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Prevelance Survey for Assessing Intensity of Group a Beta Hemolytic Streptococci (GABHS) Subclinical Infection Rate in School Children: A Cross Sectional Study

By Dr. Farheen Fatima & Dr. Shubha DS
Basaweshwara Medical College, India

Abstract - Background: GABHS infections and their sequelae Rheumatic fever and rheumatic heart disease have a worldwide distribution and pose an important health problem. In developing countries it remains as an endemic disease.

Objectives: The study is aimed to estimate prevalence and factors associated with the same among school children aged 6–12years.

Materials and Methods: This cross-sectional survey was carried out from February to July 2010, in the diagnostic laboratory of Microbiology department. The study group was divided into four groups, namely, Group A; Group B; Group C; and Group D. A total of 1769 eligible children were enrolled for sampling of these schools. For each enrolled child in the study, a standard culture and antibiogram test with the Lancefield grouping technique was done in the assessment of the outcome.

Results: Among 1769 participants, 1029 (58.2%) were boys and 740 (41.8%) were girls. The overall prevalence of GABHS was estimated 27.9%. Group A 35.62%, Group B 37.5%, Group C 34.8%, and Group D 23.7%.

Keywords : *antibiogram, factors associated, GABHS, prevalence, school children.*

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Prevelance Survey for Assessing Intensity of Group a Beta Hemolytic Streptococci (GABHS) Subclinical Infection Rate in School Children: A Cross Sectional Study

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The sensitivity was highest for vancomycin 100% and the resistance was highest for amoxicillin 79.1%.

Conclusions: The study confirmed that the prevalence of GABHS is 27.9%. Overall prevalence shows an endemic situation. Therefore, it is recommended that local health sectors should make provision for regular screening and prophylaxis.

Keywords : antibiogram, factors associated, GABHS, prevalence, school children.

I. Introduction

The prevalence of GABHS carriage in throat of normal asymptomatic school children varies from 13-15% depending upon the population studied, season and other factors.[1]

The GABHS has remained a significant human pathogen for centuries. This organism causes a wide variety of infections in humans, ranging from mild upper respiratory tract and skin infections to severe suppurative and invasive conditions like necrotising fasciitis and toxic shock syndrome. [2] of major concern is that post infectious sequelae like acute rheumatic fever (ARF) and post-streptococcal glomerulonephritis continue to occur worldwide despite efforts of clinicians, scientists and public health officials to comprehend their pathogenesis and devise ways of disease control. [2]

It is estimated that approximately 7 sore throat episodes per year, with 13.5% of these being caused by GABHS. [2]

Although ARF and rheumatic heart disease (RHD) have declined in many parts of the world, they continue to be a major cause of cardiovascular morbidity and mortality in India.[2] Sore throat caused by GABHS is one of the most common diseases during adolescence and early adulthood which makes a lot of problems and consumes a great budget for its treatment and complications, all over the world.[3, 4, 5, 6]

II. Materials And Methods

a) Study design and setting

This cross-sectional survey was carried out from February to July 2010, in the diagnostic laboratory of microbiology department.

b) Study population, sample size and sampling strategy

The study population consisted of school children from 6 to 12 years of age enrolled in various schools of Chitradurga. The sample size was calculated for the primary objective taking the prevalence to be 50% that gives the maximum sample size, with a 95% level of confidence and 5% bound on the error of estimation. The minimum sample size required was 400 children.

A list of all schools (the sampling frame) in the locality was prepared. They were divided into four groups, Namely, Group A (orphanage); Group B (residential schools); Group C (government schools); and Group D (private schools). The simple random sampling method was employed to select 1 school from each group of schools. A total of 1769 eligible children were enrolled for sampling of these schools. All of them were sampled, giving the response rate of 100%.

c) Data Collection

The outcome variable was culture status of the received sample, whether positive or negative for GABHS parasite, which was determined from a throat swab. Data on the independent variable of socio-demographic characteristics were collected by trained research officers on a pretested and structured questionnaire addressed to the student.

d) Throat swab collection and laboratory testing

Apparently healthy children 6-12 years of age were studied. A team of doctors, technician and interns visited the school twice a week. A detailed history as per recommendation of the WHO for identification of streptococcal sore throat such as fever, soreness of throat, cough and watery nasal discharge were excluded.

For each enrolled child in the study, for the assessment of the outcome [7] the test was conducted at the diagnostic microbiology laboratory, by the principal investigator and co-investigator with the help of an experienced laboratory technician. The diagnosis of GABHS disease still relies on isolation of GABHS strains on sheep blood agar followed by presumptive identification based on bacitracin sensitivity on the results of more precise serogrouping methods such as the Lancefield grouping.

From the selected subjects the tonsillar and the pharyngeal mucosa were rubbed vigorously with sterile cotton swab applicator avoiding the surrounding tissues. Throat swabs were transported to the microbiology laboratory by using Todd Hewitt broth. Then swabs were plated onto crystal violet sheep blood agar, chocolate agar and MacConkey's agar. It was then incubated in a candle jar at 35®C for 18-24 hours, examined for the presence of GABHS and sub cultured onto blood agar for bacitracin sensitivity to differentiate GABHS from non GABHS. The isolates of GABHS were subjected for Lancefield grouping as per the manufacturer's instructions with the kit.

After diagnosis of GABHS was confirmed, antibiogram test was done for the isolates according to recommendations of the National Committee for Clinical Laboratory standards (NCCLS) using Cephalothin, erythromycin, tobramycin, tetracycline, amoxicillin, co-trimoxazole, vancomycin, Cloxacillin and penicillin antibiotic discs from HiMedia Laboratories Pvt. Ltd. Mumbai.

III. Ethical Clearance

The protocol for this study was approved by the Chairman, and the secretary, institutional ethical committee (IEC). The approval was in the agreement that patient anonymity must be maintained, good laboratory practice quality control ensured, and that every finding would be treated with utmost confidentiality and for the purpose of this research only, all work was performed according to the international guidelines for human experimentation in biomedical research.[8] Approval was obtained from the Head Master of each school studied and informed consent was obtained from each of the participating pupils. The participating students were given chocolates as an incentive. Culture positive subjects were referred to the primary health center in the area for immediate treatment.

a) Data management and statistical analysis

During data collection completed questionnaires were checked regularly to rectify any discrepancy, logical errors, or missing values. The data entry was carried out using Microsoft Office Excel worksheet and then the data were exported to statistical analysis software WINK SDA for further analysis. Variables were categorized in a biologically meaningful way where applicable. To the analyzed data, mean and standard deviation for continuous variables and proportion for categorical variables were computed. Crude associations of the binary outcome variable with each independent variable were assessed by the Chi - square test. The level of statistical significance was set as $P \leq 0.05$ and for each statistically significant factor.

Results: The results represent information collected from 1769 Throat swabs.

b) Descriptive Characteristics

Among 1769 participants, 1029 (58.2%) were boys and 740 (41.8%) were girls.

c) Prevalence of GABHS

The overall prevalence of GABHS was estimated as 493/1769 (27.9%) [Table 1]. Group A 35.62% (26/73), Group B 37.5% (51/136), Group C 34.8% (187/588), and Group D 23.7% (230/972). Higher prevalence was found in 6-10 years aged; the prevalence percentage declined with increase in age and showed lowest prevalence in subjects above 10 years of age. The prevalence was higher in boys as compared with girls. [Tables 2-5].

d) The resistance pattern of GABHS

The sensitivity was highest for vancomycin (100%) followed by tobramycin 77.1%, Cephalothin 74% and erythromycin 69.6%. The resistance was highest for amoxicillin 79.1% followed by penicillin 76.4%, Cloxacillin 74.6% and Gentamicin 70%. [Table-7]

The factors associated with the GABHS prevalence and carrier rate were estimated as in [Table 8].

