerced into accepting an autopsy examination. It is important that those advising them at such a sensitive time do not take what may be the superficially kinder route of avoiding detailed discussion about the autopsy. Parents need full information about the potential benefits of the examination, including details both about the procedures involved and about the benefits in providing information about risks of recurrence if they are to make a truly informed decision. This discussion should be with an appropriately trained professional [5].

Our study provides important information for parents. If a termination has been carried out because of anomalies detected by ultrasound scan, by declining an autopsy, parents will remain ignorant of information of recurrence risk.

Conclusion

The study of dead is to save the livings. Congenital malformations have become important cause of fetal and neonatal mortality in developed countries and would very soon be increasingly

important determinants of fetal and neonatal mortality in developing countries like India and of various states- like Rajasthan, Karnataka & Andhra Pradesh where consensual marriage is common which is known cause of congenital malformation This study was undertaken with the purpose of finding out cause of death during the perinatal & neonatal period at PIMS Udaipur, to see pattern and prevalence of congenital anomalies and implication of legal aspects of fetal autopsy.

Confliction of interest: No

Ethical clearance: Not necessary.

References

1. Abdul Azeez E.P., Amit Poonia, Determinants, Attitude and practices on child Marriage Evidences From Rural Rajasthan. Social Work Chronicle 2015;4(1 & 2):1-15.
2. Mariana Costache, Anca Mihaela Lazaroiu, Andreea Contolenco. Clinical or Postmortem? The Importance of the Autopsy: A Retrospective Study. A Journal of Clinical Medicine. 2014 Sep;9(3):261–65.
3. Cristoforo Pomara, Steven B. Karch,Vittorio Fineschi, Forensic Autopsy: A Hand Book and Atlas, 2010.
4. Ludwig J. Principles of autopsy technique, immediate and restricted autopsy and other special procedure. In: Ludwig J, eds. Handbook of Autopsy Practice. 3rd ed. New Jersey: Human Press; 2002: 3-6.
5. Park K. Congenital malformations. In: Park K, eds. Park's Textbook of Preventive and Social Medicine. 18th ed. Jabalpur: Banarasidas Bhanot Publications; 2005:379-380.
6. Siva Sankara Naik V et al. Study of various congenital anomalies in fetal and neonatal autopsy. Int J Res Med Sci. 2015 May;3(5):1114-21.
7. Grover N. Congenital malformations in Shimla. Indian J Pediatr. 2000;67(4):24
8. Seshadri S, Guruswamy T, Jagadeesh S, Suresh I. Methodological issues in setting up a surveillance system for birth defects in India. Natl Med J India. 2005;18:259-62.
9. Radha Rama Dcvi A. Appaji Rao N. Bittles AH. Inbreeding inthe state of Karnataka. South India. Humn Hered. 1982;32:8-10.
10. Kumar S. Pai RA. Swaminathan MS. Consanguincous marriages and the genetic load due to Iethal genes in Kerala. Ann Humn Gentet 1967;31:141-5.
11. Rav AK. Nature, amount and extent of consanguinitv among two South Indian castcs. J Hered. 1979;70:281-296
12. Centerwall WR. Savarinathan G. Mohan LR. Booshanan V. Zachariah M. In breeding patterns in South India. Soc Biol. 1969;16:81-91.

Original Article

Indian Journal of Forensic Medicine and Pathology
Volume 12 Number 1, January - March 2019
DOI: http://dx.doi.org/10.21088/ijfmp.0974.3383.12119.7

Assessment of DASS-21 Scale Among Fresh Medical Students: A Forensic Prospective Study

Sattar MA[1], Ram Reddy CR[2]

Abstract

Context: Medical studies are demanding and require regular hard work to cope up with the competition and complexity. It may lead to depression and anxiety disorders. The stress-tolerance level among the new generation of medical students seemed to be low.

Aims: To assess the stress tolerant levels and to know the prevalence of depression and anxiety

Settings and Design: A cross sectional, questionnaire-based survey was carried out among the undergraduate medical 1st and 2nd years students of Malla Reddy Institute of medical Sciences, Hyderabad.

