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# Demography of Suicide in Coastal Region of Odisha: An Autopsy Based Study

# Amarendra Nayak<sup>a</sup>, Jyotish Ch. Choudhury<sup>b</sup>

#### Abstract

Introduction: Suicide being a major contributor to fatality world over still remains an enigma for the many scholars who have devoted time and resources to unravel its secrets. As per WHO, there occurs one suicidal death every 40 seconds. *Materials and Methods:* A prospective autopsy based study was conducted over a 3 year period from 2014-2016 in S.C.B. Medical College and Hospital, Cuttack and a total of 904 cases of suicidal deaths were studied using a specially devised questionnaire. Multiple social, biological and psychological factors were taken into account. *Result:* It revealed a male to female ratio in completed suicides of 1:1.17 and 69.14% suicides to be in the age group of 15-44 years. The victims predominantly belonged to lower income groups followed by those from lower middle class. Married females clearly outnumbered the married males. Males were seen to be more vulnerable when living in a nuclear setup. Poisoning followed by hanging was found to be the most preferred methods to commit suicide. Housewives contributed heavily to the total case load. It was found that persons with a regular employment were least likely to commit suicide.

Keywords: Suicide; Demography; Marital Status; Family Structure; Occupation.

#### Introduction

Suicide has simply been defined as deliberately putting an end to one's own life. This phenomenon which has distinctively remained a human affair, continues since time immemorial, having its fair share of mention in ancient texts as well as in recorded history. It is an outcome of a complex vicious cycle with multiple social, biological and psychological factors as its components. As per WHO, there occurs a suicidal death every 40 seconds the world throughout and in the last half a century or so there has been 60% rise in its incidence. Each year suicide accounts for about 1 million deaths globally with an overall mortality rate of 16 per 100,000 population. It is among the three leading causes of death among the 15-44 year age group worldwide [1]. As per the NCRB (2014) report, total

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number of suicide reported in India has gone up from 1,13,697 in 2004 to 1,31,666 in 2014, a rise of 15.8% over a decade. Within the said period population in India has seen a growth of 14.6%. Although there is an effective rise in suicide in this period, a declining trend has also been noticed for the period 2011-14. In 2014, when the national average was 10.6 per a lakh population, the state Odisha showed a suicide rate of 9.9 [2].

Although this phenomena has never been satisfactorily explained through logic or reasoning, still etiological factors that have been attributed to this self vanguishing mode of human mind are many. Depression, desperation, frustration, stress, remorse, self reproach, addiction, unemployment, disappointment in love, extreme poverty, disharmony, failures in trade, profession, studies, loss in business, burdened under loans and sudden fall from grace & social standing are only few to be mentioned. The means and methods adopted also vary considerably depending upon multiple epidemiological factors like age, sex, social status, economic strength, level of education, profession and also on moral values, attitudes as well as sociocultural environment.

This study has been undertaken with a view to relate various epidemiological factors to the trends of suicides observed in coastal belt of Odisha. The sole aim of the study is to compare the trends with other regions of the country and with the national as well as world scenario.

## Methodology

The study was conducted in department of Forensic Medicine of S.C.B. Medical College and Hospital, Cuttack which receives cases for medicolegal autopsy not only from the biggest apex hospital of the state of Odisha, but also from whole of Cuttack city limits, sub-urban area surrounding the city as well as cases referred from faraway places of coastal Odisha. A prospective study module was designed to probe the incidence, distribution and triggering factors of suicidal deaths in relation to age, sex, educational status, socio-economic status, employment, marital status over an period of three years from 2014-2016.

The epidemiological tool employed was an interview method using pretested, predesigned questionnaire which proved to be a flexible tool to collate accurate information from relatives and persons accompanying the case. Due precaution was taken to interview each individual separately and in case of ambiguity in a particular response, cross questioning was employed to verify the veracity. The recording of information was conducted in conducive environment, with a sympathetic approach with all efforts to gain the confidence and without any coercion or threat, whatsoever. Due care was exercised to lucidly explain the objectives of the research to the next of kin, relatives or friends so as to ensure maximum cooperation. Utmost degree of confidentiality was assured.

The alleged cases of suicide where the manner could not be established clearly beyond doubt were excluded from the study. Similarly the cases, where the version of the family members & relatives was contrary to the autopsy findings, were left out of the ambit of the study. Unclaimed deceased though confirmed to be case of suicides, were not considered due to lack of history.

#### **Result and Discussion**

Over the 3 year study period a total of 1240 cases of alleged suicides were encountered out of which 904 cases could be identified to be suicidal death without any ambiguity (Table 1). It constituted about 10.88 % of the total number of autopsies. As far as incidence of suicide goes our finding of 10.88% was little less than the 16% reported by Azmak et al [3] and 16.4% reported by Khajuria et al [4].

Females slightly outnumbered males with a male to female ratio of 1:1.17. Suicides committed below the age of 15 yrs stands at a negligible 3.10%. Similarly above the age of 60 years it was a mere 6.41%. Apart from the extremes of age, in males it was evenly distributed whereas in females a whopping 77% of suicides occurred in the age group of 15-44 years (Table 2).

The gender divide in the present study resembles similar sex ratio of 1: 1.24 as reported by Lalwani S et al [5]. Bhugra D et al have observed that Asian females exceed the males in suicides [6]. However, the NCRB data, 2009 & 2012 [7] shows the contrary. Male predominance has been reported by Kanchan T et al [8] and Vijay kumar L [9].

This study reveals a peak incidence of suicide in the age group of 15-29 years with majority belonging to female sex, which is consistent with NCRB, 2009 figures. The highest at risk age group of 15-29 has also been reiterated by Vikram Patel & Prabhat Jha et al [10], Azmak AD et al [3] and Murthy OP et al [11].

Our study reveals 72.24% of suicides to have occurred below age of 49 which is coherent with findings of Vijaykumar [9]. Similarly the maximum case burden in the age group of 15-49 years also consistent with study of Meera Th et al [12]. Many of the victims i.e. 47.57% were found to be educated upto secondary school level i.e. either high school dropouts or have read upto matriculation (Table 3). This tallies with the observation of Vijay kumar L [9].

Majority of victims i.e. 60.43% in males and 77.20% in females were married (Table 4). Male victims belonging to nuclear families clearly outnumber those of joint families whereas females in joint family structure slightly exceed those from a nuclear family scenario. The majority of suicides belonging to the married group echoes well with findings of Shukla et al [13]. In contrast to our observations Sharma et al [14] have reported more suicides to be taking place in joint families. Victims belonging to low income group at 461 cases and lower middle income groups at 345 cases clearly share the bulk of the burden (Table 5).

Married females outnumbered their unmarried counterparts whereas in males this difference was not so marked. High incidence among low socioeconomic strata has also been reported by Sorref SM et al [15]. Poverty as a reason has been put forth by Gururaj et al [16], Chavan et al [17], which has been contradicted by Vijay kumar L [9] who goes on to say that the phenomenon is more seen in high socioeconomic group. Prajapati P et al [18] have noticed highest numbers in the upper middle class.

Poisoning (51.22%) and hanging (24.78%) were found to be the most favoured means of committing suicide in this region (Table 6). Very few males resorted to burns whereas when it came to railway run-over, males clearly surpassed females. All the 7 cases of cutthroat injuries have been invariably seen in males. Khan MM et al [19] have detected organophosphate poisoning in more than half the cases they studied. Patel SP et al [20] are of the view that hanging, poisoning and burns are the commonest of methods. Khajuria B et al [4] and Arun M et al [21] have detected poisoning as the most commonly adopted method whereas Kanchan T et al [8] and Chavan BS et al [17] have reported hanging as the preferred method for suicide.

Housewives (36.06%) were found to be the single most vulnerable group to have committed suicide (Table 7). In males, the highest representation was from persons engaged in unorganised sector, distantly followed by agriculture. In females, grown

Table 1:

Period of study	2014	2015	2016	Total
Total cases	2732	2682	2898	8312
Alleged suicides	386	413	441	1240
Manner ambiguous	106	112	118	336
Clear cases of suicides	280	301	323	904

Table 2: Age and Sex distribution in victims of Suicide

Age in years		Male		Female	Total		
	No.	%	No.	%	No.	%	
<15	9	2.16	19	3.90	28	3.10	
15-29	102	24.46	250	51.33	352	38.94	
30-44	148	35.49	125	25.67	273	30.20	
45-59	126	30.21	67	13.76	193	21.35	
60 & above	32	7.67	26	5.34	58	6.41	
Total	417	(100%)	487	(100%)	904	(100%)	

Table 3: Educational status in victims of Suicide

Literacy		Male		Female		Total
-	No.	%	No.	%	No.	%
Never received formal education	41	9.83	67	13.76	108	11.95
Primary school	61	14.63	62	12.73	123	13.60
Secondary school	195	46.76	235	48.25	430	47.57
Higher secondary	67	16.07	73	14.99	140	15.49
Graduation or above	53	12.71	50	10.27	103	11.39

Table 4: Marital status and Family structure in suicide victims

Family type	Married		Unm	arried	Total		
	Male	Female	Male	Female	Male	Female	
Nuclear	133	156	103	70	236	226	
Joint	93	217	51	40	144	257	
Living alone	26	3	11	1	37	4	
Total	252	376	165	111	417	487	

Table 5: Socio-economic status of victims of suicide

S E status	Married		Ur	nmarried	Total		
	Male	Female	Male	Female	Married	Unmarried	
High income	1	2	0	1	3	1	
Upper- middle	14	49	17	14	63	31	
Lower-middle	111	129	66	39	240	105	
Low income	126	196	82	57	322	139	
Total	252	376	165	111	628	276	

Methods	<b>&gt;</b>	Poisoning	Hanging	Burns	Railway runover	drowning	Jump from height	Cut on neck/ wrist	Firearms	Total
age	sex									
<15 yr	Μ	7	1	-	-	-	-	1	-	9
5	F	12	5	-	-	2	-	-	-	19
15-29	Μ	56	28	5	9	2	-	2	-	102
	F	123	61	56	6	4	-	-	-	250
30-44	Μ	83	37	4	19	1	2	2	-	148
	F	51	29	35	10	-	-	-	-	125
45-59	Μ	69	37	3	13	-	2	2	-	126
	F	27	17	18	5	-	-	-	-	67
60 & above	Μ	23	4	-	5	-	-	-	-	32
	F	12	5	9	-	-	-	-	-	26
total	$\rightarrow$	463	224	130	67	9	4	7		904
Male subtotal	÷	238	107	12	46	3	4	7		
Female subtotal	$\rightarrow$	225	117	118	21	6	0	0		

Table 6: Methods and Means adopted by the victims of suicide

Table 7: Occupation of the victims of suicide

Occupation	Male	Female	Total
Students	12	19	31
Unemployed	75	83	158
Housewives	-	326	326
Agriculture	85	3	88
Employed in organised sector	39	11	50
Employed in unorganised sector	123	42	165
Self employed/ Business	83	12	95
Total	417	487	904

up girls dependent on the family were the second most common group to have committed suicide. Chavan BS et al [17] have claimed unemployment to be a major factor in suicide which also has been corroborated by Chakraborty NK [22] et al. Williams JMG & Pollock LR [23] have also emphasized on the relation of unemployment to suicides.

#### Conclusion

The outcome of this study reveals that the more resourceful age group of the population predominate among the suicide victims along with a slight female preponderance.

Majority of victims have attended school which has been stopped midway. Lowest to lower-middle income groups are specifically vulnerable.

Poisoning, hanging and burns in decreasing order were the usual means adopted. Unemployment is one of the major contributors to suicide. Punitive measures in Law have never been or can never be a credible deterrent for a person with suicidal intent to prevent him/her to take the extreme step. Here comes the role of family, friends, relatives, peer groups and society as a whole, as timely intervention can avert the momentary decision of self destruction.

Diagnosing premonitory symptoms, psychological counselling and social security network for vulnerable groups is need of the hour.

# Referrences

- 1. WHO, world health statistics 2017.
- 2. NCRB. Chapter-2, Suicides in India. 2014.
- Azmak A.D. Suicides in Trakya Region, Turkey, Med. Sci. Law, 2006 January;46:19-30.
- Khajuria B. Profile suicidal autopsies in a militancy affected state of India. Journal of clinical and Diagnostic Research, 2007.p.505-510.
- Lalwani S, Sharma GS, Kabra SK, Girdhar S, Dogra TD. Suicide among children and adolescents in South Delhi (1991-2000). Indian J Pediatr, 2004;71:701-3.
- Bhugra D, Desai MI, Baldwin S. Attempted suicide in west London, incidence rates across ethnic communities. Psychol Med. 1999 Sep;29(5):1125-30.
- 7. NCRB. Accidental Death and Suicides in India. 2012.