Table 1 : Aisolation of Gabhs from School Children

SEX	TOTAL NO.OF SPECIMENS PROCESSED	CULTURE POSITIVE	
		No.	%
Boys	1029	291	28.3
Girls	740	202	27.3
Total	1769	493	27.9

Table 2 : Group A (Basawamakkalu)

AGE	BOYS			GIRLS			TOTAL SAMPLED		
	TOTAL	POSITIVE		TOTAL	POSITIVE		TOTAL	POSITIVE	
		NO.	%		NO.	%		NO.	%
6-7	05	04	80	01	01	100	06	05	83.3
7-8	08	06	75	02	02	100	10	08	80
8-9	00	00	00	02	01	50	02	01	50
9-10	08	03	37.5	00	00	00	08	03	37.5
10-11	07	03	42.8	08	01	12.5	15	04	26.7
11-12	10	02	20	00	00	00	10	02	20
>12	16	02	12.5	06	01	16.7	22	03	13.6
TOTAL	54	20	37.03	19	06	31.6	73	26	35.6

Table 3 : Group- B (Orphanage)

AGE	BOYS			GIRLS			TOTAL SAMPLED		
	TOTAL	POSITIVE		TOTAL	POSITIVE		TOTAL	POSITIVE	
		NO.	%		NO.	%		NO.	%
6-7	15	12	80	07	05	71.4	22	17	77.3
7-8	10	06	60	08	04	50	18	10	55.5
8-9	12	06	50	10	03	30	22	09	40.9
9-10	12	04	33.3	07	03	42.8	19	07	36.8
10-11	14	04	28.6	05	01	20	19	05	26.3
11-12	11	01	9.1	03	00	00	14	01	07.1
>12	20	02	10	02	00	00	22	02	09.1
TOTAL	94	35	37.23	42	16	38.1	136	51	37.5

Table 4 : Group-C (Govt. School)

AGE	BOYS			GIRLS			TOTAL SAMPLED		
	TOTAL	POSITIVE		TOTAL	POSITIVE		TOTAL	POSITIVE	
		NO.	%		NO.	%		NO.	%
6-7	41	14	34.1	33	24	72.7	74	38	51.3
7-8	74	24	32.4	25	13	52	99	37	57.4
8-9	45	14	31.1	44	16	36.4	89	30	33.7
9-10	45	15	33.3	69	23	33.3	114	38	33.3
10-11	45	15	33.3	56	12	21.4	101	27	26.7
11-12	25	07	28	35	01	02.8	60	08	13.3
>12	29	09	31	22	00	00	51	09	17.6
TOTAL	304	98	32.2	284	89	31.3	588	187	31.8

Table 5 : Group-C (Pvt. School)

AGE	BOYS			GIRLS			TOTAL SAMPLED		
	TOTAL	POSITIVE		TOTAL	POSITIVE		TOTAL	POSITIVE	
		NO.	%		NO.	%		NO.	%
6-7	88	24	27.3	59	14	23.7	147	38	25.8
7-8	85	24	28.2	58	16	27.6	143	40	27.9
8-9	84	23	27.4	58	16	27.6	142	39	27.5
9-10	86	21	24.4	60	14	23.3	146	35	24
10-11	82	19	23.2	56	13	23.2	138	32	23.2
11-12	77	17	22.1	53	11	20.7	130	29	22.3
>12	75	10	13.3	51	07	13.7	126	17	13.5
TOTAL	577	138	23.9	395	91	23.0	972	230	23.7

Table 6 : Table Showing the Total No.of Subjects Tested and Total No. of Gabhs Isolated

SEX	TOTAL NO.OF SPECIMENS PROCESSED	CULTURE POSITIVE	
		No.	%
GROUP-A	73	26	35.6
GROUP-B	136	51	37.5
GROUP-C	588	187	31.8
GROUP-D	972	230	23.7

Table 7 : Antibiotic Susceptibility of GABHS

ANTIBIOTICS	RESISTANCE	
	No.	%
Cephalothin (CF)	128	26
Erythromycin (E)	144	29.4
Tobramycin (T)	113	22.9
Tetracycline (Te)	241	48.9
Amoxicillin (Amx)	390	79.1
Co-Trimoxazole (S&T)	289	58.8
Vancomycin (Va)	0	0
Cloxacillin (Cx)	368	74.6
Gentamicin (Gm)	345	70
Penicillin (P)	376	76.4

Table 8 : Factors Associated with Prevalence of Gabhs

Variable	Determiner	Total no.	Positive	
			No.	%
Age	6-10	1061	355	33.5
	>10	708	139	19.6
Gender	Male	1029	291	28.3
	Female	740	202	27.3
Residence	Orphanage	73	26	35.6
	Minority	136	51	37.5
	Sub-urban	588	187	31.8
	Urban	972	230	23.7
Oral hygiene	Good	1263	216	17.1
	Bad	506	413	81.6
Care taker	Literate	1222	183	14.9
	Illiterate	547	246	44.9

IV. Discussion

Healthy carriers of GABHS are sources for bacterial dissemination and are able to communicate the disease and even lead to severe epidemics.

There is evidence that asymptomatic throat infection caused by GABHS may lead to ARF.[9] Asymptomatic infections with subsequent rise in streptococcal antibody titers have also been reported in patients with previously diagnosed rheumatic fever (RF).[10]We observed that the prevalence of GABHS in the throat of asymptomatic school children was 27.9% which is in correlation with Koshi G et al [11], Prakash K et al. [11]

However, the prevalence of asymptomatic carriage of GABHS has been reported (11,12,13, 14,15,16,17,18) between 11-47% from various countries this could be attributed to various demographic factors.

In this study none of the school children showed the characteristic picture of streptococcal pharyngitis. This is not unusual, as in a 3 year study from Egypt. [19] none of the children had streptococcal exudative tonsillitis out of 1041 children examined.

The clinical picture alone is not reliable, as subclinical throat infection caused by GABHS is not uncommon. Also isolation of GABHS alone is not enough to suggest infection in asymptomatic children. Thus the demonstration of a rise in titer of antibodies against extracellular antigens of GABHS is essential for diagnosis of infection. [20]

a) Strength and Limitations

As per our knowledge this study is first of its kind in our locality focusing on school children of different living conditions. The throat swab testing by routine culture and Lancefield grouping method increased the validity of estimates.

Our study has certain limitations that need to be single throat swab examination for detection of GABHS, which could have underestimated the prevalence, as optimal laboratory diagnosis of GABHS requires the examination of at least two throat swabs collected over several days.

More recent studies have suggested throat culture is still considered as the 'gold standard' method for GABHS detection, giving results in about 90-95% of the cases and we have done the same.

However, Antibody studies are microbiologically important both for demonstration of GABHS pharyngitis as well as the clinical diagnosis of (RF/RHD).We were unable to perform antibody studies on subjects as we could not to get the written consent. This is one of the first few school survey studies carried out in this region and therefore, we wanted to develop a good rapport with the children before we could do intensive studies on them.

V. Conclusion

According to the present study, the streptococcal carrier rate in this area is comparable to the other studies in surrounding areas. Prevalence of GABHS from the throat of asymptomatic school children has been reported for the first time from this locality. Further epidemiological studies on this aspect are needed to substantiate the findings of our study.

In India, the streptococcal reference system has already been established and primary prevention method for RF and RHD, namely control of streptococcal infections is also going on. [21] To conclude, as methods of the streptococcal control program have now become cost effective, we strongly recommend such prevalence studies should be actively employed to prevent the high prevalence of GABHS pharyngitis and their sequelae, with special concern for children below 11 years of age.

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Study of Mastoid Air Cells Diseases using Spiral CT

By Raga Mohammed Musa, Ikhlas Abdelaziz Hassan, M. E.M. Gar El Nabi & Hussein Ahmed Hassan

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Abstract - This study aimed to study the mastoid air cells diseases and their complications using spiral CT, it was conducted in Alfaisal Specialized hospital and Ibn Elhaitham Diagnostic center in the period between September 2012 to January 2013, Hundred patients of different ages and different genders who were suspected of having mastoid air cells pathologies underwent Spiral CT scan of their temporal bones using 4MDSCT (Toshiba medical system),then the scanning was done with collimation of (1-2) mm, 2mm slice thickenings ,120 Kvp ,160 MA and 1 second rotation time. after that The results were confirmed that the mastoid air cells diseases were very common and they had serious complications, (The diseases of mastoditis and mastoditis with CSOM had higher frequency (83 patients among 100 patients).and they had pathological changes of anatomical structures of the temporal bones which contains organs of hearing and balance). Finally the study has found that Spiral CT scan is an effective imaging modality in studying of mastoid air cells diseases and their complications. Also it was more affective to explain the complex anatomical structures of the temporal bones and to know the pathological changes within it.

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Study of Mastoid Air Cells Diseases using Spiral CT

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Abstract - This study aimed to study the mastoid air cells diseases and their complications using spiral CT, it was conducted in Alfaisal Specialized hospital and Ibn Elhaitham Diagnostic center in the period between September 2012 to January 2013, Hundred patients of different ages and different genders who were suspected of having mastoid air cells pathologies underwent Spiral CT scan of their temporal bones using 4MDSCT (Toshiba medical system),then the scanning was done with collimation of (1-2) mm, 2mm slice thickenings ,120 Kvp ,160 MA and 1 second rotation time. after that The results were confirmed that the mastoid air cells diseases were very common and they had serious complications, (The diseases of mastoditis and mastoditis with CSOM had higher frequency (83 patients among 100 patients).and they had pathological changes of anatomical structures of the temporal bones which contains organs of hearing and balance). Finally the study has found that Spiral CT scan is an effective imaging modality in studying of mastoid air cells diseases and their complications. Also it was more affective to explain the complex anatomical structures of the temporal bones and to know the pathological changes within it.