Methods: About 175 students participated voluntarily out of 300 students from first and second year MBBS during the period "June 2018 to Sep 2018". The depression levels were assessed using Zung depression scale. Students were asked to complete the questionnaire and then the depression levels calculated in reference to Zung depression scale .The stress inducing factors during their course of medical education were also assessed

Statistical Analysis: The data was analyzed using proportions

Results: The overall prevalence of Depression, Anxiety & Stress (DAS) among the students was 25.14%, 24.57% 41.71% respectively without much difference among boys and girls i.e. 43.42%, 50.42% respectively. The prevalence of DAS in first year are 18.82%, 27.05%, 44.70% respectively and among second year students are 31.11%, 22.22%, 38.88% respectively.

Conclusion: The prevalence of depression anxiety and stress seemed to be more prevalent among second years compared to that of first year students

Keywords: Medical Students; Depression; Anxiety & DASS- 21.

How to cite this article:
Sattar MA, Ram Reddy CR. Assessment of DASS-21 Scale Among Fresh Medical Students: A Forensic Prospective Study. Indian J Forensic Med Pathol. 2019;12(1):37-40.

Introduction

Depression and anxiety levels in the community are considered as specific projections for mental status. Many earlier studies have documented stress and anxiety disorders amongst the medical students. According to WHO by 2020, it would be the second-most prevalent condition worldwide [1]. There is considerable evidence that rates of depression and suicide are higher in medical students and that these rates continue to remain elevated when these students become physicians [2]. Medical students are a valuable human resource for our future and depression in them leads to less productivity, reduced quality of life, learning difficulties and may negatively affect patient care [3,4].

Adjustment and general anxiety disorder are the most common problems found among medical students. They turn out to be emotionally unstable and there could be sudden mood swings. Some of the students may even turn towards alcohol or drugs for a change which are easily available nowadays in modern society.

Previous data are also shown fairly high levels of stress and symptoms of depression among medical

Authors Affiliation: [1]Assistant Professor, [2]Professor and Head, Department of Forensic Medicine, Mallareddy Institute of Medical Sciences, Hyderabad, Telangana 500055, India.

Corresponding Author: Sattar MA, Assistant Professor, Department of Forensic Medicine, Mallareddy Institute of Medical Sciences, Hyderabad, Telangana 500055, India.

E-mail: masattarjames@gmail.com

Received on 05.01.2019, **Accepted on** 02.02.2019

students. Even in today's atmosphere also the depression is the major morbidity among medical fraternity colleges. The factors which are effecting seriously on their academics as well as on their quality are as follows:-

Some of these factors which are impinging on their tender minds are,

A. Academic stress
B. Home sickness
C. New relationships (Adjustment disorder)
D. Hectic time schedules
E. Future concerns
F. New life styles

Other factors are parent's compulsion to their children with higher expectations and comparing them with others, thus interfering the child's usual self approach schedules may leading to psychological disturbances. Forcing the students for higher ranks by the corporate institutions are leading to suicidal tendencies. Extreme degree of ragging of juniors by senior students leading to suicidal deaths. According to the diagnostic and statistic manual, fourth edition (DSM-IV), individuals who exhibit five of the following symptoms will meet the criteria for a major depressive disorder:

1. Depressed mood
2. Diminished interest or pleasure
3. Significant weight loss
4. Insomnia
5. Psychomotor agitation
6. Fatigue or loss of energy
7. Feelings of worthlessness
8. Excessive guilt
9. Diminished ability to concentrate
10. Recurrent thoughts of deaths.

These symptoms may not be surfaced clinically and it looks like an iceberg phenomena with subclinical presentation Depression is associated with.

1. Adjustment disorder
2. Bipolar disorder
3. Major depression
4. Precipitation of underlying psychotic disorders like schizophrenia etc.

These disorders if not noticed and not taken care of, may lead to suicidal ideation and he/she may harm himself/herself or he/she may harm others involuntarily in the form of ragging, sexual crimes and outburst as homicides attempt. On April 3rd 2017, a 24 years old MBA student committed suicide by jumping out of a 19th floor of hotel in Mumbai as he was depressed about failure of exam (Deccan chronicle).