- Kanchan T., Meneges R.G. 'uicidal poisoning in Southern India: gender differences. J Forensic Legal Med., 2008 Jan;15(1):7-14.
- 9. Vijayakumar L. Indian research on suicide. Indian J of Psychiatry, 2010;52:291-296.
- 10. Vikram Patel, Chintanise Ramasundarahertige, Lakshmi Vijayakumar, JS Thakur, Vendan Gajalaxmi, Gopalkrishna Gururaj, Wilson Suraweera, Prabhat Jha. Suicide mortality in India: a national representative survey. The Lancet, 2012;379:2343-51.
- Murty O P, Cheh Lo Boon, Bakit P A, Hui Foo Jhi, Ibrahim Z B, Nazirah B. Suicide and Ethnicity in Malaysia. American Journal of Forensic Medicine and Patholog. 2008;29(1):19-22.
- 12. Meera TH, Singh MBK. Pattern of Neck Findings in Suicidal Hanging a study in Manipur. J Indian Acad Forensic Med, 2011;33(4):352-54.
- 13. Shukla G D, Vema B L, Mishra D N. Suicide in Jhansi city. Indian J Psychiatry, 1990;32:44-51.
- Sharma R, Vijayakumar L, Chaturvedi S.(2008) Suicidal behaviour amongst adolescent students in South Delhi. Indian J Psychiatry. 2008;50:30-33.
- 15. Soreff SM. Suicide Attempts. Biol Psychiatry, 2004 Jan 1;55(1):46.
- Gururaj G, Isaac M K, Subbakrishna D K, Ranjani R. Case Control Study of completed suicides in

Bangalore, India. Injury Control and Safety Promotion, 2004;11(3):193-200.

- 17. Chavan BS, Singh GP, Kaur J, Kochar R. Psychological autopsy of 101 suicide cases from northwest region of India. Indian J Psychiatry, 2008;50:34-38.
- Prajapati P, Prajapati S, Pandey A, Joshi V, Prajapati N. Pattern of suicidal deaths in females of south Gujurat region. National Journal of Med Res, 2012;2(1):31-34.
- 19. Khan MM, Reza H. The pattern of Suicide in Pakistan. Crisis, 2002;21(1):31-5.
- Patel SP, Gaw AC. Suicide among Immigrants from Indian subcontinent. Psychiatric Survey, 1996 May;47(5):517-21.
- Arun M, Yoganarasimha K, Kar N, Palimar V, Mohanty MK. A comparative analysis of suicide and parasuicide in India. Med Sci Law; 2007 October;47(4):335-40.
- Chakrabarti NK. Socio-legal problem of suicide and its prevention: Analysis of suicides in India; World Conference on Injury Prevention and Control (6<sup>th</sup>: 2002: Montreal), 2002.p.701-702.
- Williams JMG, Pollock LR. Factors mediating Suicidal Behaviour: their utility in primary and secondary prevention. Journal of Mental Health, 1993;2:23-26.

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# A Five Year Retrospective Study of Analysis of Pattern of Homicidal Deaths Autopsied at Vydehi Hospital, Bangalore

Ravi Raj K.G.ª, Shobhna S.S.<sup>b</sup>, Lohith Kmar R.<sup>c</sup>, Abhishek Yadav<sup>d</sup>

## Abstract

Homicide is killing of a person by another person/ by group. Killing a person may be with several motives, common being property, money and women. The person may be killed in a fit of rage or there may be a detail planning executed. According to NCRB, Karnataka 2015 accounts for 27.6% of violent crime. In the current study attempt is made to study the pattern of injuries in homicidal cases. The injuries due to blunt force were present in majority of cases with head being most commonly involved region. The predominant motive was extra marital affairs and incidence was highest in males in age group of 15-29 years.

Keyword: Homicide; Head Injury; Blunt Force; Sharp Force; Ligature Compression.

# Introduction

Homicide is considered as one among the violent crimes. Bangalore is a metropolitan city with large number of migrant people from different part of the country in view of various opportunities like job, treatment, real estate, and business. The reasons for violent crime also increase with attraction of city life style. There are stringent laws and punishment but the investigating officers are unable to prevent because of motive being personal issues such as extra marital affairs, property disputes, domestic problems, rivalries. According to National Crime record Bureau (NCRB), the violent crime rate is increasing day by day in our country on considering statistics from 2011 to 2015 and Karnataka constitute 27.6% of violent crime in 2015 [1]. The World Health Organisation (WHO) defines homicidal death resulting from

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injuries purposefully inflicted by another person (ICD9 codes 960-E978). About 80-100 cases of homicides take place every day in India [2]. When the force of injury has to be analysed there are certain decisive factors which are important for the sequence of reconstruction to differentiate the self inflicted from the injuries inflicted by others [3]. This study is undertaken to know pattern of injuries sustained and region of body involved in homicidal deaths. The authors have also tried to analyze motive behind homicidal deaths.

# Materials and Methodology

The study was done in Vydehi hospital which covers eastern part of Bangalore as a retrospective analysis done for a period of five years. The information was collected from the police information forms 146 (i) & (ii), autopsy reports, from autopsy surgeons and from the photographs that were taken during autopsy. The study analyzed the age group of victim commonly involved, gender, the motive for the crime, the pattern of injury and the common region involved. Descriptive analysis was applied in this study.

#### **Results and Discussion**

The study was done for a period of 5 years and the percentage of homicidal death was 4-6% of total cases which was corresponding to a studies done in MS

Ramaiah Medical College where the percentage of homicidal death were 4.32%, MVJ hospital where the percentage of homicidal deaths were 7%, and with a study done in Delhi where homicide constitute 5.9% [4,5,15]. This study was in contrast with study done in Pakistan were 76% of death was due to homicide [6].

The incidences were more in the male population, 65% as compared to females which was around 35%. The incidence was common in the age group of 15-29 years in both the gender which constituted around 40% of total cases. The findings were consistent with a study from Surat where males constituted 86.7% of the cases [7] and a study done in MS Ramaiah Medical College which showed the incidence in age group of 20-29 years being 49.25% [8].

The motives beyond most of the cases were not known where the cases were initially brought under unnatural death register and later converted in to crime cases this was around 28.2%. The motive due to domestic issue was next common motive which includes husband and wife fight, fight between family members, alcohol consumption and constituted 20.6% of the cases. The next common motive was extra marital affairs, 10.8%. This was in contrast with studies like in M.S Ramaiah collage as motive being revenge constitute 26.8% [4].

The study showed most common nature of injury was due to blunt force (35%), followed by sharp force (22.8%) then ligature pressure on neck (10.2%). These were consistent with a study done in Mangalore [9] but in contrast to study done in Manipal where incidence due to sharp force trauma was more. The results were different in a study done in Pakistan where injuries due to firearm and bomb blast were common and with Varanasi study where firearm injuries were common, followed by injuries due to sharp and blunt force [10,11]. The difference in the results may be attributed to the regional factors including the availability of arms and ammunitions.

Table 1: Gender wise distribution of cases of homicides in different age groups

Age group	Males	Females
<15years	02	03
15-29years	14	09
30-44 years	10	04
45-60years	10	02
>/ = 60years	01	00
Total	37	18

Table 2: Motives in cases of Homicidal Deaths

Motives	Number of cases
Extra marital affair	10
Property disputes	01
Theft	08
Domestic issues	15
Personal rivalry	04
Depression	01
Not known	16

Table 3: Pattern of Injuries in Homicidal deaths

Pattern of injuries		Number of cases
Blunt force	Abrasion	20
	Contusion	07
	Laceration	14
	Fractures	08- Skull
		02- Sternum
Sharp force	Incised wound	06
	Stab wound	13
	Chop wound	04
	Cut throat	02
Manual compressiv	ve injury of neck	01
Ligature compressi	ive injuryof neck	07
Penetrative injury	due to firearm projectile	02
Electrical injury		01
Burns due to dry h	eat	01

Table 4: Regions of body involved in homicidal death

Region of body	Number of cases
Head	21
Neck	12
Chest	06
Abdomen	05
Extremities	07

The region commonly involved in homicidal death was head (35%), followed by neck (21%), extremities (12.3%), chest (10.5%) and abdomen (8.7%). This was different from the findings of Peshawar and New Civil Hospital Surat where the common region involved is chest and Neck [13,14]. Defence wound were noticed in 7cases out of which sharp weapon were seen in 5 cases mainly involving palms followed by forearm, defence wound due to blunt force were seen only in two cases.

This can be compared with a study done in Maharashtra were majority of defence wound were due to sharp weapon [12]. Majority of cases were committed outdoor (49%) while 31% of cases were committed indoor. In remaining cases the place is not know which can be considered as a drawback of retrospective study.

#### Conclusion

The statistics could help the investigating authorities to concentrate on the distribution of violent crimes in the eastern part of Bangalore and also help them in concentrating on the type of weapon while investigation. The pattern of injuries sustained may act as guide to the doctors in emergency department for taking necessary treatment steps during the *Golden Hour*.

#### References

- 1. Crime in India 2015- compendium. National Crime Record Bureau – Ministry Of Home Affairs.
- Mohanty MK, Mohan Kumar TS, Mohanram A, Palimar V. Victims of homicidal deaths- An analysis of Variables. Journal of Clinical Forensic Medicine. 2005;12(6):302-304.
- Bohnert M, Hiittemann H, Schmidt U. Forensic Pathology Reviews, Homicides by sharp force. 1<sup>st</sup> Ed, Humana Press, 2006;4:65-66.
- Hugar BS, Girish Chandra YP, Harish S, Jayanth SH. Pattern of Homicidal Deaths, J Indian Acad Forensic Med. 2010;32(3):194-198.

- Anjanamma TC, Vijaya NM, Vijayanath V, Athani P. A Study of Unnatural death at MVJ Medical College and Research Hospital. Ind Journal Forensic Community Medicine. 2016;3(2):138-141.
- Humayun M, Khan D, Fasee-uz-Zaman, Khan J, Khan O, Parveen Z, Humayun W. Analysis of homicidal deaths in district DI Khan: an autopsy study. J Ayub Med Coll Abbottabad. 2009;21(1):155-7.
- Jhaveri S, Raloti S, Patel R, Brahbhatt J, Kaushik V. Profile of Homicidal Deaths: a Three Year Study At Surat Municipal Institute of Medical Education and Research, Surat During 2011 -2013. Natl J Community Med. 2014:5(4);406-9.
- Basappa S, Hugar, S Harish, Girish Chandra YP, Praveen S, Jayanth SH. Study of defence injuries in homicidal deaths – An autopsy study. Journal of Forensic and Legal Medicine. 2012;19(4):207–210.
- Vij A, Menon A, Menezes RG, Kanchan T, Rastogi P. A retrospective review of homicides in Mangalore, South India. J For Legal Med. 2010;17(6):312–315.
- Kumar R. Study of the pattern of homicidal deaths in Varanasi region of India. Journal of Evolution of Medical and Dental Sciences. 2013;2(43):8393-8418.
- Bashir MZ, Saeed A, Khan D, Aslam M, Iqbal J, Ahmed M. Pattern of Homicidal Deaths in Faisalabad. Journal of Ayub Medical college. 2004;16(2):57-9.
- Mohite PM, Mohite DP, Dixit PG, Anjankar AJ, Keche AS. Autopsy Evaluation of Defence Wounds in Homicidal Death in Central India. J Forensic Res. 2013;4:205. doi:10.4172/2157-7145.1000205.
- Marri MZ, Bashir MZ, Munawar AZ, Khalil ZH, Khalil IR. Analysis of Homicidal deaths in Peshawar, Pakistan. J Ayub Med Coll Abbottabad 2006;18(4): 30-3.
- 14. Zanzrukiya K, Tailor C, Chandegara P, Goverkar G, Patel U, Parkhe S. Profile of Homicidal death cases at Government Medical College & New Civil Hospital Surat. Int J Med Sci Public Health. 2014; 3(7):885-888.
- Gupta A, Rani M, Mittal AK, Dikshit PC. A study of Homicidal Deaths in Delhi. Medical Science Law. 2004;44(2):127-132.

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# A Cross-Sectional Study of Foot Dimensions for Determining Partial Identity among South Indians

Ravi Raj K.G.ª, Madhu Sudhana Reddy D.<sup>b</sup>, Lohith Kmar R.<sup>c</sup>, Abhishek Yadav<sup>d</sup>

# Abstract

Individual identification from mutilated body remains is a challenge to Forensic Experts. When incomplete skeletal material is available the stature estimation and sex differences are to be made out. Various formulae have been computed in the past using long bones but the accountability of them due to differing ethnicity and other factors like race and nutritional factors is a question. Most often a foot is brought for identification of an individual in mass disasters; natural or manmade, in assault cases where the body could be mutilated to conceal the identity of the victim. In such cases identification may not be complete, but partial identification would be of importance which helps to proceed in further investigation. One such estimate of stature of an individual by measuring foot length is of considerable value in the process of identification. Studies in the past have showed significant correlation between foot dimensions with stature and sex of an individual. It has been observed that dimensions from lower extremity have a greater correlation with the body height than those of the upper extremity. Ossification and maturation of bones of foot occur earlier than the long bones and height would be more accurately predicted from foot measurement as compared to that from long bones. This study is an effort to find correlation between foot length and stature and sex difference in this part of India and help in partial identification of the individuals.

Keywords: Forensic Anthropology; Stature; Gender; Foot Dimensions.

# Introduction

Individual identification from mutilated body remains, a challenge to Forensic Experts. When incomplete skeletal material is available the stature estimation and sex differences are to be made out. Various formulae have been computed in the past using long bones but the accountability of them due to differing ethnicity and other factors like race and nutritional factors is a question. Most often a foot is

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brought for identification of an individual in mass disasters; natural or manmade, in assault cases where the body could be mutilated to conceal the identity of the victim [1-7]. In such cases identification may not be complete, but partial identification would be of importance which helps to proceed in further investigation. One such estimate of stature of an individual by measuring foot dimensions is of considerable value in the process of identification. Studies in the past have showed significant correlation between foot dimensions with stature and sex of an individual. It has been observed that dimensions from lower extremity have a greater correlation with the body height than those of the upper extremity. This study is an effort to find correlation between foot dimensions with stature and gender in this part of India and help in partial identification of the individuals.