I. Introduction

The Mastoid air cells are open spaces containing air that are located throughout the mastoid bone, the prominent bone located behind the ear that projects from the temporal bone of the skull. The air cells are connected to a cavity in the upper part of the bone, which is in turn connected to the middle ear.

Mastoid air cells considered to be an important contributor to the physiology of middle ear function. the mastoid air cell system served as an reservoir of air and serves as buffer system to replace air in the middle ear cavity temporarily in case of Eustachian tube dysfunction. The mean volume of air in the mastoid air cell system could be about 5-8 ml. CT scan evaluation of temporal bone is considered to be the best modality to assess mastoid air cell system (1).

Mastoid air cells diseases most commonly refers to infection or inflammation involving the mastoid air cells. Frequently, an infection will start in the middle ear space (for example, otitis media, a very common problem) and then subsequently involve the mastoid air cells - since they are anatomically connected. Severe cases of the disease may lead to meningitis, which is an infection of the membranes surrounding the brain. Mastoid air cell disease is often diagnosed these days by CT scanning - which shows opacification (e.g. fluid accumulation) in the air cells. (1)

A computerized tomography (CT) scan of the mastoid process reveals the air cells as small, dark spaces separated by lighter areas of dense bone cells. Inflamed or infected cells will appear as gray or white areas on the scan where the darkened spaces would be expected to be located. When these abnormal looking cells are present, they are called mastoid cell opacification(2).

Helical CT has become the method of choice for many routine and new clinical applications. It provides good image quality for body imaging applications at table advancement per rotation of 1 to 2 times the x-ray beam collimation (3&4). Using 3D, multi-planar reformation ~MPR! Or maximum intensity projection ~MIP! Techniques would be benefited by improved volume coverage speed performance (3&4). Recent advances in 32, 64 and now 128-slice CT scanners allow the acquisition of high-resolution, volumetric data that allows image reconstruction in any plane. The advent of high-resolution CT scanning in the 1980s has revolutionized diagnostic imaging of the temporal bone. CT scanning offers the greatest structural definition of any currently available imaging modality (5&6). Temporal bone is a complex structure which contains organs for hearing and balance. Large vessels and nerves pass through temporal bone. Because of its complex anatomic structure and functional properties temporal bone is one of the most challenging organs for radiologists to detect diagnostic findings. It is obligatory to have a good knowledge of its anatomy and functions in order to accomplish optimal radiological evaluation (7).

CT is a standard examination technique in diagnosing and treatment of temporal bone diseases (7&8) Slices in different planes can be obtained by CT and it is possible to understand the complex relationship of ana¬tomical structures. Its capability of obtaining slices less than 1 mm and the development of specific examination techniques for restricted density regions increased the imaging rate of detailed examinations. With the advent of multislice CT after gaining axial 3D

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volumetric scan¬ning coronal and sagittal reformatted slices can be ob¬tained. By this technique total radiation dose can be decreased using 0.5 mm slice thickness. A CT with a sub-milimetric spatial resolution, slice thickness of 2 mm or less, wide window settings, bony detail reconstruction algorithm, having target reconstruction and high quality image reformatting programs is very efficient in evalua¬tion of inflammatory middle ear pathologies (9 &10). The most important advantage of spiral CT in temporal bone imaging is its perfect visualization of the contrast between bony structures and the air in the middle ear. In addition to detailed evaluation of the bony structures it also permits assessment of soft tissue components as well. (8 &11).

This study aimed to study the mastoid air cells diseases and their complications using spiral CT, it was conducted in Alfaisal Specialized hospital and Ibn Elhaitham Diagnostic center.

II. Materials & Methods

a) Materials

i. *Machine*

Toshiba (4 multi slice detector) Spiral CT scanner which is not different in external appearance from conventional CT scanner However, there are significant differences in several major equipment components

ii. *Patient's Population*

Hundred patients (58 female & 42 male) their ages between (15 -70) years who were suspected of mastoid air cells pathologies were referred to CT department centers for CT scan of the temporal bones.

b) Methods

i. *Technique*

We obtained the temporal bone scans using 2 mm collimation with a 2 mm slice thickness at 120 kVp, 160 mA, 1 second rotation time and a 240 mm field of view with a matrix size of 512 x 512. The initial data sets were then reconstructed at 2 mm intervals. All studies were therefore obtained with the neck flexed such that the infra-orbito-meatal line was parallel to the scanning plane when obtaining images in the axial plane. A zero degree gantry tilt when obtaining such images ensured no distortion of the post-processed 3D images. Volume-rendered 3D images were generated from the original 2D data with different soft tissue and bone

All post-processed images, axial scans and coronal MPR were studied by senior technologist and diagnosed by radiologist.

ii. *Data Analysis*

The data were collected by using questionnaire and medical reports and were analyzed by using statistical package of social science (SPSS).

III. Results

This study carried out in 100 patients their ages between (15 to 70) years old, whom suspected of mastoid air cells pathologies using 4 MDSCT (Toshiba medical system), the study was done according to gender, clinical diagnosis, side of lesion, signs & symptoms, anatomical variations and CT diagnosis and the results obtained as following.