A PG medical student of reputed corporate hospital committed suicide by consuming poison as he was depressed of academic stress (Times of India). A dental PG student of a dental college of Hyderabad commits suicide. He was failed in final exam and got depressed. (Deccan chronicle). It is important for medical educators to know the magnitude of depression in students and factors causing them, which not only effects their health and academic achievements but also has serious consequences as Thoughts of self harm, suicidal tendencies and substance abuse, which are the major health issues in youngster's life. However a very few studies are done on this subject, thus we are carrying out this cross sectional study among medical undergraduate of Ist and IInd year students

Methods

This study is a descriptive cross sectional study conducted at Mallareddy Institute of medical Sciences, Hyderabad during a period of June 2018 to Aug 2018. About 175 volunteer students each from two different batches from Bachelor of Medicine and Bachelor of Surgery (MBBS) first and second year were included in the study. We had informed them the purpose of the study and also given the general instructions accordingly. Prior to the study informed consent is taken. The questionnaire containing 21 questions is given to the students and allowed to respond in there in their own way with privacy including basic personal details and stress inducing factors.

Personal Details: Included age, sex, batch, Day boarder or Hosteller.

DASS-21 scale: 5 It is a self rated questionnaire which assess the level of depression symptoms. It has already been used in primary care and community settings and as a screening for depression. The depression levels were assess using DASS-21 scale. The questioner list of DASS-21 scale with four option 0, 1, 2, 3 for which only one has to be considered and marked, depending on which ever suits to his/her mental character of the concerned student. The question points towards the characterization of the concerned neurological situation of the student. Each question is directed with provisional diagnosis of the three above mentioned disorders. These different levels of the psychological disorders are being evaluated on 0-3 scale depending upon the intensity of the mental abnormality.

Results

Total 175 students had responded out of 300 students completely to the questioner in Malla Reddy Institute of Medical College. Majority of the students are from same age group (i.e. 23.76+1.65). Percentage of female students is more when compared to that of male students (58.33%, 44.57% respectively) (Table 1).

Table 1: Demographic parameters of the study subjects

Parameters	(%)/ Mean+ STD
Total study response in our study is	58.33
Total Females respondents %	55.43%
Total Male Respondents %	44.57%
Age of the students (Mean + STD)	23.76+1.65

Among Total study group 120 students are residents of hostel (68.57%), majority are from first year students 91 (75.83%) compared to that of second year students i.e. 29 (24.17%) From total of 55 candidates Day scholars 42 (76.36%) are from first year and 13 (23.64) are from second year. (Table 2)

Table 2: Resident status of study subjects among Ist year and IInd year students

Resident	I Year	II Year	Total
Hostel	91 (75.83%)	29 (24.17%)	120 (68.57%)
Day scholars	42 (76.36%)	13 (23.64%)	55 (31.43%)

Among our total 100 respondents 25 members are seemed to be under Depression, 24 students seemed to be Anxiety, 42 students looked as they are under Stress and 9 students are Normal (Fig. 1).

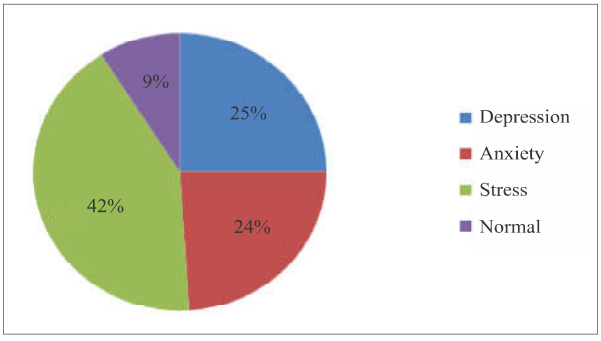

Fig. 1: Percentage of DASS among study respondents

According to our respondent data, Depression, Anxiety and Stress is seen more in first year students (31%, 26%, 37%, 7% respectively) compared to that of second year students (19%, 25%, 46%, 11% respectively. (Fig. 2).