# **Objectives of the Study**

- 1. To estimate stature of the individual by use of Foot dimensions.
- 2. To identify the sex of the individual by Foot dimensions.

3. To develop a correlation index for foot dimensions in relation to Stature and Sex of the individual.

#### Materials & Methodology

Data was collected during the period from November 2009 to October 2010, from students, 100 males and 100 females whose age ranged between 17 completed years and 22 completed years who were from South India region which included states of Karnataka, Andhra Pradesh, Tamil Nadu and Kerala population. Age, sex, date of birth, residing place, place of origin, family history, personal history, medical history, weight of the individual; RFL(right foot length), LFL (left foot length), RFB (right foot breadth), LFB (left foot breadth), Ht (height), of individuals were collected accordingly.

For the foot lengths before measuring the length it was ensured that both the feet were firmly placed on a flat surface and ensuring that both feet bear the body weight evenly. The length is measured between most backward and prominent part of the heel (pternion) and the most distal part of the longest toe of the foot (acropodion). Second toe was considered as most prominent while measuring the foot length; wherever it was longer than the great toe. For the foot breadths distance between the most prominent point on the inner side of foot (metatarsal-tibiale) and the most prominent point on the outer side of foot (metatarsal- fibulare). Were measured manually by the use of scaled graph sheets.

Stature of the individual was measured as the distance between vertex and floor using standard metric scaled measuring stand. Maximum effort was done to avoid any errors by making the individual to stand erect in barefoot against the wall, both feet kept close together and the hands hanging down on the sides. Data were collected by single examiner at fixed time between 12.30 pm to 2.30pm, to avoid errors due to stature variation and personnel errors.

Statistical analyses was done using descriptive analytical methods which included Mean, Standard deviation, Correlation coefficient (r)/ Regression coefficient (b) and constant (a). The formulae adopted are shown as below and along with the usage of

SPSS software system. All the data mentioned above were collected with prior informed consent from each individual and strict confidentiality was maintained. The following Individuals were excluded from the study:

- With pedal deformity or injury.
- With abnormalities of spine.
- With abnormal heights like gigantism, dwarfism etc.,
- Others who are not from the region of South India.

#### **Observations & Results**

The study group comprised 200 individuals. Their age ranged between 17 completed years and 22 completed years. There were 100 males and 100 females. Among males, mean height was 171.74, mean values of rfl, lfl, rfb and lfb were 26.051, 35.230, 9.46 and 9.482 respectively. Among females, mean height was 158.69, mean values of rfl, lfl, rfb and lfb were 23.836, 23.816, 8.81 and 8.930 respectively. Manually as well as SPSS Software statistical tool correlation coefficient, regression coefficient, constant of all the variables, were estimated and derived at a formula for whole male as well as whole female sample groups. In the similar manner each individual age group with sex differentiation can be estimated by applying the same linear regression formula.

After statistical analysis results in our study showed "rfl" showed significant correlation in stature estimation with (r) value of 0.771, (a) value of 58.544,(b) value of 4.476. The S.D for height was 6.555 among male population. Among the females it was "Ifl" which showed the higher significance with (r) value of 0.700, (a) value of 78.398, (b) value of 3.371. The S.D for height was 6.533.

The Derived Formula with the Above Values

Y = 58.544 + 4.276 \* (X). {Males}

Y = 78.398 + 3.371 \* (X). {Females}.

The Observation and Results were Tabulated below Coefficients (Males)

Table 1: Depicting the (a) and (b) values for rfl against Ht. [Males]

Model		Unstandard B	ized Coefficients Std. Error	Standardized Coefficients Beta	t B	Sig. Std. Error
1 (Constant) 58.544 6.2		6.274		9.331	.000	
	Rfl	4.276	.251	.771	17.029	.000

a Dependent Variable: ht

#### Model Summary

Table 2: Depicting	the (r) val	ue for rfl against	Ht. [Males]
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Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.771(a)	.594	.592	5.903

a Predictors: (Constant), rfl

#### **Coefficients (Females)**

Table 3: Depicting the (a) and (b) values for Ifl against Ht. [Females]

Model		Unstandard	ized Coefficients	Standardized Coefficients	t	Sig.
		B	Std. Error	Beta	B	Std. Error
1	(Constant) Lfl	78.398 3.371	8.254 .346	.700	9.499 9.743	.000 .000

a Dependent Variable: ht

#### Model Summary

Table 4: Depicting the (r) value for Ifl against Ht. [Females]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.700(a)	.489	.484	4.691

a Predictors: (Constant), lfl

#### General

Table 5: Depicting the Pearson correlation in the whole sample size. Female Correlations

		Age	Sex	HT	RFL	LFL	RFB	LFB
Age	Pearson Correlation Sig. (2-tailed) N	1 200	002 .977 200	.244(**) .000 200	.073 .307 200	.016 .827 200	.186(**) .009 200	.121 .088 200
Sex	Pearson Correlation Sig. (2-tailed) N	002 .977 200	1 200	708(**) .000 200	666(**) .000 200	090 .206 200	420(**) .000 200	282(**) .000 200
HT	Pearson Correlation Sig. (2-tailed) N	.244(**) .000 200	708(**) .000 200	1 200	.771(**) .000 200	.059 .410 200	.561(**) .000 200	.342(**) .000 200
RFL	Pearson Correlation Sig. (2-tailed) N	.073 .307 200	666(**) .000 200	.771(**) .000 200	1 200	014 .846 200	.570(**) .000 200	.372(**) .000 200
LFL	Pearson Correlation Sig. (2-tailed) N	.016 .827 200	090 .206 200	.059 .410 200	014 .846 200	1 200	.031 .663 200	.032 .653 200
RFB	Pearson Correlation Sig. (2-tailed) N	.186(**) .009 200	420(**) .000 200	.561(**) .000 200	.570(**) .000 200	.031 .663 200	1 200	.666(**) .000 200
LFB	Pearson Correlation Sig. (2-tailed) N	.121 .088 200	282(**) .000 200	.342(**) .000 200	.372(**) .000 200	.032 .653 200	.666(**) .000 200	1 200

Table 6: Depicting the Pearson correlation in the Female population

		Age	Sex	НТ	RFL	LFL	RFB	LFB
Age	Pearson Correlation Sig. (2-tailed)	1	.(a)	.201(*) .044	014 .891	003 .975	008 .940	.000 .999
	N	101	101	101	101	101	101	101
Sex	Pearson Correlation Sig. (2-tailed)	.(a)	.(a)	.(a)	.(a)	.(a)	.(a)	.(a)
	N	101	101	101	101	101	101	101

ΗT	Pearson Correlation Sig. (2-tailed) N	.201(*) .044 101	.(a) 101	1 101	.637(**) .000 101	.700(**) .000 101	.388(**) .000 101	.361(**) .000 101
RFL	Pearson Correlation Sig. (2-tailed) N	014 .891 101	.(a) 101	.637(**) .000 101	1	.927(**) .000 101	.425(**) .000 101	.377(**) .000 101
LFL	Pearson Correlation Sig. (2-tailed) N	003 .975 101	.(a) 101	.700(**) .000 101	.927(**) .000 101	1 101	.434(**) .000 101	.390(**) .000 101
RFB	Pearson Correlation Sig. (2-tailed) N	008 .940 101	.(a) 101	.388(**) .000 101	.425(**) .000 101	.434(**) .000 101	1 101	.866(**) .000 101
LFB	Pearson Correlation Sig. (2-tailed) N	.000 .999 101	.(a) 101	.361(**) .000 101	.377(**) .000 101	.390(**) .000 101	.866(**) .000 101	1 101

\* Correlation is significant at the 0.05 level (2-tailed).

\*\* Correlation is significant at the 0.01 level (2-tailed).

a Cannot be computed because at least one of the variables is constant.

## Male Correlations

Table 7: Depicting the Pearson correlation in the Male population. Report

		Age	Sex	НТ	RFL	LFL	RFB	LFB
Age	Pearson Correlation Sig. (2-tailed)	1	.(a)	.495(**) .000	.212(*) .036	.022 .826	.376(**) .000	.201(*) .046
	Ň	99	99	99	99	99	99	99
Sex	Pearson Correlation Sig. (2-tailed)	.(a)	.(a)	.(a)	.(a)	.(a)	.(a)	.(a)
	Ň	99	99	99	99	99	99	99
HT	Pearson Correlation Sig. (2-tailed)	.495(**) .000	.(a)	1	.497(**) .000	021 .840	.436(**) .000	.156 .123
	N	99	99	99	99	99	99	99
RFL	Pearson Correlation Sig. (2-tailed)	.212(*) .036	.(a)	.497(**) .000	1	156 .124	.439(**) .000	.223(*) .027
	N	99	99	99	99	99	99	99
LFL	Pearson Correlation Sig. (2-tailed)	.022 .826	.(a)	021 .840	156 .124	1	014 .889	.005 .962
	N	99	99	99	99	99	99	99
RFB	Pearson Correlation Sig. (2-tailed)	.376(**) .000	.(a)	.436(**) .000	.439(**) .000	014 .889	1	.560(**) .000
	N	99	99	99	99	99	99	99
LFB	Pearson Correlation Sig. (2-tailed)	.201(*) .046	.(a)	.156 .123	.223(*) .027	.005 .962	.560(**) .000	1
	Ň	99	99	99	99	99	99	99

\*\*Correlation is significant at the 0.01 level (2-tailed).

\*Correlation is significant at the 0.05 level (2-tailed).

a Cannot be computed because at least one of the variables is constant.

Table 8: Depicting the Descriptive data of the whole sample size in total and age-wise. Male population

Age	Sex		HT	RFL	LFL	RFB	LFB	
17	0	Mean	165.89	25.368	25.458	8.60	8.674	
		IN	19	19	19	19	19	
		S.D	3.914	1.3195	1.1466	.462	.4331	
	1	Mean	158.50	24.629	24.750	8.42	8.521	
		Ν	14	14	14	14	14	
		S.D	6.260	.9450	.9011	.464	.4492	

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	Total	Mean	162.76	25.055	25.158	8.52	8.609
		N	33	33	33	33	33
		S.D	6.190	1.2166	1.0935	.464	.4397
18	0	Mean	170.70	26.015	25.765	9.60	9.640
		Ν	20	20	20	20	20
		S.D	7.263	1.4225	1.6220	.881	.9139
	1	Mean	157.97	23.513	23.461	8.96	9.045
		N	38	38	38	38	38
		S.D	6.092	1.0758	1.2323	.527	.5436
	Total	Mean	162.36	24.376	24,255	9.18	9.250
		N	58	58	58	58	58
		S.D	8.883	1.6925	1.7560	.728	.7427
19	0	Mean	173.04	26.339	51.575	9.77	9.908
		N	36	36	36	36	36
		S.D	6.140	1.1282	149.9743	.703	.7024
	1	Mean	156.22	23.335	23.226	8.84	9.039
		N	23	23	23	23	23
		S.D	7.746	1.3145	1.3689	.590	.5433
	Total	Mean	166.48	25.168	40.524	9.41	9.569
		N	59	59	59	59	59
		S.D	10.678	1.8992	117.3375	.799	.7697
20	0	Mean	174.00	26.053	26.247	9.44	9.094
		N	17	17	17	17	17
		S.D	5.466	.9592	.8032	.636	2.2582
	1	Mean	161.99	25.021	24.975	9.16	9.279
		N	14	14	14	14	14
		S.D	4.732	1.1963	1.3684	.481	.4080
	Total	Mean	168.57	25.587	25.673	9.32	9.177
		N	31	31	31	31	31
		S.D	7.911	1.1761	1.2529	.580	1.6735
21	0	Mean	178.67	27.367	27.133	9.83	9.900
		N	3	3	3	3	3
		S.D	1.155	.6351	1.1504	.289	.6083
	1	Mean	162.18	23.475	23.513	8.00	8.150
		N	8	8	8	8	8
		S.D	3.384	.7760	.8236	.428	.3071
	Total	Mean	166.67	24.536	24.500	8.50	8.627
		N	11	11	11	11	11
		S.D	8.223	1.9510	1.8974	.937	.8990
22	0	Mean	178.25	25.875	26.125	9.88	10.025
		N	4	4	4	4	4
		S.D	.500	1.1815	1.0813	.250	.0957
	1	Mean	161.75	23.575	23.875	9.00	8.975
		Ν	4	4	4	4	4
		S.D	9.069	.6898	.8539	.408	.4573
	Total	Mean	170.00	24.725	25.000	9.44	9.500
		Ν	8	8	8	8	8
		S.D	10.637	1.5210	1.5033	.563	.6392
Total	0	Mean	171.74	26.051	35.230	9.46	9.482
		N	99	99	99	99	99
		S.D	6.555	1.2422	90.4887	.793	1.2062
	1	Mean	158.69	23.836	23.816	8.81	8.930

# Ravi Raj K.G. et. al. / A Cross-Sectional Study of Foot Dimensions for Determining Partial Identity among South Indians

Male/Female Max, and Min. Variables



Fig. 2: Chart showing the mean value of the data obtained. Male and Female population are shown separately color coded

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Fig. 2: Chart showing the data collected. Male and Female population are shown separately color coded.