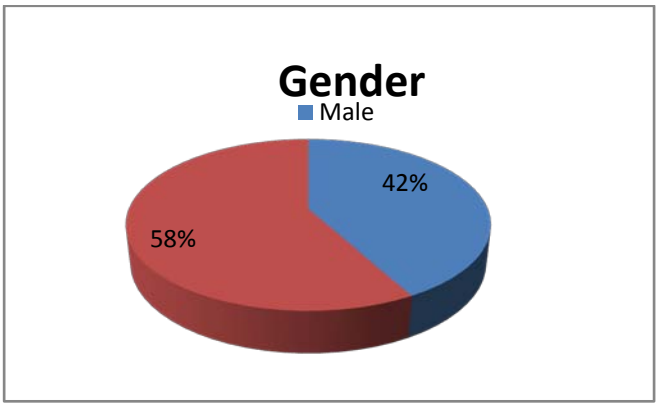

Figure (4.1) : Shows gender distribution

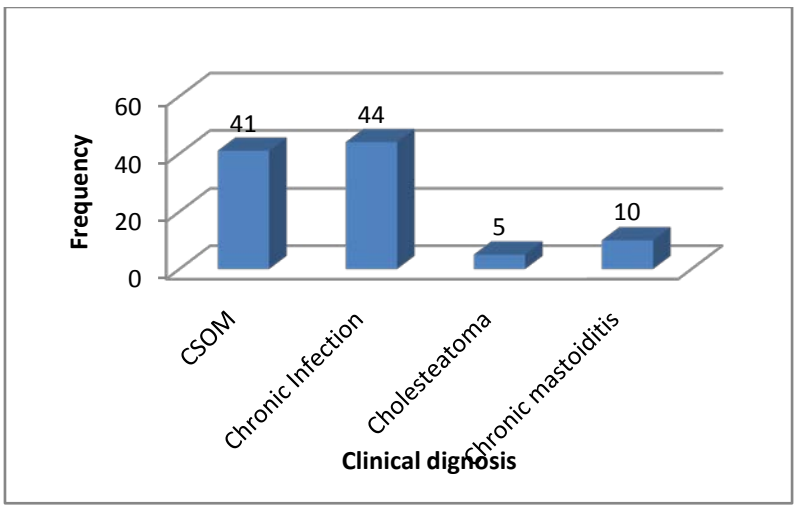

Figure (4.2) : Shows clinical diagnosis frequency

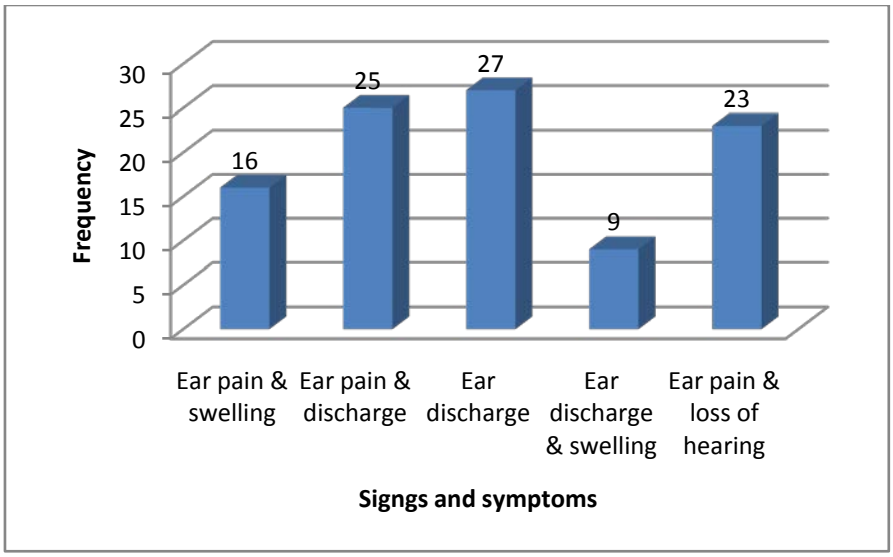

Figure (4.3) : Shows signs &symptoms frequency

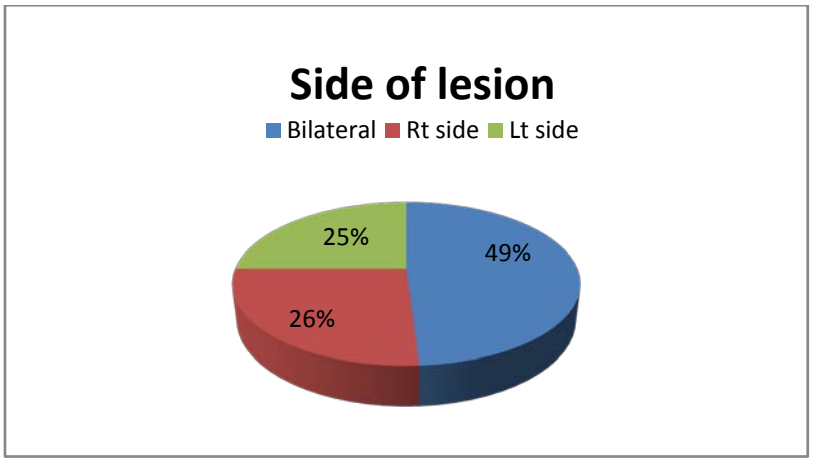

Figure (4.4) : Shows side of lesion distribution

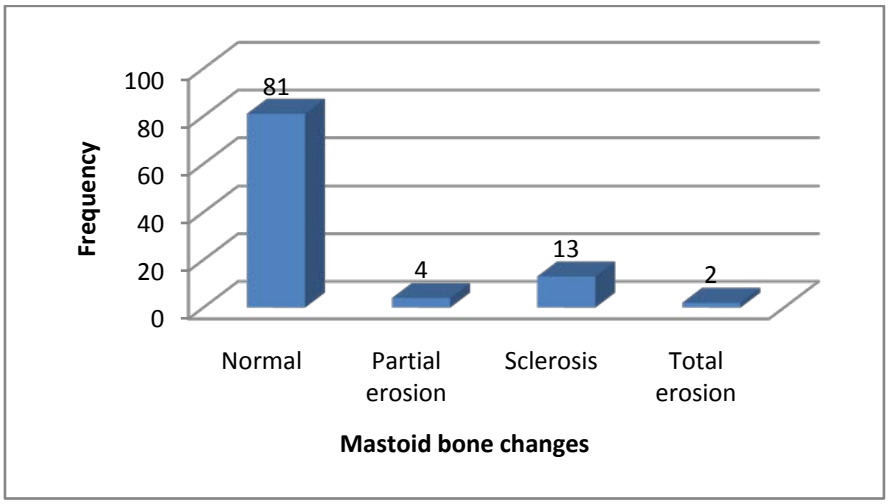

Figure (4.5) : Shows mastoid bone changes frequency

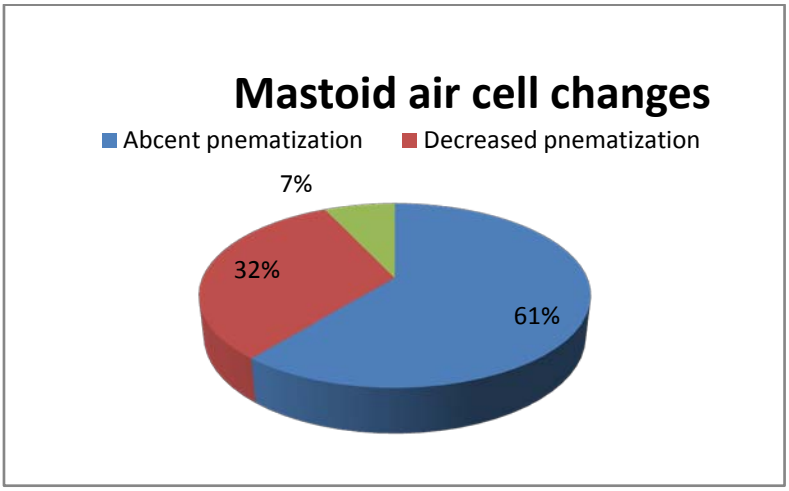

Figure (4.6) : Shows mastoid air cells changes distribution

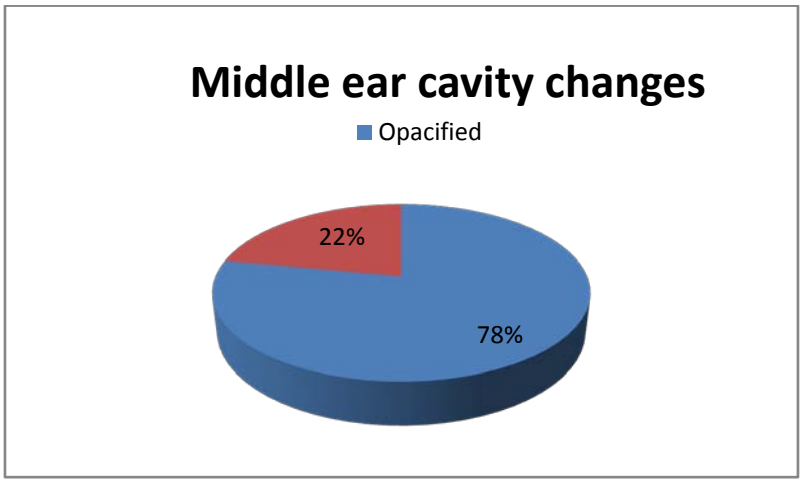

Figure (4.7) : Shows middle ear cavity changes distribution

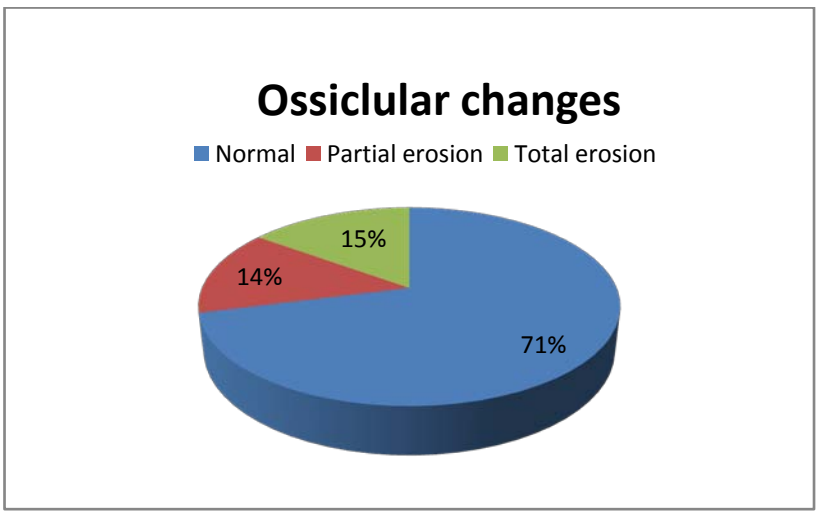

Figure (4.8) : Shows ossicular changes distribution

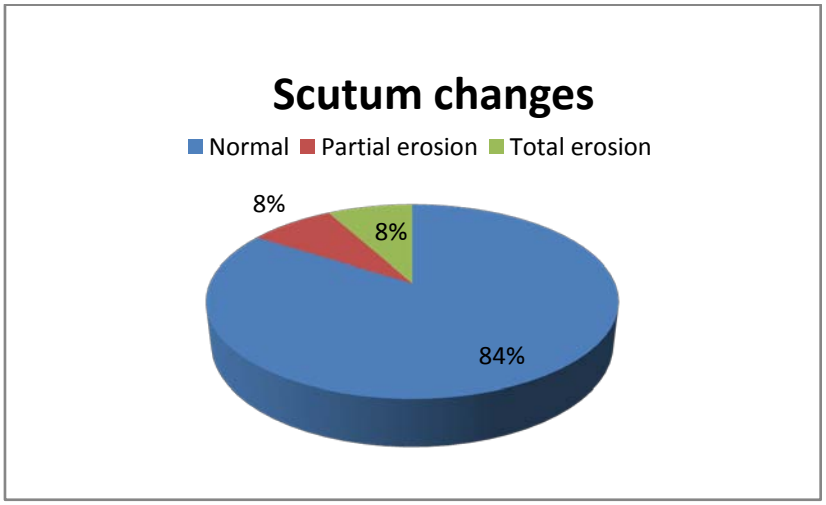

Figure (4.9) : Shows scutum changes distribution

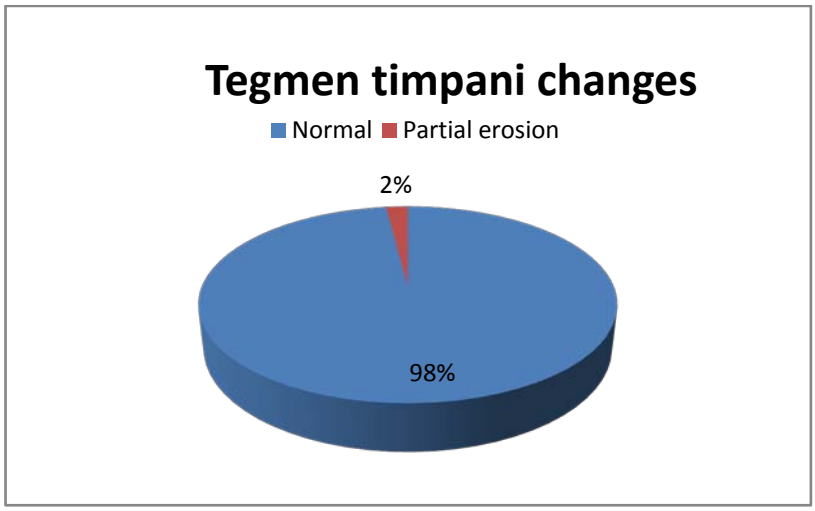

Figure (4.10) : Shows tegmen timpani changes distribution

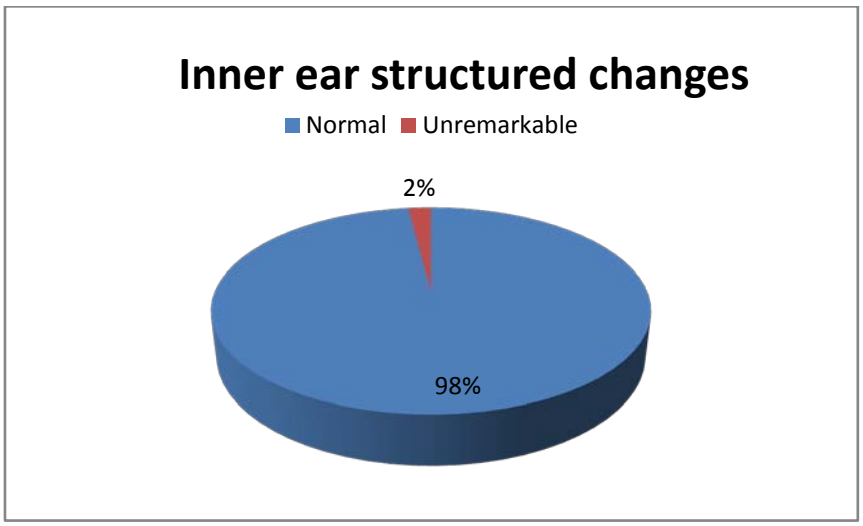

Figure (4.11) : Shows inner ear structures changes distribution

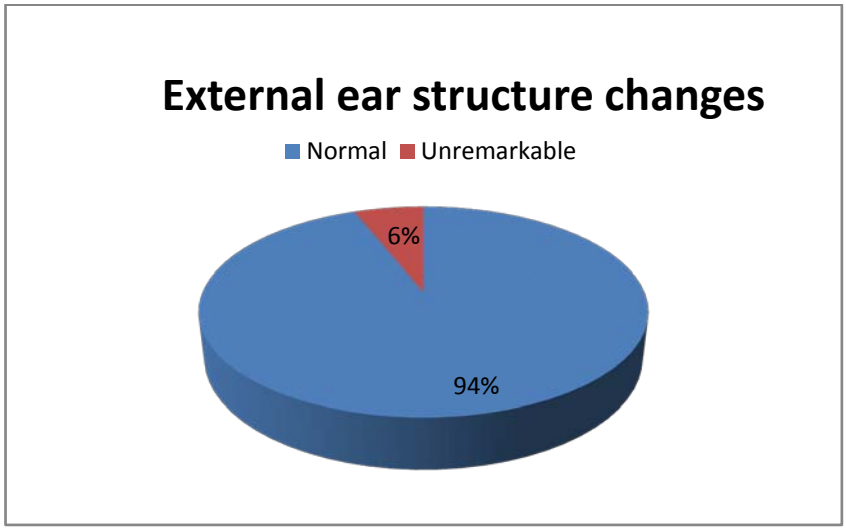

