


Original Research Article

Weights of human organs at autopsy in Mandya zone Karnataka - A retrospective study

Puttaswamy*

Associate Professor, Department of Forensic Medicine, Mandya Institute of Medical Sciences, Mandya, Karnataka, India

*Corresponding author email: pswamyfmt63@gmail.com

	International Archives of Integrated Medicine, Vol. 2, Issue 9, September, 2015. Copy right © 2015, IAIM, All Rights Reserved. Available online at http://iaimjournal.com/	
	ISSN: 2394-0026 (P)	ISSN: 2394-0034 (O)
	Received on: 26-08-2015	Accepted on: 02-09-2015
	Source of support: Nil	Conflict of interest: None declared.

Abstract

Mean organs' weight in 2100 subjects who died and got autopsied at mortuary district hospital Mandya Institute of Medical Sciences (MIMS), Mandya revealed that they in general were heavier than reported from other parts of India. Various organs continued to attain their maximum weight up to 40-50 years of age.

Key words

Postmortem examination, Organ weights, Medico legal deaths.

Introduction

Human body organs and its weights play a very crucial role in forensic medicine as any deviation in their weight from normal range suggests pathological change in the organ and even helps in coming to opinion regarding cause of deaths due to pathological diseases and even to establish relationship between trauma and pathology [1, 3]. Organ weights helps in estimating body weight and height of an individual other than age, gender racial characters which also are dependent on environmental and socio economic factors [1-10] which varies in different parts of India. Present study of organ weights which is

done at Mandya is an attempt to throw light on available literatures in books and scanty literatures are only available which correlate the factors discussed above.

Material and methods

The present study was carried out in 2100 (1600 males and 500 females) who underwent post mortem examination at mortuary MIMS Mandya within 6 hours of death, study period was from 1st January, 2006 to 31st December, 2012.

In this study only those subjects who belonged to Mandya district whose complete demographic

profile was known. Standard autopsy protocol and procedure as described in current methods of autopsy practice by (J. Ludwig 2nd edition) were employed for organ removal. After extraneous tissues and blood were removed each organ was weighed separately using digital organ weighing machine having accuracy of + 0.1 gm, The subjects were divided into seven age group i.e. <10, 11-20, 21-30, 31-40, 41-50, 51-60 and >60 years.

Inclusion criteria

All the males and females cadavers of Mandya district whose complete demographic profile was known were included in the study.

Exclusion criteria

- Autopsy of dead bodies conducted after 6 hours of death.
- Decomposed bodies were excluded from the study.

Results and Discussion

Mean organ weights as observed in present study in general were more (**Table – 1A, 1B, 2A, 2B**) than reported in other parts of country. They are more in accordance with northern part of country and western world possibly because of stature and body weight and nutritional status [1].

In a study from Nagpur region [3] weights of brain and liver were reported to be maximum at the age 20 and 40 years respectively, where as in present study in both male and females weight of brain increased up to 30 years. Lung, liver, spleen, pancreas attained peak weights at 40-50 years and kidney at 40-50 years. It may be due to differences in socio economic condition and dietary habits and nutritional and genetic factors. After attaining the peak except heart all other organs started declining in their weights owing to age related factors but heart showed increased weight probably due to deposition of fat and incidence of cardiomyopathies in study population.

Comparing the weights of liver and brain it was seen that except in children mean weight of liver was more than brain in both sexes. These tally with findings of studies on Japanese and European population [10-15] and contrary to studies from other parts of India [2, 9].

Weight of prostate showed steady increase in elderly males above 50 years owing to its hypertrophy after age of 40 years. It tallies with studies done in European and American population [12, 13].

Conclusion

Mean organ weights study in general is a study which needs more research amongst various races, healthy and diseases population of both sexes of all ages to throw light on factors which are variables and constant and depend on pathophysiological changes which leads to interpretation of cause of death especially in sudden natural deaths. To know trauma aggravating a pre existing pathological lesion in an organ and also trauma pathological diseases leading to malignancies and deaths.

References

1. Singh D, Sharma AK, Sing S, Thind AS, Tyagi S. Prediction of spine body length and body weight from brain Weight of adults in Chandigarh Zone. JIAFM, 1998; 20(3): 53-59.
2. Kohli A, Agarwal BBL. Study of Normal adult Organ weights in the North Indian population. JFMT, 1996; 12: 21-22.
3. Gharpure PV, Jhala H. Normal Standard for body weight and organ weights in India. IMG, 1958; 92, 93: 445-47.
4. Buch Nan WJ, Dalfy FJ. Weights of Human Viscera in Natives of Bengal. Indian Med. Gazette, 1902; 37-56.
5. Batra AK, Dongre AP, Mohanty AC. S study of organ weight from persons who died in accident in Nagpur, Maharashtra State. JFMT, 2002; 19(1): 21-24.