# Male and Female Data

M-Male Ht.(Cms) RFL (Cms) LFL (Cms) RFB (Cms) LFB (Cms) LFB F-Female Ht.(Cms) RFL (Cms) LFL (Cms) RFB (Cms) LFB (Cms)

# Discussion

In our study we studied 200 sample size (100 males and 100 females) from region of South India, mainly from eastern districts. In our study a significant correlation was obtained for male individuals 0.771 height and rfl, whereas in females it showed significance of 0.700 for height with Ifl. for gender estimation our did not show any significance with foot dimensions. Among male population the findings were (r) value of 0.771, (a) value of 58.544, (b) value of 4.476 and the S.D. for height was 6.555. Among the females, it was "Ifl" which showed the higher significance with (r) value of 0.700, (a) value of 78.398, (b) value of 3.371 and the s.d for height was 6.533. The derived formula with the above values:

y = 58.544 + 4.276 \* (x). {males}

y = 78.398 + 3.371 \* (x). {females}

Substituting the values of either the height and/or foot length (if gender is known in case of selection of foot to the above formulae the required value may be calculated with +/- SD of the height.

The above formulae tried and tested is applicable to all the age groups with near accurate results.

another advantage of the results obtained is that if the age group is known, applying the linear regression formula, after calculating the regression coefficient (r) and constant value (a), the human remains can be isolated according to the individual's age at the time of death.

# Conclusion

- 1. Stature/height of the individual was correlating well with the foot length than foot breadth.
- 2. That stature varies in a single day in a single individual.
- 3. Right foot length showed statistically highly significant correlation with the height in males.
- 4. Left length showed statistically highly significant correlation with the height in females.
- 5. Deduced a formula to estimate either height or rfl (males), lfl (females).

The formulae are:

y = 58.544 + 4.276 \* (x). {males} y = 78.398 + 3.371 \* (x). {females}

#### References

- PekkaSaukko, Bernard Knight. The establishment of identity of human remains, Knights Forensic Pathology. Third edition, pg-123.
- 2. Jeremy Rich. Forensic Medicine of lower extremity. 2005.p.380-383, 74, 75.

- Dikshit PC. Textbook of Forensic Medicine and Toxicology. 2<sup>nd</sup> edition, 2007;
- 4. Modi's Medical Jurisprudence and Toxicology. Edited by Mathiharan, Student edition, 2009.
- Mukhejee's Textbook of Forensic Medicine and Toxicology. Edited by Karmakar R N, 3<sup>rd</sup> edition.
- KrishanVij, Textbook of Forensic Medicine and Toxicology, priniciples and practices, 4<sup>th</sup> edition. 2008.
- 7. Narayan Reddy KS, The Essentials of Forensic Medicine and Toxicology, 28<sup>th</sup> edition, 2009.

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# Estimation of Stature from Nasal Height and Nasal Breadth for Population in and Around Rajkot Region of Gujarat

# Vaghela Raghurajsinh Dhirubhai<sup>a</sup>, Manvar Princekumar Jayantilal<sup>b</sup>

## Abstract

Determination of stature from fragmented human remains is vital part of forensic investigation for thepurpose of identification. Determination of stature from dismembered body parts can play vital role for identification of person. Present study was done to derive regression formula and multiplication factor to estimate stature from Nasal dimensions mainly Nasal Height and Nasal Breadth for population in and around Rajkot region of Gujarat. Total 100male cases and 100 female cases randomly selected from cadavers brought for post-mortem examination at mortuary of P.D.U. Govt. Medical College and Hospital, Rajkot. Stature was measured with measuring tape and Nasal dimensions were measured by Spreading caliper after breaking Rigor mortis, if developed. Collected data were statistically analysed using software like Epi info 7 and Microsoft excel. Mean stature as well as mean Nasal dimensions were significantly higher for male than for female (p<0.05). Regression formula and multiplication factor derived in present study are useful to estimate stature from nasal dimensions for population in and around Rajkot region of Gujarat.

Keywords: Identification; Stature; Nasal Height; Nasal Breadth.

## Introduction

During legal investigations, especially in crimes resulting in fatalities or when unknown human remains are recovered by investigating agencies, the forensic pathologist is often required to give an opinionregarding personal identification of the deceased. Stature or bodyheight is one of the most important parameters to determine thephysical identity of an individual. There is a definite biological relationship of stature with the all body parts such as extremities, head, trunk, vertebral column, etc. Many studies have been conducted on the determination of stature from percutaneous measurements of various body parts including arms, legs, feet, hands, etc. Nose is the important physiognomic feature in humans. Nasal dimensions are among the most important cephalometric parameters used in the descriptions of human morphology, identification of individuals and

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classification of sex and races. However, different population exhibits variation in their body proportions as they are affected by race, diet, genetics of a person, geographical location and climatic conditions [4]. Due to which, results of a study conducted on one population cannot be applied on other population. Even results of a study conducted on one generation of a population cannot be applied on next generation as they are affected by secular changes in physical growth. With this view, present study was carried out to derive regression formula and multiplication factor to determine stature from Nasal dimensions for population in and around Rajkot region.

#### Material and Method

This study was carried out on 100 male cases and 100 female cases randomly selected from cadavers brought for post-mortem examination at mortuary of P.D.U. Govt. Medical College and Hospital, Rajkot during the period of January 2015 to May 2016. Age group selected for the study was 21 years and above. The cadavers with any injury, disease or anomaly that affects Facial dimensions were excluded from the study. The bodies that were decomposed, charred or mutilated were also excluded from the study. Vaghela Raghurajsinh Dhirubhai & Manvar Princekumar Jayantilal / Estimation of Stature from Nasal Height and Nasal Breadth for Population in and Around Rajkot Region of Gujarat

Measurements were taken up to nearest 0.1 cm as below after breaking rigor mortis, if developed.

#### Stature

The body was placed in supine position on a flat, hard surfaced autopsy table. Head was fixed in such way that Frankfort plane remains at right angle to autopsy table. Frankfort plane is defined as plane adjoining the upper margin of the ear openings and lower margin of the orbit of the eyes. Knee and hip joints were kept extended, and the neck and feet were kept in neutral position. If rigor mortis was present, it was broken down. Stature (Total Body Length) was measured between the vertex of the head and the heel using a measuring tape up to nearest of 0.1 cm.

#### Nasal Height

It was measured as straight distance between nasion and subnasale (In the midline, the point where nasal septum merges with the upper lip). It was measured by spreading caliper with scale as follows: one tip of the calliper was placed at subject's nasion and the movable part was moved and placed on subnasale.

#### Nasal Breadth

It was measured as straight distance at right angle to the Nasal Height from ala to ala (lateral surface of external nose) by spreading caliper.

Table 1:	Descriptive	statistics	(Mean ±	sD)
----------	-------------	------------	---------	-----

Male	Female	Total Cases
167.59±4.47	151.39±4.55	159.49±9.28
4.34±0.24	3.93±0.26	4.15±0.33
3.75±0.24	3.46±0.24	3.60±0.28
	Male 167.59±4.47 4.34±0.24 3.75±0.24	Male         Female           167.59±4.47         151.39±4.55           4.34±0.24         3.93±0.26           3.75±0.24         3.46±0.24

\* All measurements are in centimeters.

Table 2: Comparison for gender difference in stature and nasal dimensions

Parameter	Ν	lean	T Value	P Value*
	Male	Female		
Stature	167.59	151.39	25.391	0.000 (S)
Nasal Height	4.37	3.93	12.564	0.000 (S)
Nasal Breadth	3.75	3.46	8.674	0.000 (S)

\* S=Significant

\*p Value<0.05 is significant and p Value<0.001 is highly significant.

Table 3: Correlation of nasal dimensions with stature

Parameter	Pearson Correla	tion Coefficient (R)* Female
Nasal Height	0.240	0.196
Nasal Breadth	0.188	0.124

\*p Value is less than 0.05 for all.

#### Statistical Analysis

All the measurements were statistically analysed using software like Epi info 7 and Microsoft Office Excel 2007.The data was analysed for male and female cases separately as well as for total cases i.e. both sexes together. Result of data analysed for total cases can be applied to determine stature from Nasal dimensions, when sex is unknown. Pearson correlation coefficient (r) was calculated to assess the correlation of stature with Nasal dimensions. Independent samples T-test was applied to determine statistical significance of gender differences in stature and Nasal dimensions. P-value of less than 0.05 was considered significant. Regression formula and multiplication factors were derived to estimate stature from Nasal dimensions.

#### Observation

Table 1 is showing descriptive statistics of all the cases. It is evident from the table that mean of stature and nasal dimensionsare higher for male than for female.Genderdifference in stature and Nasal dimensionsarestatistically confirmed by applying t-test as shown in Table 2 (p <0.001).

Table 3 is showingcorrelation of Nasal dimensions with stature. Nasal Height and Nasal Breadthare showing positive and significant correlation with stature in male as well as female cases.

# Simple regression formula when sex is known

#### For Male

- 1. From Nasal Height STATURE= 148.039 + 4.470 x Nasal Height
- 2. From Nasal Bredth Stature= 154.305 + 3.544 x Nasal Breadth

#### **For Female**

- 1. From Nasal Height Stature= 137.803 + 3.456 x Nasal Height
- 2. From Nasal Breadth Stature= 143.265 + 2.351 x Nasal Breadth

# Simple Regression Formula When Sex is Unknown

- 1. From Nasal Height Stature= 83.052 + 18.408 x Nasal Height
- 2. From Nasal Breadth Stature= 96.966+ 17.356 x Nasal Breadth

Mean Multiplication Factor when Sex Is Known

#### For Male

- 1. From Nasal Height STATURE= **38.42** X NASAL HEIGHT
- 2. From Nasal Breadth Stature= **44.87**X Nasal Breadth

#### For Female

- 1. From Nasal Height Stature=**38.66** X Nasal Height
- 2. From Nasal Breadth Stature= **44.00** X Nasal Breadth

#### Mean multiplication factor when sex is unknown

- 1. From nasal height Stature=**38.53** X Nasal Height
- 2. From Nasal Breadth Stature = **44.43** X Nasal Bradth

Table 4: Comparison of stature estimated by regression formula and by mean multiplication factor (Mean ± SD)

Parameter	Male	Female	Total Cases
Measured Stature	167.59±4.47	151.39±4.55	159.49±9.28
Stature Estimated By Regression Formula Nasal Height	167.59±1.74	151.39±0.89	159.49±6.13
Nasal Breadth	167.59±0.84	151.39±0.56	159.49±4.85
Stature Estimated By Mean Multiplication Factor	140 OF (0.22	151 07 0 00	140.00.10.05
Nasal Height Nasal Breadth	168.21±10.66	151.97±9.98 152.06±10.56	160.00±12.85 160.06±12.43

SD=Standard Deviation

Table 4 is showing comparison of stature estimated by regression formula with stature estimated by mean multiplication factor.Standard deviation (SD) measures amount of dispersion from mean value.

From Table 4, it is evident that mean stature estimated by regression formula as well as multiplication factor are very nearer to mean measured stature.

However, SD of stature estimated by mean multiplication factor are higher than SD of stature estimated by regression formula, which means stature estimated by mean multiplication factor is showing more dispersion from its mean value. So, regression formula measures stature more precisely than mean multiplication factor.

# Discussion

The main objective of this study is to find out correlation between Nasal dimensions with stature and to use result of this study as a basis for developing stature estimation standards specifically for population in and around Rajkot region of Gujarat.Several such studies have been carried out in past for different population of India.

Agnihotri AK et al [5] studied 150 Indo-Mauritian adults (75 males and 75 females) of age group between 20 to 28 years to establish anthropometric relationship between stature and nasal dimensions. Comparative statistical analysis among both gender clearly revealed that Nasal breadth emerged as a major predictors for stature estimation among males. But none of nasal parameters worked to estimate stature of females.

Sagar S et al [6] studied 300 Jatvas (100 males and 200 females) aged between 17 to 40 years of Delhi region. They measured Stature, Nasal height, Nasal breadth, Head length, Head breadth and Ear length. They concluded that Jatvas Males exhibit greater dimensions for Nasal Breadth and females exhibit greater dimensions for Nasal height.

From comparison of these studies, it is evident that all the studies have found positive correlation between Nasal dimensions and stature, which means Nasal Height and Nasal Breadth are useful parameter to estimate stature. All the studies show significant gender difference mean stature as well as Nasal Height and Nasal Breadth. Table 5 shows comparison of mean stature and mean nasal height and mean nasal breadth with other similar studies. It is evident from the table that all the studies have found different mean stature as well as mean nasal height and mean nasal breadth. This finding substantiate well known fact that different population shows difference in stature as well as in body proportions, so population and sex specific regression formula and multiplication factor are required for accurate stature reconstruction from nasal dimensions.

Table 5: Comparison of present study with other similar studies

Author	Mean Stature	* (Mean ± SD)	SD) Facial Dimensions				
			Mean Nasal Height		sal Height	Mean Nasal Breadth	
	Male	Female	Male	Female	Male	Female	
Agnihotri AK et al. <sup>5</sup>	173.40±7.70	157.36±6.17	5.27±0.33	5.20± 0.35	3.28±0.49	2.95±0.37	
Sagar S et al.6	152.33±0.56	152.44±0.39	4.77±0.06	4.88±0.23	3.90±0.05	3.75±0.15	
Present Study	167.59±4.47	151.39±4.55	4.37±0.24	3.93±0.26	3.75±0.24	3.46±0.24	

#### Conclusion

In present study, mean stature estimated from regression formula as well as multiplication factor are similar to mean measured stature in both sexes, however, regression formula measures stature more precisely than mean multiplication factor. So, regression formula and multiplication factor derived from present study can be used to determine stature of deceased person from nasal dimensionswhen mutilated head is found.