Figure (4.12) : Shows extremer ear structures changes distribution

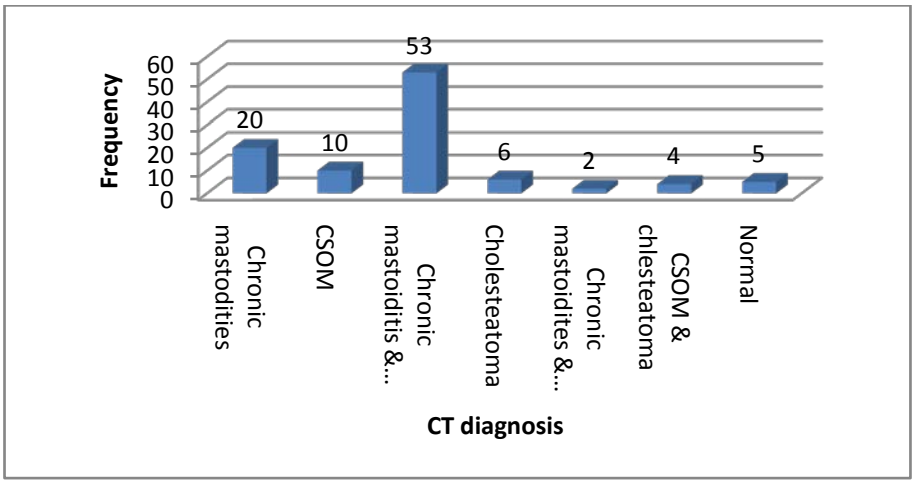

Figure (4.13) : Shows CT diagnosis frequency

Table (4.1) : Demonstrates CT diagnosis * Clinical diagnosis Cross tabulation

CT diagnosis	Clinical diagnosis				Total
	CSOM	Chronic Infection	Cholesteatoma	Chronic mastoiditis	
Chronic mastodities	2	14	0	4	20
CSOM	8	2	0	0	10
Chronic mastoditis& CSOM	28	19	0	6	53
Cholesteatoma	0	2	4	0	6
Chronic mastoidites & cholesteatoma	1	1	0	0	2
CSOM & chlesteatoma	1	2	1	0	4
Normal	1	4	0	0	5
Total	41	44	5	10	100

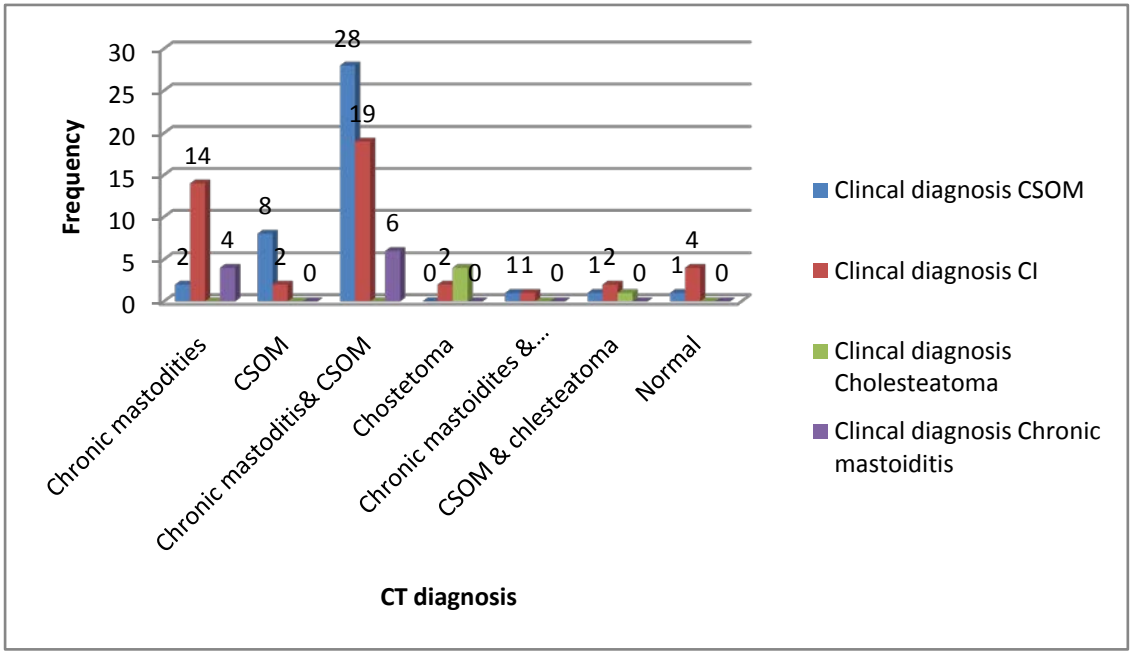

Figure (4.14) : Shows CT diagnosis & clinical diagnosis Cross tabulations

Table (4.2) : Demonstrates CT diagnosis * signs & symptoms Cross tabulation

CT diagnosis	Signs & amp; symptoms					Total
	Ear pain & swelling	Ear pin & discharge	Ear discharge	Eear discharge & swelling	Ear pain & loss of hearing	
Chronic mastodities	4	5	7	2	2	20
CSOM	2	2	3	2	1	10
Chronic mastoditis &CSOM	8	13	17	5	10	53
Cholestetoma	1	0	0	0	5	6
Chronic mastoidites & cholesteatoma	0	0	0	0	2	2
CSOM & cholesteatoma	1	0	0	0	3	4
Normal	0	5	0	0	0	5
Total	16	25	27	9	23	100