6. Venkataraman K, Samsundesams, Soman SD. An Evolution of Radiation protection standard for Indian conditions. Health phys., 1963; 9: 647.
7. Jain SC, Dogra TD, Mehta SC. Organ weight in autopsy cases from an urban apex hospital. Indian Journal of Medical Research, 1992; 96: 37-44.
8. Franklin CA. Modi. Textbook of medical Jurisprudence and Toxicology, 21st edition, N.M. Tripathi Pvt. Ltd., 1990, p. 332.
9. Buchanan TW, Maddox RH. Editorial: Tables of weight of viscera, 1902; 402(37): 255.
10. Pearl R. The weight of the Negro brain. Science, 1934; 80: 216.
11. Bean RB. The weight of the organs in relation to type, race, sex, stature and age. Ant Recl, 1917; 326.
12. Williams PL, Warwick R. In, Gray's Anatomy 36th edition, Longman, 1980, p. 480.
13. Tahaka GL. Reference Japanese man-mass of organs and other characteristics of normal Japanese. Health physics, 1979; 36(3): 336-46.
14. Edgar R, Smith H, Glasister's Medical Jurisprudence and toxicology, 13th edition, Churchill Livingstone, Edinburgh, 1973, p. 755.
15. Suderman FW, Boemer F. Normal values in clinical medicine. WB Saunders, Philadelphia, 1949.

Table – 1A: Organ weight (gm) in various age groups in males.

Age (years)	Sub	Variables	Brain	Rt Lung	Lt Lung	Heart	Rt Kidney	Lt Kidney
<11	38	Mean	1100.01	149.60	144.43	88.19	52.95	56
		SD	219.80	46.49	44.63	34.96	21.29	22.15
		Range	510-350	70-210	50-190	30-172	10-105	20-110
11-20	175	Mean	1325.15	444.96	411.51	247.96	114.20	123.55
		SD	135.15	99.28	103.64	62.99	23.55	24.72
		Range	880-1520	195-530	172-510	90-421	50-145	55-160
21-30	460	Mean	1341.28	579.86	531.95	289.63	128.79	138.90
		SD	114.162	151.56	147.32	56.28	22.50	23.11
		Range	1042-1610	210.590	180-545	140.442	56-180	65-190
31-40	375	Mean	1337.86	609.95	547.79	302.10	136.72	146.15
		SD	109.99	163.15	155.98	58.02	31.74	30.71
		Range	1081-1641	212-838	205-810	181-465	78-265	75-295
41-50	247	Mean	1334.12	622.38	556.30	314.68	132.70	141.45
		SD	121.56	163.20	160.18	67.60	30.28	34.86
		Range	1030-1552	260-756	235-730	120.481	60-260	70-280
51-60	225	Mean	1309.2	607.28	541.68	319.10	130.89	141.60
		SD	119.09	171.05	183.24	82.21	32.20	30.25
		Range	1001-1591	230-760	210.746	130.990	80-290	100-260
>60	80	Mean	1289.06	602.99	528.84	325.32	125.90	135.75
		SD	122.89	178.46	163.30	84.62	31.58	32.75
		Range	1040-1575	240-780	220-880	130-990	90-220	100-235
Total	1600	Mean	1325.06	569.90	516.65	291.90	128.18	137.75
		SD	126.08	175.82	165.46	72.25	30.40	31.29
		Range	510-1650	70-835	50-880	30-490	10-290	20-295

Table – 1B: Organ weight (gm) in various age groups in males.