Mean stature as well as mean nasal height and mean nasal breadth are significantly higher for male than for female, so sex specific regression formula and mean multiplication factor should be derived. Present study has derived regression formula and multiplication factors for male and female cases separately as well as for total cases i.e. both sexes together. Regression formula and multiplication factor derived for total cases can be applied to determine stature from nasaldimensions, when sex is unknown. However, sex specific regression formula and multiplication factors can estimate sex more accurately.

Asdifferent population show difference in stature as well as in body proportions, results of present

study are applicable to population in and around Rajkot region.

#### Reference

- UN General Assembly Official Records. General Assembly Resolution, 217 A(III), 3rd Session; December 10,1948:71-77.
- Reddy KSN. The Essentials of Forensic Medicine & Toxicology. 33rd ed. New Delhi: Jaypee Brothers Medical Publishers (P) Ltd; 2014.p.57.
- Vij K. Textbook of Forensic Medicine & Toxicology. 5th ed. New Delhi: Reed Elsevier India Private Limited; 2011.p.35,51.
- Ghosh, S Malik. Assessing Intergenerational Differences in Anthropo-Physiological Variables: Case Study of a Tribal Population. The Internet Journal of Biological Anthropology. 2006;1(1).
- Agnihotri AK, Kachhwaha S, Googoolye K, Allock A. Estimation of stature from cephalo-facial dimensions by regression analysis in Indo-Mauritian population. Journal of Frensic and Legal Medicine. 2011;18:167-172.
- Sagar S, Nath S. Estimation of stature from different head and face measurements among male and female Jatvas of Delhi. Journal of Humanities and Social Science. 2014 September;19(9):52-55.

# A Study of Health Profile of Sanitary Staff, Hazards Sustained and their Practice in Handling Biomedical Waste

# Sanjay D. Gaiwale<sup>a</sup>, Madhusudan R. Petkar<sup>b</sup>, Vandana S. Gundla<sup>c</sup>

# Abstract

The proper handling and disposal of Bio-medical waste (BMW) is very imperative. There are well defined set of rules for handling BMW worldwide. In this descriptive observational cross-sectional study, 78 sanitary staff handling BMW participated. Maximum number of study participants (29.48%) belonged to age group of 41-45 years. 65.38% BMW handling workers were addicted to tobacco either in the form of smoking/chewing/ misery/gutkha chewing while 34.61% male workers were alcoholic. 60.25% staff suffered needle stick injuries (NSI) and 19.23% staff were injured while handling sharp objects. It was observed that one worker was HIV positive and has given history of needle stick injury while one worker was found to be Hepatitis B positive. 65.38% study participants had complains of lower backache while 34.61% workers were emotionally disturbed and they were not satisfied with their job. After training the use of Personal Protective Equipments (PPE) like gloves, mask and goggles improved to 93.59%, 83.33% and 12.82% respectively. Training also was fruitful where the participants got themselves vaccinated 100% and 79.48% for Tetanus and Hepatitis B respectively.

**Keywords:** Bio-Medical Waste; Sanitary Staff; Needle Sticks Injuries; Personal Protective Equipments; Vaccination.

# Introduction

Biomedical waste (BMW) is a term which means "any waste that is generated during diagnosis, treatment, or immunization of human beings or animals, or in the research activities pertaining to or in the production or testing of biological products and includes ten categories mentioned in Schedule I of the Government of India's BMW (management and handling) rules 1998" [1].

In the persuasion of the aim of reducing health problems, eliminating potential risks, and treating sick people, healthcare services inevitably create

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waste which itself may be hazardous to health. On an average about 0.33 million tons of hospital waste is generated in India annually and the waste generation rate ranges from 0.5 to 2.0 kg/bed/day [2]. The growth of BMW is expected at around eight per cent annually [3]. This BMW includes human tissues, body fluids, blood, excreta, unused drugs, cotton, swabs, disposable syringes, needles, I.V. tubes, blood bags and sticky bandages contaminated by blood and pus etc [4]. The MBW should be segregated at source into color coded bags or containers and its collection and proper disposal should be a significant concern for both medical personnel and general community [5].

Indiscriminate segregation, storage, transport, treatment, disposal and exposure to BMW pose a serious threat not only to environment but also to human health. The spectrum of hazards due to BMW can range from injuries and diseases like gastroenteritis, tuberculosis, septicemia, tetanus and skin infectious to more deadly disease such as HIV/ AIDS and Hepatitis [6,7]. Although, there is an increased global awareness among health professionals about the hazards and also appropriate management techniques but the level of awareness in India is found to be unsatisfactory [7, 8]. With this background the present study was

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conducted with objectives to know the health status, occupational hazards and awareness of the sanitary staff handling BMW.

## Material and Methods

The descriptive observational cross-sectional study was carried out for a period of one year in a tertiary care hospital with prior approval of institutional ethics committee. It included details of various socio-demographic variables like age, sex, working experience, type of work, occupational hazards (injuries) and other details regarding attitude and practice for bio medical waste handling and its management. All the sanitary staff handling BMW was approached individually and was briefed about the study and informed consent was taken, to participate in the study. They were assured about their confidentiality and anonymity. Total 78 sanitary staff participated in the present study. A detailed model questionnaire was prepared and filled for each participant which included:

- 1. History and general health parameters.
- 2. Enquiry about the exposure & history of vaccination.
- 3. Training given or not.

Table 1: Basic profile of sanitary staff handling BMW (n=78)

4. Use of Personal Protective Equipments (PPE).

The data was collected, compiled, systematized, tabulated and analyzed by using SPSS version 14.0 software (Statistical Package for Social Sciences) and results expressed in percentages.

# Results

As depicted in Table 1; 78 sanitary staff handling BMW was successfully enrolled in the study. Majority (29.48%) of study participants belonged to age group of 41- 45 years, of which 15 were male and 8 were female. Minimum number of staff was in the age group of 56-60 years out of which 2 were male and 3 were female. More than two third staff in the study group was working in the hospital from 11 to 15 years.

It was found that 65.38% BMW handling workers were addicted to tobacco either in the form of smoking/chewing/misery/gutkha chewing while 34.61% male workers were alcoholic. Very less number of workers was addicted to some drugs. Most of the workers were known cases of either of Diabetes mellitus, Hypertension, Ischaemic heart disease (IHD) or Bronchial Asthma (BA) and receiving treatment for the same.

Characteristics	Male n=48	Female n=30	n=78	%
Age				
20-25	04(08.33%)	02(06.66%)	06	07.69
26-30	05(10.41%)	04(13.33%)	09	11.53
31-35	04(08.33%)	04(13.33%)	08	10.25
36-40	06(12.50%)	03(10.00%)	09	11.53
41-45	15(31.25%)	08(26.66%)	23	29.48
46-50	05(10.41%)	02(06.66%)	07	08.97
51-55	07(14.58%)	04(13.33%)	11	14.10
56-60	02(04.16%)	03(10.00%)	05	06.41
Duration of work				
1-5 Yrs	05(10.41%)	02(06.66%)	07	08.97
6-10 Yrs	06(12.50%)	04(13.33%)	10	12.82
11-15 Yrs	21(43.75%)	10(33.33%)	31	39.74
16-20 Yrs	09(18.75%)	09(30.00%)	18	23.09
>20 Yrs	07(14.58%)	05(16.66%)	12	15.38
Habits				
Tobacco/Gutkha	33(68.75%)	18 (60%)	51	65.38
Alcoholic	27(56.25%)	00	27	34.61
Drugs	3(6.25%)	00	3	3.84
Chronic disease				
DM	08(16.66%)	06(20.00%)	14	17.94
HTN	07(14.58%)	04(13.33%)	11	14.10
IHD	05(10.41%)	03(10.00%)	8	10.25
BA	05(10.41%)	02(06.66%)	7	08.97

Table 2: Distribution of hazards sustained while handling BMW

Characteristics	Male n=48	Female n=30	n=78	%
Physical Hazards				
Needle stick injuries (NSI)	28(58.33%)	19(63.33%)	47	60.25
Electric shock due to faulty instruments	00	03(10.00%)	03	03.84
Burns, Scalds	09(18.75%)	05(16.66%)	14	17.94
Cuts with sharp objects	10(20.83%)	05(16.66%)	15	19.23
Chemical Hazards				
Irritation of eyes	15(31.25%)	10(33.33%)	25	32.05
Latex allergy	08(16.66%)	05(16.66%)	13	16.66
Eczema & related skin lesion due to excessive use soap/detergent	17(35.41%)	10(33.33%)	27	34.61
Biological Hazards				
Tuberculosis	06(12.50%)	02(06.66%)	8	10.25
HIV	01(02.08%)	00	1	01.28
HBV	01(02.08%)	00	1	01.28
Psychosocial & other hazards				
Low back pain	28(58.33%)	23(76.66%)	51	65.38
Neck Pain	14(29.16%)	10(33.33%)	24	30.76
Muscle sprain	13(27.08%)	11(36.66%)	24	30.76
Headache	12(25.00%)	11(36.66%)	23	29.48
Mental stress due to work	13(27.08%)	10(33.33%)	23	29.48
Emotional abuse by patient's relatives or staff	17(35.41%)	10(33.33%)	27	34.61
Acidity	22(45.83%)	09(30.00%)	31	39.74
Varicosity	05(10.41%)	00	05	06.41

Table 3: Impact of training & change in attitude regarding use of preventive measures

Preventive measures	Males N=48		Female	es N=30	Total N=78	
	Before	After	Before	After	Before	After
Gloves	38(79.16%)	46(95.83%)	22(73.33%)	27(90%)	60(76.92%)	73(93.59%)
Mask	30(62.50%)	41(85.41%)	20(66.66%)	24(80%)	50(64.10%)	65(83.33%)
Goggles	00	07(14.58%)	00	03(10%)	00	10(12.82%)
Washing hands with soap	48(100%)	48(100%)	30(100%)	30(100%)	78(100%)	78(100%)
TT vaccination	40(83.33%)	48(100%)	25(83.33%)	30(100%)	65(83.33%)	78(100%)
HBV vaccination	35(72.91%)	38(79.16%)	20(66.66%)	24(80.00%)	55(70.51%)	62(79.48%)

As per Table 2 depicting distribution of hazards sustained while handling BMW; 60.25% staff suffered needle stick injuries (NSI), 3.84% (females) were affected with electric shock due to handling of faulty instruments, 17.94% had burns/scalds and 19.23% staff were injured while handling sharp objects.

Considering chemical hazards 32.05% and 16.66% of sanitary staff suffered with irritation of eyes and latex allergy respectively.

Eczema and related skin lesions due to excessive use of soap/detergent were the most commonly (34.61%) encountered chemical hazard observed in the participants.

8 workers had a history of Pulmonary Koch's out of which 3 were suffering from active tuberculosis and receiving Anti Koch treatment and remaining five was asymptomatic.

It was observed that one worker was HIV positive

and has given history of needle stick injury while one worker was found to be Hepatitis B positive.

Less than one third of the participants suffered from neck pain, muscle sprain, headache, varicosity, acidity and mental stress due to work. 65.38% of them had complains of lower backache while 34.61% workers were emotionally disturbed and they were not satisfied with their job due to repeated humiliation by other staff and patient's relatives.

As per Table 3 the use of Personal Protective Equipments (PPE) like gloves, mask and goggles while handling and disposing biomedical waste by health care workers was 76.92%, 64.10% and 0% respectively before training and after training it was improved to 93.59%, 83.33% and 12.82% respectively. 83.33% workers received TT vaccination before training, whereas it was 100% after training. Similarly 70.51% of them received HBV vaccination before training, while it increased to 79.48% after training. Sanjay D. Gaiwale et. al. / A Study of Health Profile of Sanitary Staff, Hazards Sustained and their Practice in Handling Biomedical Waste

#### Discussion

There is no doubt that, given the diversity of material coming under the heading of biomedical waste, there is considerable potential for hazardous exposure to occur through this waste management. NSIs are an important and common occupational injury amongst healthcare workers and have a significant impact on the morbidity and mortality of these workers through the transmission of Blood borne pathogens (BBP) [9,10].

The World Health Organization has estimated that exposure to sharps in the workplace accounts for 40% of infections with HBV and HCV and 2-3% of HIV infections among health care workers [11]. In our study it was found that 60.25% of workers suffered from NSI and 19.23% with cuts from sharp objects. Consequently 1.28% workers were infected with HIV and HBV each. Musa et al reported 66.1% workers were affected with NSI and 11.3% with sharp objects [12].

There are different strategies to prevent infections due to NSI, including training health care workers (HCWs) and a reduction in unnecessary invasive procedures. Vaccination is one of the best ways to protect HCWs from infection, but vaccination is only available for HBV and Tetanus.

In our study 83.33% workers received TT vaccination before training, whereas it was 100% after training. Similarly 70.51% of them received HBV vaccination before training, while it increased to 79.48% after training. In Lakbala P et al. study, the number of vaccinated workers was 92.4% [13]. While in Musa et al study only 12.6% HCW had completed the hepatitis B vaccination course [12].