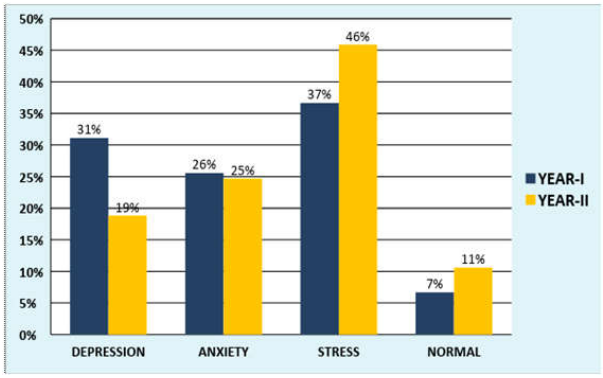

Fig. 2: Comparison of DASS among medical college students

Depression and stress was found to be more among females compared to males. But anxiety rate was more among males compared to females. (Fig. 3).

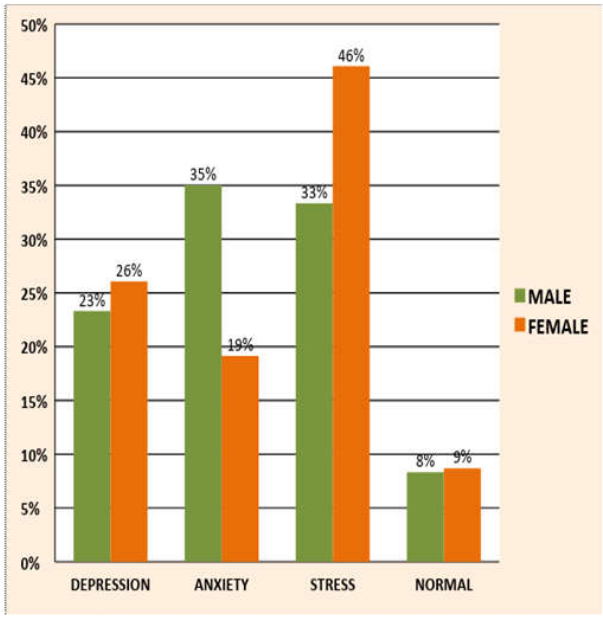

Fig. 3: Sex wise comparison of DASS scale

Discussion

In our study the prevalence rate of depression among medical students is 25.71%. Which inconsistent with another Indian study (sector medical college Mumbai) which showed the prevalence rate of depression among medical students as 39.9% which correspondence with prevalence rates found in other developing countries [6]. A study from Pakistan also showed high prevalence rate as 43.9%. [7,8]. A recent study from Brazil found the prevalence rate of depression among medical students as high as 40.5% with 1.2% had very severe depressive symptoms [9]. A study from Chinese medical school found nearly

half of them found depressed and severely depressed were 2% [10]. The prevalence rate of depression from study of western world also showed in the range of 14-24% [11,12].

Medical profession demands great concentration, commitment and discipline from students. This will increase when the students start their clinical postings and classes simultaneously. In this light some of the students cannot cope with the didactic syllabus, which consequently alters their physical mental stress. The prevalence of depressive symptoms was high among newly entered students (Ist year)as compared to second ,year students. This finding correlate with the results of previous studies [7,11,13]. This could be due to stress of new study environment with entirely newer subjects of medical stream. there will be a sudden change in their eating habits and sleeping pattern due to greater degree of workload which is a new experience to the medical students Home sickness is also a contributory factor in them as there are many hostellers. All of these factors causes the stress which may leads to depression. Female students were more likely to report symptoms suggestive of depression as compared to male students which are inconsistent with western reports [11]. A possible explanation for this finding is due to the fact the women articulate depressive symptoms, even very minor ones more easily than men this is a generalised fact about the women [12]. There was an interesting finding in this survey which has not been reported earlier .We found that students facing language problem in their medical course because English was not the medium of instruction up to 10+2 level and suddenly in medical school the medium of instruction changed to English and they find difficulty to understand the subjects which are completely new to them. That causes stress and anxiety which may leads to depression .