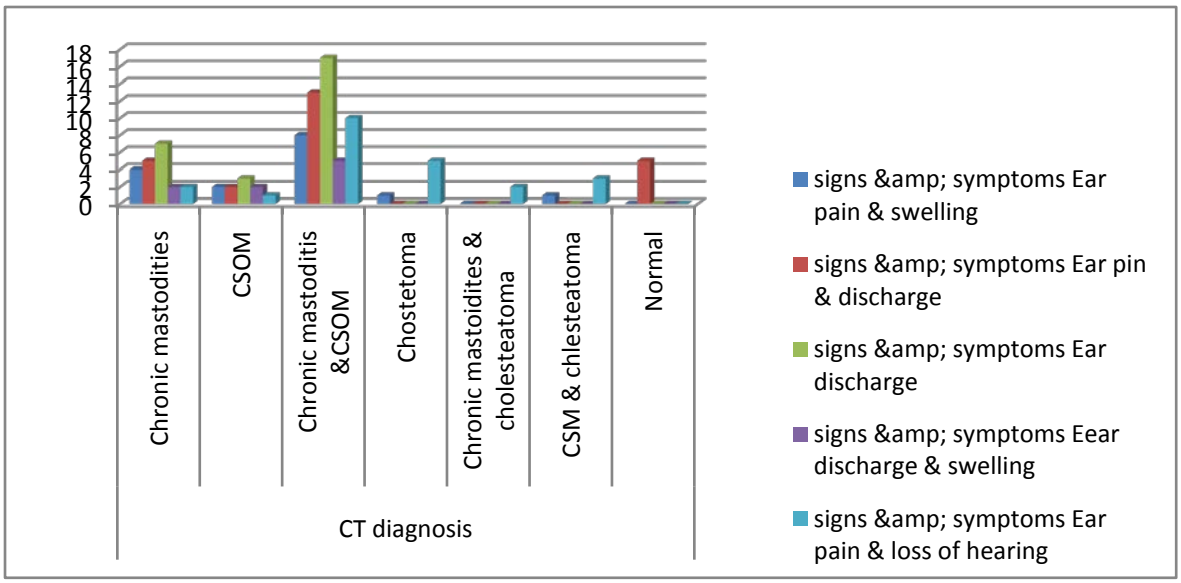

Figure (4.15) : Shows CT diagnosis & signs and symptoms cross tabulation

Table (4.3) : Demonstrates CT diagnosis * Side of lesion Cross tabulation

CT diagnosis	Side of lesion			Total
	Bilateral	Rt side	Lt side	
Chronic mastodities	10	3	7	20
CSOM	4	5	1	10
Chronic mastoditis & CSOM	30	10	13	53
Cholesteatoma	1	3	2	6
Chronic mastoidites & cholesteatoma	1	1	0	2
CSM & cholesteatoma	3	1	0	4
Normal	0	3	2	5
Total	49	26	25	100

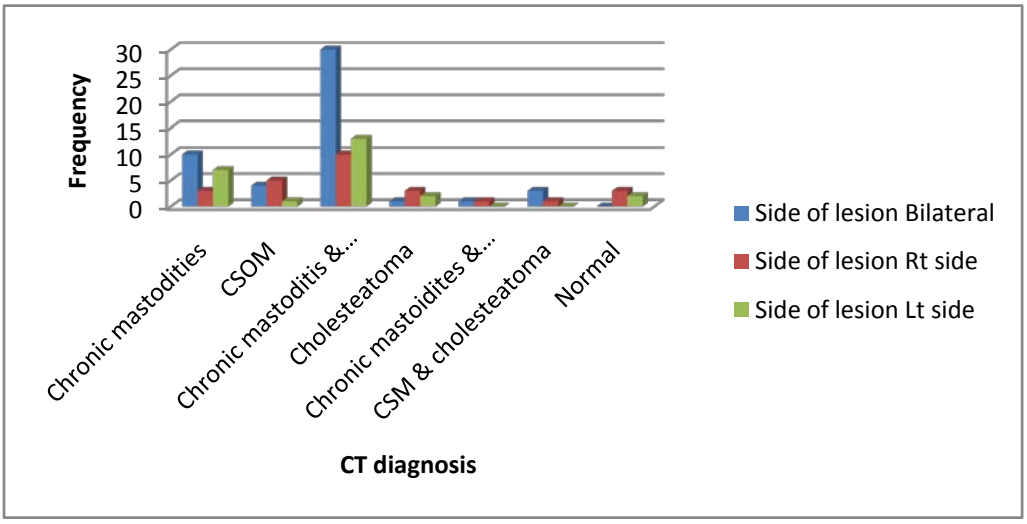

Figure (4.16) : Shows CT diagnosis & side of lesions cross tabulation

Table (4.4) : Demonstrates CT diagnosis * Mastoid bone changes Cross tabulation

CT diagnosis	Mastoid bone changes				Total
	Normal	Partial erosion	Sclerosis	Errigular	
Chronic mastodities	15	1	4	0	20
CSOM	10	0	0	0	10
Chronic mastoiditis & CSOM	43	1	8	1	53
Cholesteatoma	5	0	1	0	6
Chronic mastoidites & cholesteatoma	1	1	0	0	2
CSOM & chlesteatoma	2	1	0	1	4
Normal	5	0	0	0	5
Total	81	4	13	2	100

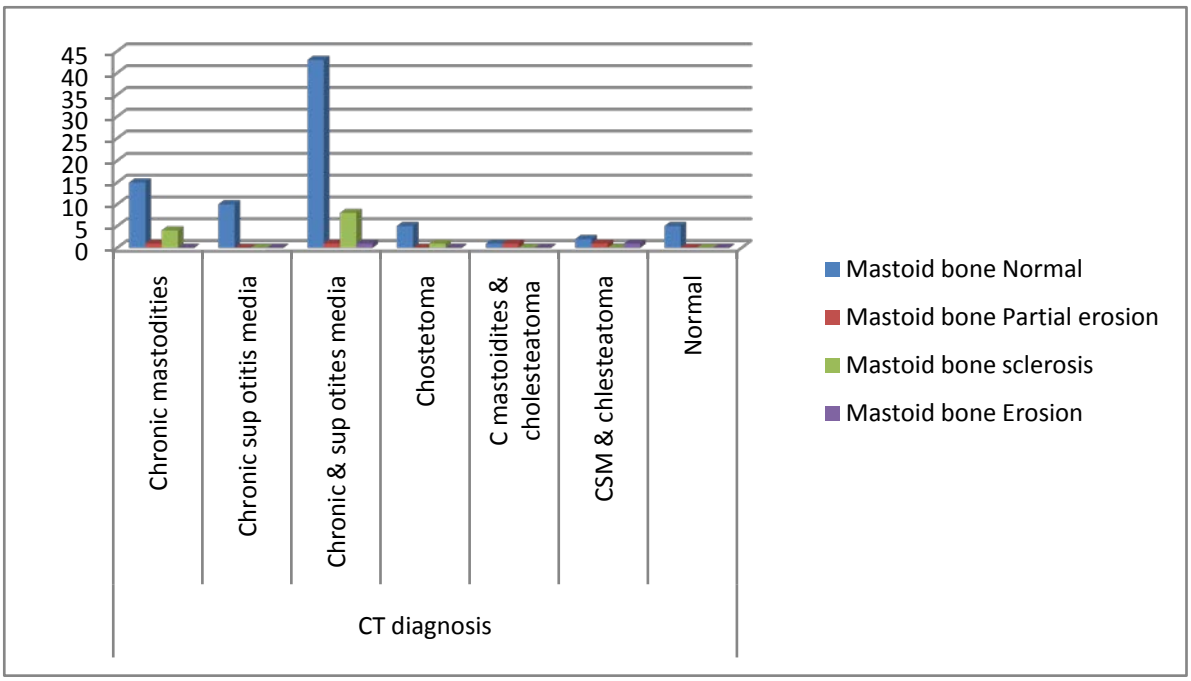

Figure (4.17) : Shows CT diagnosis & mastoid bone changes Cross tabulation

Table (4.5) : Demonstrates CT diagnosis * mastoid air cells changes Cross tabulation