Use of PPE is one of the important measures to safeguard health care workers from exposure to occupational hazards, especially in developing countries where conventional occupational safety control principles remain a challenge to implement. Our study showed that use of PPE like gloves, mask and goggles while handling and disposing biomedical waste by health care workers was 76.92%, 64.10% and 0% respectively before training and after training it was improved to 93.59%, 83.33% and 12.82% respectively. The study by Chudasama et al. reported that use of PPE by sanitary staff was 74.1% [14].

Continuing training programs and awareness workshops on importance of Personal Protective Equipments to prevent cross infection and biomedical waste related physical hazards and diseases is necessary to safeguard the health of workers.

## **Conclusion and Recommendations**

Study results demonstrated a lack of awareness in several aspects of BMW management among study participants. In addition it was observed that the awareness and practices of biomedical waste management was increased evidently after the training.

Based on the Study Findings, the Following Supportive Measures are Recommended

- Planning of systematic educational programs targeted at using PPE, as well as refreshing training programs in order to promote organized and systematic disposal of BMW.
- Provision of an adequate number of safety facilities such as puncture-resistant disposal containers (safety boxes) and new needle devices with safety features.
- Stressing the importance of reporting accidents like NSIs and cuts with sharp objects and the development of a defined system aimed at the registration of needle stick and sharps injuries in order to achieve higher safety.
- Development of safety management systems, and training on workplace safety.
- Awareness regarding risk factors in handling BMW, proper immunization and post exposure prophylaxis for health care workers.

#### References

- Government of India. The Ministry of Environment and Forests. Biomedical Waste (Management and Handling) Rules. 1998. Extraordinary, Part II, Section3, Subsection (ii). The gazette of India, No. 460, 27 Jul 1998. Available from: http://envfor.nic.in/legis/ hsm/biomed.html. [Last accessed on 2017 Nov 08].
- 2. Patil AD, Shekdar AV. Health-care waste management in India. J Environ Manage. 2001 Oct;63(2):211-20.
- Mathur V, Dwivedi S, Hassan MA, Misra RP. Knowledge, attitude, and practices about biomedical waste management among healthcare personnel: A crosssectional study. Indian J Comm Med. 2011;36:143-5.
- Mohankumar S, Kottaiveeran K. Hospital Waste Management and Environmental Problems in India. IJPBA 2011 Nov-Dec;2(6):1621-1626.
- Central pollution control board. Environmental standard and guidelines for management of hospital waste. CPCB, Ministry of Environment and Forest, New Delhi; 1996.

- Pruss A, Giroult E, Rushbrook D. Safe management of wastes from health care activities, World Health Organization, Geneva; 1999.
- Rao PH. Report: Hospital waste management awareness and practices: a study of three states in India. Waste Manag Res. 2008 June;26(3):297-303.
- Kishore J, Goel P, Sagar B, Joshi TK. Awareness about biomedical waste management and infection control among dentists of a teaching hospital in New Delhi, India. Indian J Dent Res. 2000 Oct-Dec;11(4):157-61.
- 9. Pruss-Ustun A, Rapiti E, Hutin Y. Estimation of the global burden of disease attributable to contaminated sharps injuries among health-care workers. Am J Ind Med. 2005;48(6):482-490.
- National Institute for Occupational Safety and Health. NIOSH Alert: preventing needle stick injuries in health care settings [DHHS (NIOSH) Publication No. 2000–108] U.S. Department of Health and Human Services, Cincinnati, OH; 1999.

- 11. World Health Organization. The world health report: 2002: Reducing risks, promoting healthy life. World Health Organization, Geneva; 2002.
- Musa S, Peek-Asa C, Young T, Jovanovi N. Needle Stick Injuries, Sharp Injuries and other Occupational Exposures to Blood and Body Fluids among Health Care Workers in a general hospital in Sarajevo, Bosnia and Herzegovina. Int J Occup Saf Health. 2014;4(1):31-37.
- Lakbala P, Ebadi Azar F, Kamali H. Needlestick and sharp injuries among housekeeping workers in hospital of Shiraz, Iran. BMC Research Notes. 2012; 5:276. Available: http://www.biomedcentral.com/ 1756-0500/5/276/.
- 14. Chudasama RK, Rangoonwala M, Sheth A, Misra SKC, Kadri AM, Patel UV. Biomedical Waste Management: A study of knowledge, attitude and practice among health care personnel at tertiary care hospital in Rajkot: Journal of Research in Medical and Dental Science. 2013;1(1):1822.

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# A Comparative Study of ART Regimens and the Haematological Effect of ART in Treatment of PLHIV

# Singh Swati<sup>a</sup>, Namey R.D.<sup>b</sup>

## Abstract

*Background*: Haematological manifestations are the second commonest cause of morbidity and one of the common causes of mortality in HIV patients. In the course of ART administration, clinically significant haematologic abnormalities are common in persons with HIV infection. *Objectives*: To study the comparison of haematological parameters in subjects with different CD4 counts, to compare haematological findings of pre-ART group with ART group and two ART regimens namely ZLN and TLE. *Study Design*: Prospective observational study. *Material and Methods*: After obtaining informed consent, 225 PLHIV were clinically evaluated and subjected to CBC, PBS, ALC, ESR and CD4 count. *Statistical Analysis*: Data was expressed as percentage and mean ± standard deviation. Statistical tests used were chi-square test, Fisher's exact test and Mann-Whitney U test and Kolmogorov-smirnov analysis. *Results*: TLC (p=0.02), MCV(p=0.04) and ALC (p<0.0003) were significantly raised while Hb, MCH, MCHC, PCV, ESR, CD4 count showed Non significant raised values in ART group in comparison to pre-ART group. MCH (p=0.01) and ALC (p<0.001) were significantly raised and Hb, MCHC, PCV, ESR, ALC showed Non significant raised values in PLHIV on TLE regimen when compared to ZLN regimen while TLC (p=0.04) was significantly raised in ZLN regimen. *Conclusion*: Most significant parameter was ALC in comparison between treated and untreated PLHIV groups and two ART regimens. TLE regimen fared better than ZLN regimen in treatment of PLHIV.

Keywords: Haematological; PLHIV; TLE; ZLN.

## Introduction

The first AIDS case in India was detected in 1986 [1]; since then the spread of HIV in India has been diverse, epidemic being most extreme in the southern half of the country and in the far North-East [2].

HIV infection is associated often with a wide range of haematological abnormalities, including impaired haematopoiesis, immune mediated cytopenias and coagulopathies, particularly in the later part of the disease [3].

Though many studies have been conducted, in most of them, various aspects were addressed and the focus on the haematological manifestations was limited. Most of the available data is from the west,

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which might not be directly applicable to the Indian subcontinent. Hence, this study was conducted using one of the most easily available investigations (complete haemogram) in a medical college-based observational study of HIV-infected adults attending R.C.S.M. GMC, Kolhapur. Even after thorough research we were unable to find any study which compared haematological parameters between two common ART regimens (ZLN and TLE).

## Material and Methods

HIV seropositive patients referred from ART centre of R.C.S.M Govt Medical College, Kolhapur for CBC to haematology department, central clinical laboratory (CCL) from March 2015 to March 2016 were included in this study, irrespective of their ART status. Written informed consent was obtained from all. Patients were excluded if they were less than 18 years of age or were pregnant or refused to become part of study.

After taking informed consent, detailed clinical history of every subject was recorded which included

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history of any opportunistic infection and treatment taken. Also, general and systemic examination was done. Haematological parameters (Hb, TLC, DLC, Platelet count, MCV, MCH, MCHC, HCT) were determined using the haematology auto analyzer CounCell-23 plus whereas the immunological parameter (CD4+ T cells) were assayed using the BD FACS Count system. Differential leucocyte count and patterns of anaemia were studied on peripheral blood smear stained with Leishman stain. ESR was carried out. Absolute lymphocyte count (ALC) was calculated as-

ALC (cells/cu.mm) = Differential lymphocytes (%) X TLC (cells/cu.mm)

The collected information was compiled in a predetermined proforma.

Anaemia was defined as haemoglobin <13g/dl (men) and <12g/dl (women), leucopenia as total leucocyte count <4000cells/µl, neutropenia as absolute neutrophil count <1000cells/µl, lymphopenia as absolute lymphocyte count <800cells/µl and thrombocytopenia as platelet count <150×10^3 cells/µl.

## Ethics

The study was carried out after taking permission from the Institute's Ethical Committee and MSACS (Maharashtra State AIDS Control Society).

#### Statistics

Descriptive statistics were expressed as percentage and mean±SD. Statistical tests used were chi-square test, Fisher's exact test and Mann-Whitney U test. Kolmogorov-smirnov analysis was used to assess the linearity of the data. Pearson's rank order correlation was used to assess the correlation between two parameters. P<0.05 was treated as statistically significant. SPSS Vs. 16 (IBM Corp) ® and Microsoft excel (Microsoft corp. pvt. Itd. ™) were used to perform the statistical analysis.

## Results

Total number of HIV seropositive patients presenting in CCL in the prescribed period was 356. The number of cases meeting the inclusion criteria was 235. 10 cases had insufficient data so they were excluded from the study. Hence, the sample size for study was 225. Majority of HIV positive patients in our study belonged to 30-40 years age group (36.4%, n=50) followed by 40-50 years (29.3%, n=82). Out of the 225 subjects, 123 (54.6%) were males and 102 (45.3%) were females.

Most of the patients in our study i.e. 205 (91%) were receiving ART while 20 (9%) patients were not receiving ART(i.e. Pre-ART). Out of these 205 subjects, 124 (55.11%) subjects were on ZLN therapy and 81(16.44%) subjects on TLE therapy.

In our study, maximum patients presented with symptom of weight loss 156 (69.3%) followed by 80 (35.5%) patients with fever, 53 (23.5%) patients with cough and 12 (5.33%) patients with abdominal pain. Few of the patients presented with multiple symptoms mentioned above. Predominant sign was pallor present in 34 (15.1%) subjects followed by other signs such as lymphadenopathy in 15 (6.7%), icterus in 4 (1.78%), clubbing in 3 (1.33%) and cyanosis in 1



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Hematological parameters	Pre-ART	ART	
	(Mean ± SD)	(Mean ± SD)	P value
TLC (cells/cu.mm.)	4950±1633.8	5700±2048.7	0.02
Differential neutrophil%	64±8.1	61±8.2	0.43
Differential lymphocyte%	17±8.5	18±10.6	0.5
Differential monocyte%	2±0.4	2.0±0.8	0.61
Differential eosinophil%	1±0.2	1±0.2	1
Differential basophil%	1±0.8	1±0.5	0.8
Hb (g%)	10.25±1.9	12.1±2.2	0.08
MCV(fl)	79.5±11.8	91.9±13	0.04
MCH(pg)	26.35±6.2	30±6.7	0.07
MCHC(g/dl)	31.95±3.8	34.1±3.6	0.9
PCV (%)	30.5±5.2	33.4±4.9	0.3
ESR(mm/hr)	16±4.2	14±4.4	0.4
CD4 count(cells/cu.mm)	193±341.0	210±283.1	0.09
ALC (cells/cu.mm)	1089±527.8	1225±586.8	0.0003
Platelet count(cells/cu.mm)	2.565±0.8	2.6±0.6	0.5

 Table 1: Comparison of haematological parameters in Pre-ART (HIV positive patients not on ART) subjects and

 HIV positive subjects on ART

Table 2: Comparison of haematological parameters in study subjects on two different ART regimens (ZLN and TLE)

Haematological parameters	TLE	ZLN	P value
TLC (cells/cu.mm.)	5600±2400.1	5700±1779.7	0.04
Differential neutrophil %	60.1±8.9	62.0±7.6	0.5
Differential lymphocyte %	18±10.6	18.5±10.7	0.9
Differential monocyte %	2.0±0.7	2.0±0.8	0.5
Differential eosinophil %	1.0±0.2	1.0±0.3	0.5
Differential basophil %	1.0±0.6	1.0±0.5	0.5
Hb (g%)	12.4±2.3	11.3±2.1	0.4
MCV (fl)	96.8±13.3	91.3±12.9	0.06
MCH (pg)	34.5±6.7	28.2±6.6	0.01
MCHC (g/dl)	35.9±3.9	33.4±3.4	0.08
PCV (%)	33.4±4.3	33.0±5.3	0.6
ESR (mm/hr)	15.0±4.7	14.0±4.3	0.09
CD4 count (cells/cu.mm)	246.5±250.3	194±303.1	< 0.001
ALC (cells/cu.mm)	1296±564.8	1156.0±602.9	0.08
Platelet count (cells/cu.mm)	2.5±0.6	2.6±0.6	0.5

#### (0.44%) subject (Figure 1).

Table 1 shows comparison of haematological parameters in Pre-ART (HIV positive patients not on ART) subjects and HIV positive subjects on ART. Table 2 shows comparison of haematological parameters in study subjects on two different ART regimens (ZLN and TLE).

#### Discussion

Haematological abnormalities may occur as a result of HIV infection itself, as sequelae of HIVrelated opportunistic infections or malignancies or as a consequence of therapies used for HIV infection and associated conditions [4]. We evaluated 225 consecutive HIV seropositive patients who presented at Central Clinical Laboratory, RCSM GMC, Kolhapur, irrespective of their ART status. We also compared the final haematological diagnosis of patients on ART with Pre-ART group and the same between ZLN treatment group and TLE treatment group.

Availability of free antiretroviral drugs to HIV infected individuals has provided a new lease of life to HIV positive patients. Treatment of HIV infected patients with currently available highly active antiretroviral therapy (HAART) drugs is successful in reducing the burden of disease but it's associated with various side effects [5].