Conclusion

Depression is a major problem in medical students and when it is severe it may leads to suicidal ideation. .there should be a perfect mechanism to identify and help the students to come out from such a grievous situation and it should be considered seriously .An effective system should be start for its prediction and identifying in medical students. There should be an effective interventions to reduce the incidence of depression

Recommendations

1. Early detection of DASS symptoms in the students and taking appropriate steps to treat the cases in time.

2. All the colleges should start counselling centres for the students along with their parents.

3. Counselling of the students pre and post admission of the courses should be done routinely.

Source(s) of support: Nil

Presentation at a meeting: Nil

Conflicting Interest

(If present, give more details): None

References

1. World Health Organization. Mental and neurological disorders. Fact sheet No. 265; 2001.
2. Levine RE, Bryant SG. The depressed physician; a different kind of impairment. Hosp. Physician. 2000;36:67-73.
3. Dyreby LN, Thomas MR, Shanafelt TD. Systemic review of depression, anxiety, and other indicators of psychological distress among US and Canadian medical students. Acad MED. 2006;81:354-73.
4. Rosvold EO, Bjertness EO. Physician who do not take sick leave; hazardous Heros? Scand J Public Health. 2001;29:71-75.
5. Depression, Anxiety, Stress scales (DASS) Psy Tool kit. Available from: https://www.psytoolkit.org/survey-library/depression-anxiety-stress-dass.html
6. Supe AN. A study of stress in medical students at Seth GS Medical College. J Postgrad Med. 1998;44:1-6.
7. Khan MS, Mahmood S, Badshah A, Ali SU, Jamal Y. Prevalence of depression, Anxiety, and their associated factors among medical students. J Pak Med Assoc. 2006;56(12):583-6
8. Inam SNB, Saquib A, Alam E. Prevalence of Anxiety and Depression among medical students of private university. J Pak Med Assoc. 2003;53:44-47.
9. Costa EF, Santana YS, Santos AT, Martins LA, Melo EV, Andrade TM. Depressive symptoms among Medical students in a Brazilian Public University. Rev Assoc Med Bras (1992). 2012 Jan-Feb;58(1):53-9.
10. Chan DW. Depressive symptoms and depressed mood among Chinese Medical students in Hong Kong Comp Psychiatry. 1991;32:170-80.
11. Clark DC, Zeldow PB. Vicissitudes of depressed mood during four years of medical school.; JAMA 1988;260:2521-28.
12. Noble RE. Depression in women. Metabolism 2005;54:49-52
13. Goebert D. Thompson D. Takeshita J, Beach C, Bryson P, Ephgrave, K et al. Depressive symptoms in medical students and residents; a multi school study. Acad Med. 2009;84:236-41.

Guidelines for Authors

Manuscripts must be prepared in accordance with "Uniform requirements for Manuscripts submitted to Biomedical Journal" developed by international committee of medical Journal Editors

Types of Manuscripts and Limits

Original articles: Up to 3000 words excluding references and abstract and up to 10 references.

Review articles: Up to 2500 words excluding references and abstract and up to 10 references.

Case reports: Up to 1000 words excluding references and abstract and up to 10 references.

Online Submission of the Manuscripts

Articles can also be submitted online from http://rfppl.co.in/customer_index.php.

I) First Page File: Prepare the title page, covering letter, acknowledgement, etc. using a word processor program. All information which can reveal your identity should be here. use text/rtf/doc/PDF files. Do not zip the files.

2) Article file: The main text of the article, beginning from Abstract till References (including tables) should be in this file. Do not include any information (such as acknowledgement, your name in page headers, etc.) in this file. Use text/rtf/doc/PDF files. Do not zip the files. Limit the file size to 400 Kb. Do not incorporate images in the file. If file size is large, graphs can be submitted as images separately without incorporating them in the article file to reduce the size of the file.