CT diagnosis	Mastoid air cells changes			Total
	Abcent pnematization	Decreased pnematization	Normal	
Chronic mastodities	13	7	0	20
CSOM	4	5	1	10
Chronic mastoiditis & CSOM	36	17	0	53
Cholesteatoma	4	1	1	6
Chronic mastoidites & cholesteatoma	1	1	0	2
CSOM & cholesteatoma	3	1	0	4
Normal	0	0	5	5
Total	61	32	7	100

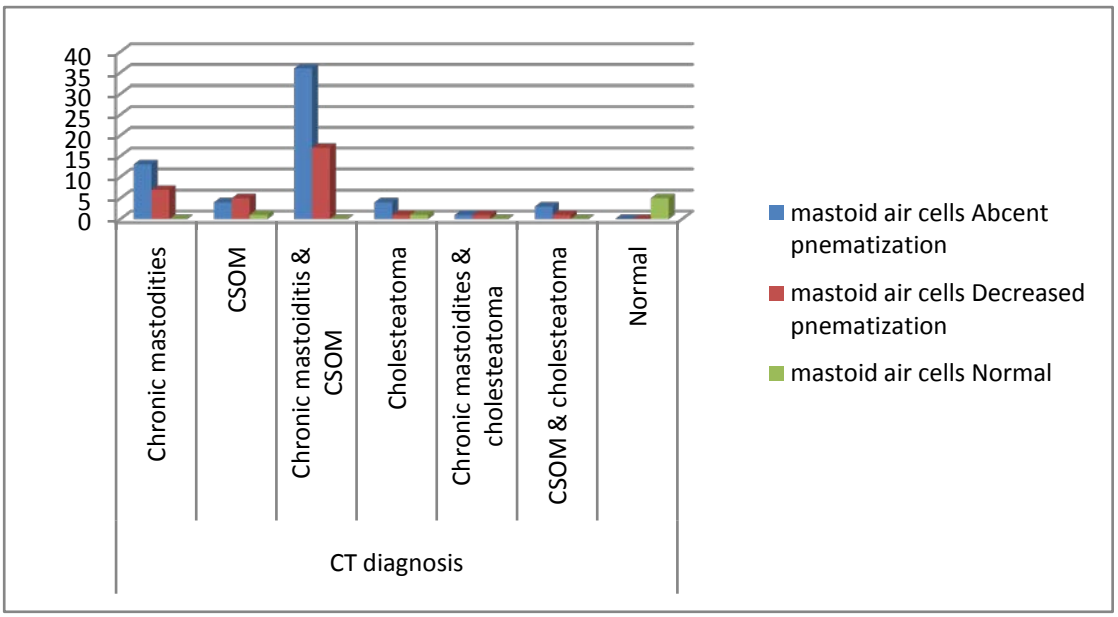

Figure (4.18) : Shows CT diagnosis & mastoid air cells changes Cross tabulation

Table (4.6) : Demonstrates CT diagnosis & middle ear cavity changes cross tabulation

CT diagnosis	Middle ear cavity changes		Total
	Obacified	Normal	
Chronic mastodities	5	15	20
CSOM	9	1	10
Chronic mastoiditis&CSOM	53	0	53
Cholesteatoma	6	0	6
Chronic mastoidites & cholesteatoma	1	1	2
CSOM & cholesteatoma	4	0	4
Normal	0	5	5
Total	78	22	100

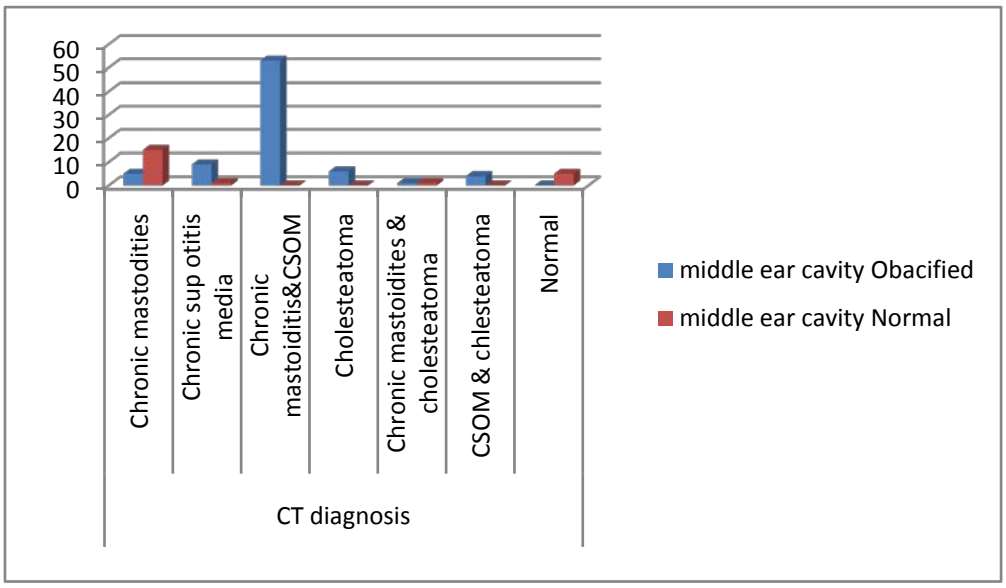

Figure (4.19) : Shows CT diagnosis & middle ear cavity changes Cross tabulation

Table (4.7) : Demonstrates CT diagnosis * Ossicular changes Cross tabulation

CT diagnosis	Ossicular changes		Total
	Normal	Erosion	
Chronic mastodities	18	2	20
CSOM	04	6	10
Chronicmastoiditis &CSOM	40	13	53
Cholesteatoma	2	4	6
Chronic mastoidites & cholesteatoma	0	2	2
CSOM & cholesteatoma	2	2	4
Normal	5	0	5
Total	71	29	100

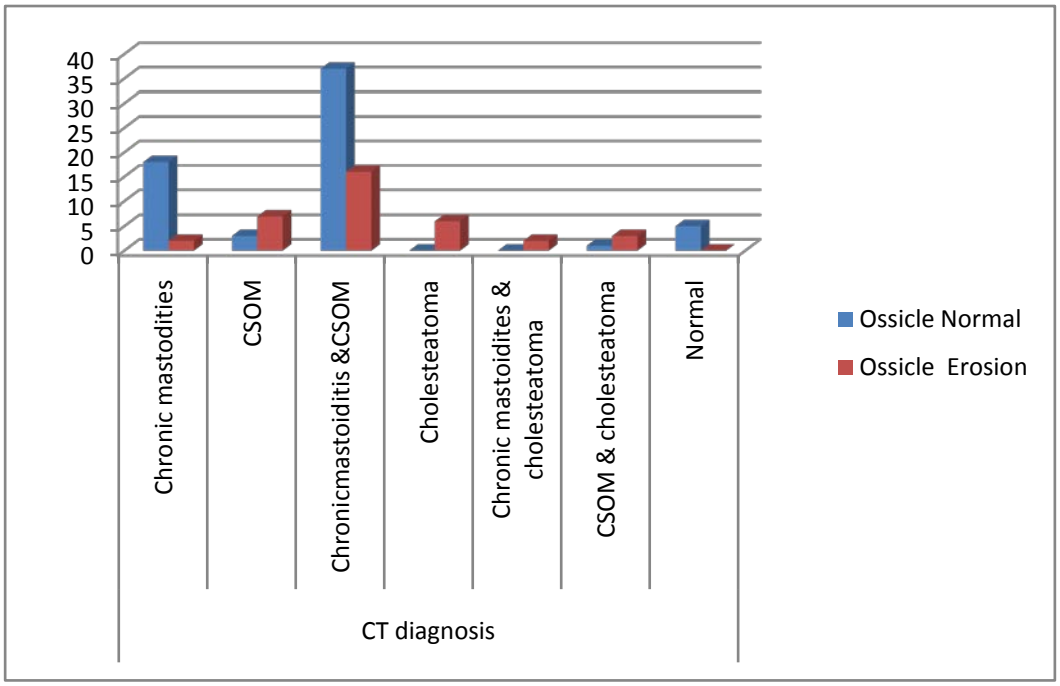

Figure (4.20) : Shows CT diagnosis & ossicular changes Cross tabulation

Table (4.8) : Demonstrates CT diagnosis * scutum changes Cross tabulation

CT diagnosis	Scutum changes			Total
	Normal	Partial erosion	Total erosion	
Chronic mastodities	19	0	1	20
COM	10	0	0	10
Chronic mastoiditis &CSOM	50	2	1	53
Cholesteatoma	0	3	3	6
Chronic mastoidites & cholesteatoma	0	2	0	2
CSOM & chlesteatoma	0	1	3	4
Normal	5	0	0	5
Total	84	8	8	100