The first line regimen of antiretroviral therapy (ART) as per NACO guidelines includes [5]-

-ZLN (Zidovudine [300mg] + Lamivudine [150mg] + Nevirapine [200mg])

-TLE (Tenofovir [300mg] + Lamivudine [150mg] + Efavirenz [600mg])

- ZLE (Zidovudine [300mg] + Lamivudine [150mg] + Efavirenz [600mg])

- TLN (Tenofovir [300mg] + Lamivudine [150mg] + Nevirapine [200mg])

205 patients in our study were on ART while 20 were pre-ART, this disparity can be due to different rates of patients coming to Haematology department, CCL for blood investigations. Pre-ART patients are not generally advised CBC by ART centre of our hospital while patients on ART undergo routine CBC monitoring.

Most of the HIV positive patients were symptomatic and presented with weight loss 156 (69.3%), fever 80 (35.5%), cough 53 (23.5%) and abdominal pain 12 (5.33%) (Figure 1). Dikshit B et al had observed that 82.5% patients in his study were symptomatic, out of them 54.5% complained of fever and 10.3% had loss of weight [6].

The predominant sign present in subjects of our study was pallor 34 (15.1%) followed by lymphadenopathy 15 (6.7%), icterus 4 (1.78%), clubbing 3 (1.33%) and cyanosis 1 (0.44%) (Figure 1).

Haematological abnormalities are among the most common complications of HIV which involves all lineages of blood cells. Results from the study showed that HIV infection affect haematological indices of patients regardless of age and sex.

# Comparison of Haematological Parameters between Pre-Art Subjects and Subjects on ART

In the course of ART administration, clinically significant haematologic abnormalities maybe common in persons with HIV infection. Impaired haematopoiesis, immune-mediated cytopenias and altered coagulation mechanisms have all been described in HIV-infected individuals. Abnormalities may occur in individuals as a result of the following actions; HIV infection, sequel of HIV-related opportunistic infections, malignancies and consequence of therapies used for HIV infection and associated conditions [7].

In our study findings a significant variation was observed in some of the haematological parameters examined in HIV positive subjects on anti-retroviral (ART) treatment. The total WBC count shows a significant increase from pre-ART to ART. The significant increase in mean values from pre-ART to patients on ART observed in absolute lymphocyte (p=0.003) and total WBC (p=0.02) may indicate suppressive activity of the antiretroviral drug on the virus with the resultant decrease in leucopenia and lymphocytopenia (Table 1). Leucopenia and lymphocytopenia are the hallmarks of HIV infection and is thought to be mediated by infection of the virus with subsequent killing of CD4+ T cells. It can also be caused by certain medications such as ART and certain infections thereby decreasing TLC and ALC such as in studies by Enawgaw et al and Ibeh et al [7,8,9]. The significant increase found in the TLC from pre-ART to ART follows the pattern already reported by Amegor OF et al [10].

The result showed an increased mean PCV from pre-ART to patients on ART, the data tend to have similar progression with the values obtained from Haemoglobin (Table 1).

This suggests an effective therapeutic effect of the drug since a decreased PCV indicates anaemia. Mean haemoglobin increases in patients who receive ART thus reversing HIV associated anaemia which is consistent with studies by Enawgaw B et al (p<0.001), Ibeh BO et al and Amegor OF et al and [8-10]. The mean values of MCV (p=0.04), MCH, MCHC were all increased in ART patients compared to patients not on ART, similar trend was present in study by Enawgaw B et al wherein all the above parameters were raised significantly (p <0.001) [8].

The reduction of ESR( $16 \pm 4.2$  to  $14 \pm 4.4$ mm/hr) attest to the reduced anaemic condition found in the HIV subjects on anti-retroviral therapy. ESR decreased when compared with the pre-ART, ESR often may rise significantly in individuals due to infection or medication and merely reflect the anaemic condition seen in these subjects (Table 1) [11]. Ibeh BO et al have reported reduced mean ESR in HIV patients on ART (40.33mm/hr) compared to pre-ART (41.46mm/hr) [9].

A reduction in mean differential granulocyte count was observed between the pre-ART and ART (Table 1). It is of note that abnormal granulopoiesis and anti-granulocyte antibodies have been noted and described in HIV infected patients [12]. This is believed to contribute to the observed increase in neutropenia. The low granulocyte count seen in the ART patients may reflect the action of anti-retroviral drugs on HIV infection or associated conditions [13].

The incidence of comparative neutropenia in treated patients is consistent with other report by Ibeh BO et al which have also shown a high incidence of granulocytopenia particularly in patients with more profound immunodeficiency [9].

A reduced platelet count may indicate disease progression and may sometimes be associated with abnormal bleeding. Thrombocytopenia may result due to immune system malfunction [14]. The result here showed increase in platelet count from the pre-ART to ART (Table 1) which is consistent with studies by Enawgaw B et al and Ibeh BO et al [8,9]. This indicates a reduced incidence of thrombocytopenia in the HIV positive ART subjects. This action maybe adduced to the activity of the administered antiretroviral therapy.

HIV patients accessing ART have been reported by Enawgaw et al (p=0.038) and Amegor OF et al to have an increased CD 4 cell count such a trend was also observed in our study [8,10]. Further investigation is needed to ascertain these haematological findings since in our study just 20 patients were pre-ART compared to 205 ART patients hence its limitation.

# Comparison of Haematological Parameters between Subjects on ZLN and TLE Antiretroviral Therapy

In low resource settings, fixed-dose combinations of nucleoside reverse transcriptase inhibitors (NRTIs) such as Tenofovir and Lamivudine; and nonnucleoside reverse transcriptase inhibitors (NNRTIs) such as Efavirenz, are commonly used as antiretroviral therapy (ART) for HIV-infected patients in order to increase adherence to lifelong treatment.

Our study showed significantly decreased mean MCH (p=0.01) and CD4 count (p<0.001) values in patients on ZLN as compared to patients on TLE though mean TLC was significantly higher (p=0.04) in patients on ZLN than patients on TLE antiretroviral therapy (Table 2).

In a study conducted by Krishnan CR et al, the two ART regimens showed sustained improvement in the CD4 count but TLE (Mean CD4-514.43 cells/ cu.mm) showed a slightly more increase in CD4 than ZLN (Mean CD4- 471.42 cells/cu.mm). The incidence of adverse effects (i.e. anaemia) was more in ZLN regimen compared to TLE. This study showed that TLE is safer than ZLN and the efficacy is relatively similar in both the regimens [15]. CD4 count comparison of ZLN and TLE regimens done by Hemasri M et al showed there is no significant difference between the two regimens, both had equal efficacy profile, during treatment with ZLN regimen mean CD4 was 358.43 while during TLE regimen mean CD4 was 322.95 and thus concluded that even though the combination of ZLN is very efficacious as a anti retroviral drug regimen, but TLE should be

preferred by the physicians in Govt. general hospital [16].

However, even after thorough research, studies on haematological parameters observed during ZLN and TLE treatment were not found thus, there is a lacuna in literature.

HAART recovers neutropenia, lymphopenia, thrombocytopenia, anaemia. Relatively less changes in haemoglobin, PCV and platelet count in HIV seropositive patient could be an indication of low toxicity in patients on HAART [17]. A possibility of coexisting iron deficiency anaemia and megaloblastic anaemia couldn't be ruled out as serum ferritin and serum Vit B12/Folic acid level respectively wasn't done.

Anaemia, neutropenia, lymphocytopenia and thrombocytopenia are reversible by HAART so HAART should be started earliest after diagnosis of HIV infection and determining the CD4 count. ART drug toxicities are common findings so accordingly the treatment should be modified. Hence, routine monitoring of haematological parameters in patients with HIV/AIDS is recommended, to detect the abnormalities at the earliest, find the aetiology and treat appropriately. These measures will reduce the morbidity and mortality.

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ART Centre, R.C.S.M. G.M.C., Kolhapur Department of Microbiology, R.C.S.M.G.M.C., Kolhapur.

# References

- 1. Ghosh TK. AIDS: A serious challenge to public health. J Indian Med Assoc 1986 Jan;84 (1):29-30.
- 2. Panda S, Chatterjee A, Abdul-Quader AS. The epidemic and the response in India: An Overview 2002.p.20.
- 3. Sande MA, Volberding (eds). The medical management of AIDS. 4<sup>th</sup> ed. Philadelphia: W. B. Saunders; 1995.
- Moses A, Nelson J, Bagby GC Jr. The influence of human immunodeficiency virus-1 on hematopoiesis. Blood 1998;91(5):1479-1495.
- 5. Antiretroviral Therapy Guidelines for HIV-Infected Adults and Adolescents Including Post-exposure Prophylaxis, May. NACO; 2008.p.7-19.
- 6. Dikshit B, Wanchu A, Sachdeva RK, Sharma A, Das R. Profile of haematological abnormalities of Indian

HIV infected individuals. BMC Blood Disord 2009; 9(1):5.

- Sieg SF, Harding CV, Lederman MM. HIV-1 infection impairs cell cycle progression of CD4+ T cells without affecting early activation responses. J Clin Invest 2001;108:757-764.
- Enawgaw B, Alem B, Addis Z, Melku M. Determination of haematological and immunological parameters among HIV positive patients taking highly active antiretroviral treatment and treatment naïve in the antiretroviral therapy clinic of Gondar University Hospital, Gondar, Northwest Ethiopia: a comparative cross-sectional study. BMC Haematology 2014;14:8
- Ibeh BO, Omodamiro OD, Ibeh U, Habu JB. Biochemical and haematological changes in HIV subjects receiving winniecure antiretroviral drug in Nigeria. J Biomed Sci 2013;20:73.
- Amegor OF, Bigila DA, Oyesola OA, Oyesola TO, Buseni ST. Asian Journal of Epidemiology 2009;2(4):97-103.
- 11. Lowe DM. The ESR in HIV: A neglected parameter?.AIDS 2010;24(18):2773-5. Available at: http://www.ncbi.nlm.nih.gov> PMC2978672.

- Kovacs JA, Vogel S, Albert JM. Controlled trial of interleukin-2 infusions in patients infected with the human immunodeficiency virus. N Engl J Med 1996; 335:1350-6.
- Mueller BU, Tannenbaum S, Pizzo PA. Bone marrow aspirates in children with immunodeficiency virus infection. J Pediatr Hematol Oncol 1996;18(3):266-271.
- 14. Najean Y, Rain JD. The mechanism of thrombocytopenia in patients with HIV infection. J Lab Clin Med 1994;123:415-7.
- Krishnan CR, Sajeeth CI. A comparative study of antiretroviral therapy induced CD T-cell changes among HIV infected patients. Int Res J Pharm 2014;5(9):726-9.
- 16. Hemasri M, Dr.Sudhapoornima P, Sowmya Sri CH, Ramya S, Avinash I, Kiran Kumar B. Safety and effectiveness of anti-retroviral drug regimens ZLN and TLE in tertiary care teaching hospital: a prospective observational study. IOSR-JPBS;11(2): 88-96.
- 17. Choi SY, Kim I, Kim NJ, Lee S, Choi Y, Bae J, et al. Haematological manifestations of human immunodeficiency virus infection and the effect of highly active anti-retroviral therapy on cytopenia. Korean J Hematol. 2011;46(4):253–7.

# Consent in Clinical Practice: A Review

# Nishat Ahmed Sheikh

# Abstract

Consent is an ethical principle. Medical treatment can only be administered with consent of a competent patient. Giving the treatment without consent is failure to respect patient's autonomy; violating an individual's right to self-determination. Any medical treatment given without consent is an action for trespass where damages are payable. The core idea of autonomy is one's action and decisions are one's own. Therefore every patient has the right to know what happens to his body. It is the moral and legal duty of a physician to inform the patient about all the aspects of his illness and help him by advising so that he is able to make a logical and intelligent decision about his treatment. Examining or treating a patient without his consent amounts to battery and assault and may invite legal liabilities for a physician.

Keywords: Consent; Clinical Practice; Medico-Legal.

# Introduction

The word consent is from the French word 'consente' and the Latin word 'consentire', which means co 'together' + sentire 'feel' [1]. The concept of consent comes from the ethical issue of respect for autonomy, individual integrity and self determination.

Every human being of adult years and sound mind has a right to determine what shall be done with his own body and a surgeon who performs an operation without patient's consent commits an assault for which he is liable in damages.' Judge Cardozo (1914). With these words Judge Cardozo, expressed patient's right to autonomy in making informed decision pertaining to his medical treatment [2]. The term consent means voluntary agreement, compliance, or permission. Section 13 of the Indian Contract Act lays down that two or more persons are said to consent when they agree upon the same thing in the same sense (meeting of the minds) [3]. In modern

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days, the doctor is no longer held in high esteem. The faith in the healer has been slowly waning. The gentleman's agreement no longer holds true and every agreement is now in black and white. Today the doctor is viewed with suspicion and the doctor too safeguarding himself or herself prefers to have consent for everything.

# Consent and Its Validity

It becomes legally valid, when it is given only after understanding: What it is given for? The risks involved in consequence. Fulfills the rules of consent. Consent from a patient to a doctor is a must for examining or treating especially when the law demands it for any reason.