3) Images: Submit good quality color images. Each image should be less than 100 Kb in size. Size of the image can be reduced by decreasing the actual height and width of the images (keep up to 400 pixels or 3 inches). All image formats (jpeg, tiff, gif, bmp, png, eps etc.) are acceptable; jpeg is most suitable.

Legends: Legends for the figures/images should be included at the end of the article file.

If the manuscript is submitted online, the contributors' form and copyright transfer form has to be submitted in original with the signatures of all the contributors within two weeks from submission. Hard copies of the images (3 sets), for articles submitted online, should be sent to the journal office at the time of submission of a revised manuscript. Editorial office: Red Flower Publication Pvt. Ltd., 48/41-42, DSIDC, Pocket-II, Mayur Vihar Phase-I, Delhi – 110 091, India, Phone: 91-11-22754205, 45796900, 22756995. E-mail: author@rfppl.co.in. Submission page: http://rfppl.co.in/article_submission_system.php?mid=5.

Preparation of the Manuscript

The text of observational and experimental articles should be divided into sections with the headings: Introduction, Methods, Results, Discussion, References, Tables, Figures, Figure legends, and Acknowledgment. Do not make subheadings in these sections.

Title Page

The title page should carry

1) Type of manuscript (e.g. Original article, Review article, Case Report)
2) The title of the article, should be concise and informative;
3) Running title or short title not more than 50 characters;
4) The name by which each contributor is known (Last name, First name and initials of middle name), with his or her highest academic degree(s) and institutional affiliation;
5) The name of the department(s) and institution(s) to which the work should be attributed;
6) The name, address, phone numbers, facsimile numbers and e-mail address of the contributor responsible for correspondence about the manuscript; should be mentoined.
7) The total number of pages, total number of photographs and word counts separately for abstract and for the text (excluding the references and abstract);
8) Source(s) of support in the form of grants, equipment, drugs, or all of these;
9) Acknowledgement, if any; and
l0) If the manuscript was presented as part at a meeting, the organization, place, and exact date on which it was read.

Abstract Page

The second page should carry the full title of the manuscript and an abstract (of no more than 150 words for case reports, brief reports and 250 words for original articles). The abstract should be structured and state the Context (Background), Aims, Settings and Design, Methods and Materials, Statistical analysis used, Results and Conclusions. Below the abstract should provide 3 to 10 keywords.

Introduction

State the background of the study and purpose of the study and summarize the rationale for the study or observation.

Methods

The methods section should include only information that was available at the time the plan or protocol for the study was written such as study approach, design, type of sample, sample size, sampling technique, setting of the study, description of data collection tools and methods; all information obtained during the conduct of the study belongs in the Results section.

Reports of randomized clinical trials should be based on the CONSORT Statement (http:// www. consort-statement. org). When reporting experiments on human subjects, indicate whether the procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional or regional) and with the Helsinki Declaration of 1975, as revised in 2000 (available at http://www.wma. net/e/policy/l 7-c_e.html).

Results

Present your results in logical sequence in the text, tables, and illustrations, giving the main or most important findings first. Do not repeat in the text all the data in the tables or illustrations; emphasize or summarize only important observations. Extra or supplementary materials and technical details can be placed in an appendix where it will be accessible but will not interrupt the flow of the text; alternatively, it can be published only in the electronic version of the journal.

Discussion

Include summary of key findings (primary outcome measures, secondary outcome measures, results as they relate to a prior hypothesis); Strengths and limitations of the study (study question, study design, data collection, analysis and interpretation); Interpretation and implications in the context of the totality of evidence (is there a systematic review to refer to, if not, could one be reasonably done here and now?, What this study adds to the available evidence, effects on patient care and health policy, possible mechanisms)? Controversies raised by this study; and Future research directions (for this particular research collaboration, underlying mechanisms, clinical research). Do not repeat in detail data or other material given in the Introduction or the Results section.

References

List references in alphabetical order. Each listed reference should be cited in text (not in alphabetic order), and each text citation should be listed in the References section. Identify references in text, tables, and legends by Arabic numerals in square bracket (e.g. [10]). Please refer to ICMJE Guidelines (http://www.nlm.nih.gov/bsd/uniform_ requirements.html) for more examples.