Age (years)	Sub	Variables	Liver	Spleen	Pancreas	Rt Testis	Lt Testis	Prostate
<11	38	Mean	619.95	57.98	46.50	6.83	7.12	15.22
		SD	222.45	28.82	29.98	1.42	1.50	3.35
		Range	311-880	21-90	12-75	5-9	5-10	12.20
11-20	175	Mean	1420.62	130.05	106.28	23.72	25.18	39.94
		SD	175.49	29.98	13.60	7.48	7.68	16.12
		Range	909.164	70-180	80-128	20-35	12-49	29.78
21-30	460	Mean	1493.80	162.50	131.20	28.24	29.40	62.19
		SD	168.80	43.10	33.15	6.34	6.05	14.78
		Range	835-1816	76.271	80-144	21-45	20-37	34-87
31-40	375	Mean	1544.68	165.20	131.95	29	30	64.15
		SD	362.10	62.58	19.40	2.57	4.20	8.88
		Range	903-1890	89-316	71.165	20-49	18-48	35-80
41-50	247	Mean	1591.50	168.60	134.55	30.52	31.90	65.25
		SD	269.90	69.58	21.59	6.16	6.146	5.29
		Range	1120-2033	110-332	112-190	26-48	19-48	50-88
51-60	225	Mean	1487.18	146.20	130.48	29.41	29.20	65.92
		SD	109.10	28.35	10.45	3.91	1.58	3.09
		Range	830-1589	102-310	116-145	24-36	24-42	60-90
>60	80	Mean	1480.80	144	114.90	27.40	27.79	66.35
		SD	369.98	27.06	15.10	9.35	8.89	3.40
		Range	848-1995	108-300	84-135	18-40	18-48	62-88
Total	1600	Mean	1427.72	155.18	124.73	27.40	28.48	59.85
		SD	279.46	54.20	36.88	7.50	7.36	16.98
		Range	311-2032	21-331	12-190	5-49	5-48	12-88

Table – 2A: Organ weight (gm) in various age groups in females.

Age (years)	Sub	Variables	Brain	Rt Lung	Lt Lung	Heart	Rt Kidney	Lt Kidney
<11	28	Mean	1044.62	148.65	137.99	92.05	58.68	67.90
		SD	154.80	52.26	48.32	29.55	21.42	23.28
		Range	500-1218	60-200	55-190	30-150	20-110	30-120
11-20	125	Mean	1206.48	388.88	370.06	214.72	114.99	122.51
		SD	109.26	9039	111.95	47.15	26.96	27.35
		Range	890-1550	150-470	140-995	90-380	40-140	50-155
21-30	208	Mean	1210.25	435.10	403.45	241.29	124.45	133.86
		SD	109.98	67.96	72.99	50-50	23.50	25.66
		Range	940-1610	210-890	200-860	135-385	70-165	74-170
31-40	115	Mean	1208.10	440.65	405.80	251.99	125.10	134.11
		SD	122.98	88.42	82.70	49.19	33.80	33.35
		Range	1010-1550	220-810	200-800	140-390	75-230	80-240
41-50	55	Mean	1192.55	480.05	405.76	265.69	115.90	123.68
		SD	101.89	112.92	82.69	45.15	26.29	28.09
		Range	930-1530	260-800	200-800	160-370	70-200	80-205
51-60	40	Mean	1174	471.88	450.60	288.69	114.80	123.05
		SD	72.16	110.38	141.39	55.49	19.26	20.03
		Range	960-1450	200-705	250-690	180-400	90-170	100-180
>60	29	Mean	1165.28	468.76	450.10	289.69	113.40	119.06
		SD	82.35	89.52	111.16	38.29	31.15	31.85
		Range	1070-1580	240-750	195-775	140-380	90-190	100-210

Table – 2B: Organ weight (gm) in various age groups in females.

Age (years)	Sub	Variables	Liver	Spleen	Pancreas	Uterus	Rt Ovary	Lt Ovary
<11	28	Mean	498	51.75	59.28	18.75	7	7.78
		SD	76.38	7.95	7.36	4.08	1.421	1.259
		Range	410-598	41-60	50-60	15-25	5-8	6-8
11-20	125	Mean	1282.88	129.38	101.28	55.94	8.15	8.58
		SD	222.50	18.85	15.68	11.69	2.15	2.22
		Range	825-1519	70-150	72-125	45-87	6-10	3-22
21-30	208	Mean	1302.30	131.96	111.78	78.12	14.48	15.48
		SD	199.90	33.35	28.35	12.11	7.60	8.00
		Range	846-1580	72-210	83-151	65-92	8-30	9-35
31-40	115	Mean	1341.60	137	121.58	90.14	15.10	16
		SD	313.80	8.89	14.35	12.48	4.48	5.48
		Range	801-1720	80-252	110-127	75-112	12-25	12-28
41-50	55	Mean	1382.90	139.10	122.88	89.75	16.25	17.48
		SD	244.30	29.05	5.82	21.54	4.10	4.69
		Range	10902-1700	107-280	96-118	70-124	11-25	11-25
51-60	40	Mean	1381.60	133.60	109.22	88.26	13.90	14.10
		SD	170.80	20.45	7.99	92.05	1.25	1.25
		Range	970-1660	110-150	60-120	67-120	12-17	13-14
>60	29	Mean	1356.70	132.18	106-120	78.65	13.38	13.65
		SD	155.20	32.40	9.38	9.64	1.365	0.85
		Range	1212.1620	41-280	98-123	67-82	12-15	13-15