# **Types of Consent**

# Implied Consent

An implied consent is not written, that is, its existence is not expressly asserted but nonetheless, it is legally effective. It is provided by the demeanor of the patient. It implies consent to medical examination in a general sense i.e. when a patient approaches the doctor for treatment; it is presumed that there is consent for routine physical examination.

# Expressed Consent

Anything other than the implied consent described above is expressed consent. An expressed

consent is one the terms of which are stated in distinct and explicit language. It may be oral or written. For the majority of relatively minor examinations or therapeutic procedures, oral consent is employed but this should preferably be obtained in the presence of a disinterested party. However, a person closely related/associated with the patient is not ideal for the purpose [5].

#### Informed Consent

In medical practice, anything beyond the routine would require this type of consent. The concept of informed consent has come to the force in recent years and patients who allege that they did not understand the nature of the medical procedure to which they gave consent have brought many actions. This is essential in medical practice, when diagnosing or treating is beyond the routine methods, wherein risks are involved. Thus, the doctor should explain all relevant details to the patient. This is called rule of full disclosure. All information should be explained in comprehensive, non-medical terms preferably in patient's own language about the, Nature of the illness, Nature of the proposed treatment or procedure, Alternative procedure, Risks and benefits involved in both the proposed and alternative procedure, Potential risks of not receiving the treatment and Relative chances of success or failure of both procedures [5,6].

#### Blanket Consent

Consent taken on a printed form that covers (like a blanket) almost everything a doctor or a hospital might do to a patient, without mentioning anything specifically. Blanket consent is legally inadequate for any procedure that has risks or alternatives. The informed consent when expressed by the patient in writing is termed as "informed expressed written consent". This is a must in all surgeries, administration of anesthesia and all complicated therapeutic and diagnostic procedures [7].

Rules of consent are though rigid in their legal implications, certain deviations are usually allowed and they are:

#### Doctrine of Therapeutic Privilege

At times it may not be possible to explain everything to the patient. Accordingly under such circumstances doctor can reveal the details to any one of the close relatives of the patient. This is called doctrine of therapeutic privilege [8].

# Doctrine of Emergency

According to this, a doctor can provide the treatment without taking prior consent from a patient who is gravely sick, critically ill, unconscious or not able to understand the suggestions or when mentally ill (Section 92, IPC).

#### Doctrine of Loco-Parentis

In emergency situations involving children, when their parents/guardian are not available, according to this doctrine, consent can be obtained from the person accompanying [9].

#### Consent and Age

Minimum age for giving valid consent for physical/medical examination is 12 years (Section 89, IPC). Accordingly, for medical examination of a child below the age of 12 years, the consent is to be obtained from the parent/guardian of the child. A person who is above 18 years age can give valid consent to suffer any harm which may result from an act in good faith and which is not intended or known to cause grievous hurt or death (Section: 88, IPC) [10].

#### Consent in Relation to Medico-legal Purposes

In medico-legal cases where the law requests an examination, consent must be obtained whether it is victim or accused/assailant to be examined. Without consent examination amounts to assault [11]. Examination findings when used in process of investigation can damages the party examined. If later on the party is proved innocent, damages sustained cannot be undone. This is why the right to deny consent for examination is generally given to the party [12].

## Marriage and Conjugal Obligations

Regarding consent in relation to these matters, such as sterilization, artificial insemination, etc. consent of both the partners must be obtained.

#### Sexual Intercourse

In India sexual intercourse with a consenting woman amounts to the legal offence of rape if she is below the age of 18 years and this is called as statutory Rape.

#### Examination of Rape Victim

In the examination of a victim of alleged rape to confirm the allegation, the doctor should obtain prior

consent observing all formalities. The consent must necessarily be after telling her that the findings of clinical examination shall be revealed in a court of law. Consent must be obtained frok her relatives if the victim is a child or minor.

## Consent and Negligence Charges

In medical negligence charges against a doctor, consent is not a valid defense.

#### Consent in Drunkenness and Intoxicated Cases

Consent obtained from a person who is drunk/ under the influence of alcohol is invalid. However, in such events, examination of the case may be done and findings may be revealed only after obtaining the consent at a later period when the person becomes sober.

#### Consent in Examining Criminal Cases

Here no consent is necessary, provided the requisition is from a police officer who is not below the rank of Sub-Inspector of Police, and the examination is done in the presence of disinterested witness (Section: 53, Cr. P C). However, a doctor as a routine formally may obtain consent, and according to this section if the criminal is not willing to get examined, examination may be done with mild degree of force. When the criminal is a female, examination should be done only by or under the supervision of a lady medical officer [13].

#### Consent in Unconscious

Victims/assailants/any patient: Examination findings can be divulged to police only after the patient regains consciousness and gives consent for disclosure.

#### Consent in Relation to Autopsy Examination

It is improper and illegal to perform autopsy without consent or authorization. Consent differs with type of autopsy to be performed:

- Consent is not required if it is a medico legal autopsy. Here autopsy is done only with an authorization.
- Consent is a must from spouse or relatives for clinical or pathological autopsy. Failure to get consent here is a ground for charges of mutilation of deceased and emotional hurt by legal heirs [14].

# Consent in Relation to Remove and Retain Parts of the Body

Specific consent must be obtained for this purpose. However, no civil action has so far been reported for the removal of tissues from the body at autopsy even without specific consent [15]. Perhaps it may be justifiable to remove certain tissues for demonstration, even without consent during bonafide autopsies, done without visible mutilation of the body.

#### **Consent in Relation to Organ Transplantation**

In living: A person can donate voluntarily his/her organs, tissues, etc. to another person for therapeutic purposes. However, in India the consent given for such purposes becomes legally valid only if the donor is above the age of 18 years [16]. Informed witnessed consent under Human Organ Transplantation Act, 3.22 It states that a living person should give his/ her consent in writing to donate kidney, for the transplantation purposes, in presence of two or more witnesses, at least one of them should be a near relative of the person consenting.

In dead: Consent should be given earlier by the person in writing in the form of a Written Will when he was alive. However, this consent or will made by the deceased when he/she was alive becomes null and void after his/her death and to remove organs from the dead body; consent must be obtained from legal possessors of the dead body. No law of the land can procure organs from the dead body if the legal possessor of the deceased refuses to give his/her consent to donate the organs or tissues [16].

#### Consent in Emergencies

Emergencies require a quick response. Law clearly mandates that during emergencies the doctors must put all efforts in providing the requisite care rather that completing medical records or taking consent. However, once the emergency is over, the doctor must specifically ensure that all the procedural requirements have been completed.

#### **Consent: Surgical Interventions, Procedure**

During pre-surgery counseling, the patient must be specifically informed about the choice of anesthesia, the alternatives if any that may have to be attempted and the risks involved in each type. Take separate consent for surgery and anesthesia.

The patient must be disclosed the name of the principal anesthetist and the principal surgeon and

the same must be duly recorded in the consent. A doctor or Hospital need not voluntarily disclose the name of each member of the surgical team to the patient but if the patient specifically seeks this information there can be no valid reason to withhold the same. Special care must be taken if there is a possibility of damage or removal of an organ. The patient must be counseled and an elaborate written consent must be taken [17].

#### **Consent: In Medical Termination of Pregnancy**

It is mandatory to take written consent in termination of pregnancy, even if the patient may have volunteered for the same. An elaborate procedure is laid down for terminating pregnancy under Medical Termination of Pregnancy Act, 1971 and rules made there under, which must be religiously followed. Only when the pregnancy involves extreme risk to the life of the pregnant woman, the doctor may terminate pregnancy without consent. A per MTP Act, to carry out medical termination of pregnancy, consent of mother alone is sufficient if she is or claims to be more than 18 years of age. Otherwise consent of nearest relatives or guardian is required. A procedure involving sterilization or one that limits sexual functions of the spouse, consent of both the partners is required [18].

#### **Consent: Blood Transfusion**

Before any surgery, procedure, contemplate whether blood transfusion would be required or not. If there is any possibility, even bleak, take specific, separate and written consent of the patient for blood transfusion and keep blood ready rather than requisitioning blood at the last minute.

#### **Consent: Refusal, Compulsory Treatment**

It is advisable in case the patient refuses to consent to any life-saving procedure or treatment, withdrawing from the patient should be seriously considered. Any kind of delay, refusal in giving consent for a treatment, procedure, hospitalization must be clearly and specifically be recorded in the patient's medical records.

#### **Consent: General Precautions**

 Give all the requisite information in the language known to the patient explain the content of the document in a language known to the patient before taking the patients signature or thumb impression and also get this fact attested by the independent witnesses.

- Any pressure, compulsion or coercion on the patient to give consent is per se illegal and impermissible.
- Recording of the correct, specific medical name of the procedure, surgery, treatment in the consent is a must. General declaration in the consent form cannot be a substitute for providing legally mandatory specific information.
- Taking consent on a printed sheet having standard clauses without recording any requisite particulars is negligence. Courts are increasingly commenting adversely against hospitals, doctors for taking consent in such a routine manner.
- It is advisable to ensure that documents like consent form, information sheets, medical records should be written by a single person and with the same pen without changing ink, as such documents are usually kept with the hospital and not given to the patient, but it bears patients signature. Hence preferably be written by single person with same pen without changing ink.
- Do not avoid taking patients written consent if a written and specific consent is the legal requisite.
   Even if the patient volunteers or suggest a particular course and if a written and specific consent is the legal requisite, a written consent must be taken. Recording the fact that the patient had volunteered for that particular course in the patient's medical record cannot be a substitute for a written consent.
- Possible complication and side effects must be explained by the doctor to the patient and in case the consequences are grave, the aforesaid information must be given in writing, either in the consent form, prescription or discharge card.
- No consent is required to put the patient on the ventilator
- Do not reduce the consent to mere formality. It is rather a process of communication 'requiring the fulfillment of certain established elements like competence, sufficient disclosure, understanding and volunteering.
- The patient must be duly informed about the advantages abd disadvantages, risks and complications associated with a procedure, surgery, treatment in terms that can be comprehended by the patient.
- When any procedure has been made compulsory by law e.g. Vaccination, consent is not necessary.
- Prisoner can be treated without their consent.

 No patient can be detained in hospital without his consent. If the patient wants discharge against medical advice (DAMA), he or she may be discharged after taking his signature, undertaking on the case papers for the same.

#### Conclusion

Thus valid consent is an important ingredient of our medical practice today. Examination of a patient for diagnosis, therapeutic intervention, treatment and surgery, consent should be obtained to safe guard oneself from future medical litigation. We must adhere to aim in medicine "do no harm". By helping in healing we must not harm the patient.

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#### Ethical Clearance

The articles do not violate any ethical, moral or legal guidelines pertaining to scientific work.

#### Reference

 Dogra T D, Lt. Col. Abhijit Rudra. Consent in medical practice. In: Lyon's Medical Jurisprudence and Toxicology. 11 th edition. Delhi Law House, 2005; 180-208.

- Justice Cardozo, Schloendroff V. Society of New York Hospital, 1914, cited in Machin V, Churchill's Medico legal Pocket Book, 1<sup>st</sup> edn, Churchill Livingston, 2003.
- 3. Singh J, Bhushan. Medical Negligence and Compensation. Bharat Law Publications, Jaipur. 2nd edition 1999;11-4.
- 4. Medico Legal System Module x p-2 Symbiosis Centre of Health Care, Pune.
- 5. Rao NG. Forensic Pathology, 6th edn, HR Publication Aid, 2002.
- 6. Nandy A. Principles of Forensic Medicine. New Central Book Agency (P) Ltd: Kolkotta, 2000.
- 7. MR Chandran (Ed). Guharaj Forensic Medicine, 2nd edn. Orient Longman, Hyderabad 2004.
- 8. Committee of Bioethics 1993-94: Informed consent, parental permission and assent in paediatric practice. Paediatrics 95;02:314-17.
- 9. Shield JPH, Baum JD, Children's consent to treatment. BMJ, 1994;308:1182-83.
- 10. Singhal SK. The Doctor and the Law, 1st edn. MESH Publishing House Pvt. Ltd., 1999.
- 11. YV Chandrachud, VR Manohar, A Singh. Ratanlal and Dhirajlal's, The Indian Penal Code (Act No: 45 of 1860 as amended up to the Criminal Law Second Amendment Act No: 46 of 1983, and Dowry Prohibition Amendment Act No: 43 of 1986, along with State Amendments), 28th edn, Wadhwa and Co. Law Publishers, Agra, 2004.
- 12. Kaushal KA. Medical negligence and legal remedies with special reference to COPRA, 2nd edn. Universal Law Publishing Co. Pvt. Ltd. 2001.
- 13. Jagadish Singh, Medical Negligence and Compensation, 2nd edn, Bharath Law Publications, Jaipur, 1999.
- 14. Subrahmanyam BV, Forensic Medicine, Toxicology and Medical Jurisprudence (Simplified and New Look), Modern Publishers, New Delhi, 2004.
- Hidaytulla M, Sathe SP. Ratanlal and Dhirajlal's The Code of Criminal Procedure, Wadia and Co. Pvt. Ltd., Nagpur, 1988.
- 16. The Transplantation of Human Organ Act, 1994 (No: 42 of 1994, 8th July 1994).
- 17. Bernard K. Simpson's Forensic Medicine, 11th edn, Arnold: London, 1997.
- 18. Consumer Protection Act, 1986, retrieved on July 11, 2009, Internet source: http://ncdrc.nic.in/1\_1.html.

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[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, 2<sup>nd</sup> 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, 4<sup>th</sup> 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/ HSQ 20.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.

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