Standard journal article

[1] Flink H, Tegelberg Å, Thörn M, Lagerlöf F. Effect of oral iron supplementation on unstimulated salivary flow rate: A randomized, double-blind, placebo-controlled trial. J Oral Pathol Med 2006; 35: 540-7.

[2] Twetman S, Axelsson S, Dahlgren H, Holm AK, Källestål C, Lagerlöf F, et al. Caries-preventive effect of fluoride toothpaste: A systematic review. Acta Odontol Scand 2003; 61: 347-55.

Article in supplement or special issue

[3] Fleischer W, Reimer K. Povidone iodine antisepsis. State of the art. Dermatology 1997; 195 Suppl 2: 3-9.

Corporate (collective) author

[4] American Academy of Periodontology. Sonic and ultrasonic scalers in periodontics. J Periodontol 2000; 71: 1792-801.

Unpublished article

[5] Garoushi S, Lassila LV, Tezvergil A, Vallittu PK. Static and fatigue compression test for particulate filler composite resin with fiber-reinforced composite substructure. Dent Mater 2006.

Personal author(s)

[6] Hosmer D, Lemeshow S. Applied logistic regression, 2nd edn. New York: Wiley-Interscience; 2000.

Chapter in book

[7] Nauntofte B, Tenovuo J, Lagerlöf F. Secretion and composition of saliva. In: Fejerskov O,

Kidd EAM, editors. Dental caries: The disease and its clinical management. Oxford: Blackwell Munksgaard; 2003. p. 7-27.

No author given

[8] World Health Organization. Oral health surveys - basic methods, 4th edn. Geneva: World Health Organization; 1997.

Reference from electronic media

[9] National Statistics Online—Trends in suicide by method in England and Wales, 1979-2001. www.statistics.gov.uk/downloads/theme_health/HSQ20.pdf (accessed Jan 24, 2005): 7-18. Only verified references against the original documents should be cited. Authors are responsible for the accuracy and completeness of their references and for correct text citation. The number of reference should be kept limited to 20 in case of major communications and 10 for short communications.

More information about other reference types is available at www.nlm.nih.gov/bsd/uniform_requirements.html, but observes some minor deviations (no full stop after journal title, no issue or date after volume, etc).

Tables

Tables should be self-explanatory and should not duplicate textual material.

Tables with more than 10 columns and 25 rows are not acceptable.

Table numbers should be in Arabic numerals, consecutively in the order of their first citation in the text and supply a brief title for each.

Explain in footnotes all non-standard abbreviations that are used in each table.

For footnotes use the following symbols, in this sequence: *, ¶, †, ‡‡,

Illustrations (Figures)

Graphics files are welcome if supplied as Tiff, EPS, or PowerPoint files of minimum 1200x1600 pixel size. The minimum line weight for line art is 0.5 point for optimal printing.

When possible, please place symbol legends below the figure instead of to the side.

Original color figures can be printed in color at the editor's and publisher's discretion provided the author agrees to pay.

Type or print out legends (maximum 40 words, excluding the credit line) for illustrations using double spacing, with Arabic numerals corresponding to the illustrations.

Sending a revised manuscript

While submitting a revised manuscript, contributors are requested to include, along with single copy of the final revised manuscript, a photocopy of the revised manuscript with the changes underlined in red and copy of the comments with the point to point clarification to each comment. The manuscript number should be written on each of these documents. If the manuscript is submitted online, the contributors' form and copyright transfer form has to be submitted in original with the signatures of all the contributors within two weeks of submission. Hard copies of images should be sent to the office of the journal. There is no need to send printed manuscript for articles submitted online.

Reprints

Journal provides no free printed reprints, however a author copy is sent to the main author and additional copies are available on payment (ask to the journal office).

Copyrights

The whole of the literary matter in the journal is copyright and cannot be reproduced without the written permission.

Declaration

A declaration should be submitted stating that the manuscript represents valid work and that neither this manuscript nor one with substantially similar content under the present authorship has been published or is being considered for publication elsewhere and the authorship of this article will not be contested by any one whose name (s) is/are not listed here, and that the order of authorship as placed in the manuscript is final and accepted by the co-authors. Declarations should be signed by all the authors in the order in which they are mentioned in the original manuscript. Matters appearing in the Journal are covered by copyright but no objection will be made to their reproduction provided permission is obtained from the Editor prior to publication and due acknowledgment of the source is made.

Approval of Ethics Committee

We need the Ethics committee approval letter from an Institutional ethical committee (IEC) or an institutional review board (IRB) to publish your Research article or author should submit a statement that the study does not require ethics approval along with evidence. The evidence could either be consent from patients is available and there are no ethics issues in the paper or a letter from an IRB stating that the study in question does not require ethics approval.

Abbreviations

Standard abbreviations should be used and be spelt out when first used in the text. Abbreviations should not be used in the title or abstract.

Checklist

- Manuscript Title
- Covering letter: Signed by all contributors
- Previous publication/ presentations mentioned, Source of funding mentioned
- Conflicts of interest disclosed

Authors

- Middle name initials provided.
- Author for correspondence, with e-mail address provided.
- Number of contributors restricted as per the instructions.
- Identity not revealed in paper except title page (e.g.name of the institute in Methods, citing previous study as 'our study')

Presentation and Format

- Double spacing
- Margins 2.5 cm from all four sides
- Title page contains all the desired information. Running title provided (not more than 50 characters)
- Abstract page contains the full title of the manuscript
- Abstract provided: Structured abstract provided for an original article.
- Key words provided (three or more)
- Introduction of 75-100 words
- Headings in title case (not ALL CAPITALS).
  References cited in square brackets
- References according to the journal's instructions

Language and grammar

- Uniformly American English
- Abbreviations spelt out in full for the first time. Numerals from 1 to l0 spelt out
- Numerals at the beginning of the sentence spelt out

Tables and figures

- No repetition of data in tables and graphs and in text.
- Actual numbers from which graphs drawn, provided.
- Figures necessary and of good quality (color)
- Table and figure numbers in Arabic letters (not Roman).
- Labels pasted on back of the photographs (no names written)
- Figure legends provided (not more than 40 words)
- Patients' privacy maintained, (if not permission taken)
- Credit note for borrowed figures/tables provided
- Manuscript provided on a CDROM (with double spacing)

Submitting the Manuscript

- Is the journal editor's contact information current?
- Is the cover letter included with the manuscript? Does the letter:

1. Include the author's postal address, e-mail address, telephone number, and fax number for future correspondence?
2. State that the manuscript is original, not previously published, and not under concurrent consideration elsewhere?
3. Inform the journal editor of the existence of any similar published manuscripts written by the author?
4. Mention any supplemental material you are submitting for the online version of your article. Contributors' Form (to be modified as applicable and one signed copy attached with the manuscript)

Indian Journal of Forensic Medicine and Pathology

Library Recommendation Form

If you would like to recommend this journal to your library, simply complete the form below and return it to us. Please type or print the information clearly. We will forward a sample copy to your library, along with this recommendation card.

Please send a sample copy to:

Name of Librarian

Name of Library

Address of Library

Recommended by:

Your Name/ Title

Department

Address

Dear Librarian,

I would like to recommend that your library subscribe to the **Indian Journal of Forensic Medicine and Pathology**. I believe the major future uses of the journal for your library would provide:

1. useful information for members of my specialty.
2. an excellent research aid.
3. an invaluable student resource.

I have a personal subscription and understand and appreciate the value an institutional subscription would mean to our staff.

Should the journal you're reading right now be a part of your University or institution's library? To have a free sample sent to your librarian, simply fill out and mail this today!

Stock Manager

Red Flower Publication Pvt. Ltd.

48/41-42, DSIDC, Pocket-II

Mayur Vihar Phase-I

Delhi - 110 091(India)

Phone: Phone: 91-11-45796900, 22754205, 22756995, Cell: +91-9821671871

E-mail: sales@rfppl.co.in