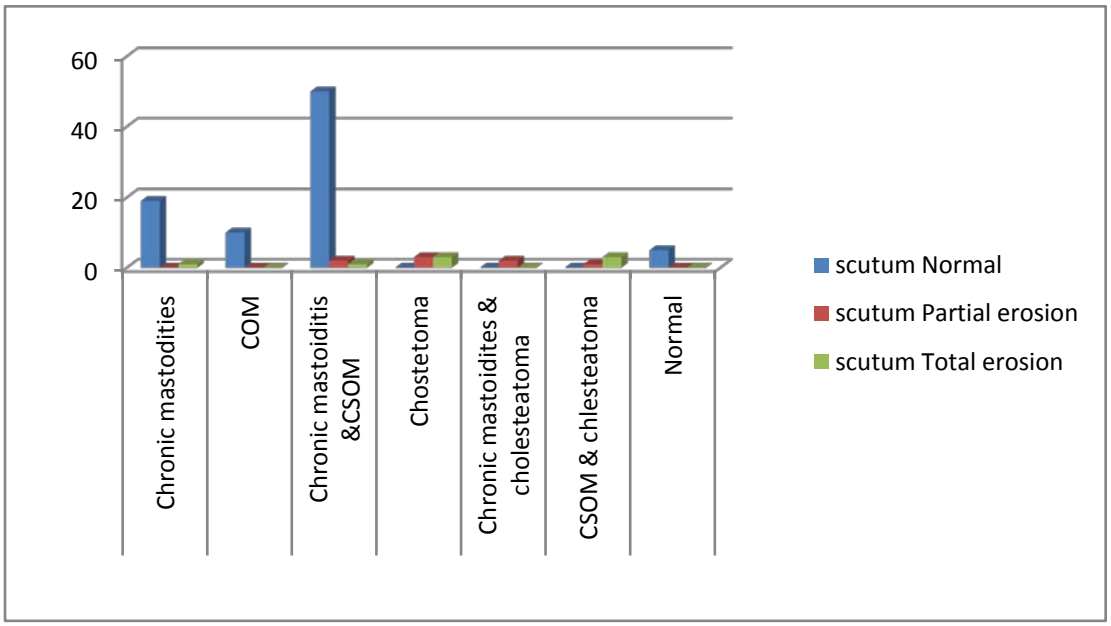

Figure (4.21) : Shows CT diagnosis & scutum changes Cross tabulation

Table (4.9) : Demonstrates CT diagnosis * tegmen timpani changes Cross tabulation

CT diagnosis	Tegmen timpani changes		Total
	Normal	Partial erosion	
Chronic mastodities	19	1	20
CSOM	10	0	10
Chronic mastoiditis &CSOM	53	0	53
Chostetoma	6	0	6
Chronic mastoidites & cholesteatoma	2	0	2
CSOM & chlesteatoma	3	1	4
Normal	5	0	5
Total	98	2	100

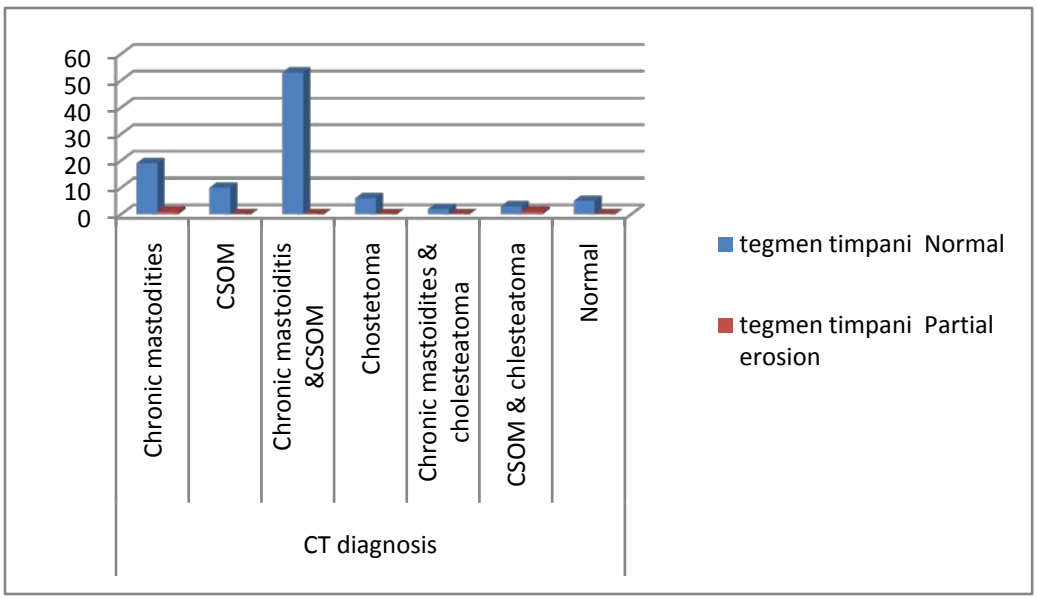

Figure (4.22) : Shows CT diagnosis & tegmen timpani changes Cross tabulation

Table (4.10) : Demonstrates CT diagnosis * inner ear structures changes Cross tabulation

CT diagnosis	Inner ear structures		Total
	Normal	Unremarkable	
Chronic mastodities	19	1	20
CSOM	10	0	10
Chronic mastoditis & CSOM	53	0	53
Chostetoma	6	0	6
Chronic mastoidites & cholesteatoma	2	0	2
CSOM & chlesteatoma	3	1	4
Normal	5	0	5
Total	98	2	100

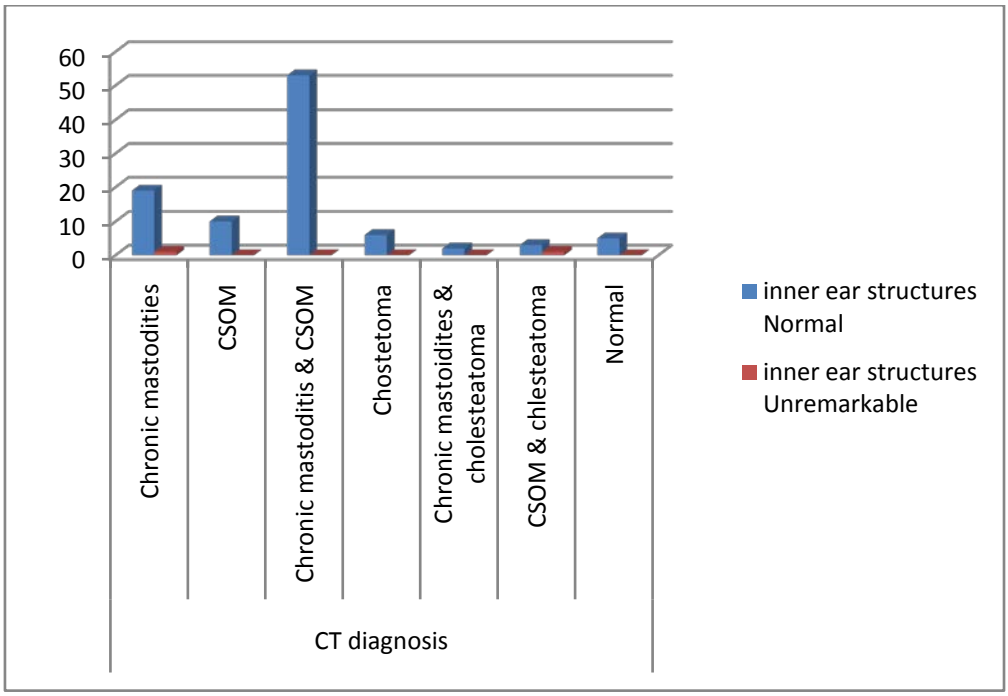

Figure (4.23) : Shows CT diagnosis & Inner ear structure change Cross tabulation

Table (4.11) : Demonstrates CT diagnosis * external ear structures changes Cross tabulation

CT diagnosis	External ear structures		Total
	Normal	Unremarkable	
Chronic mastodities	20	0	20
CSOM	10	0	10
Chronic mastoiditis & CSOM	49	4	53
Chostetoma	5	1	6
Chronic mastoidites & cholesteatoma	2	0	2
CSOM & chlesteatoma	3	1	4
Normal	5	0	5
Total	94	6	100

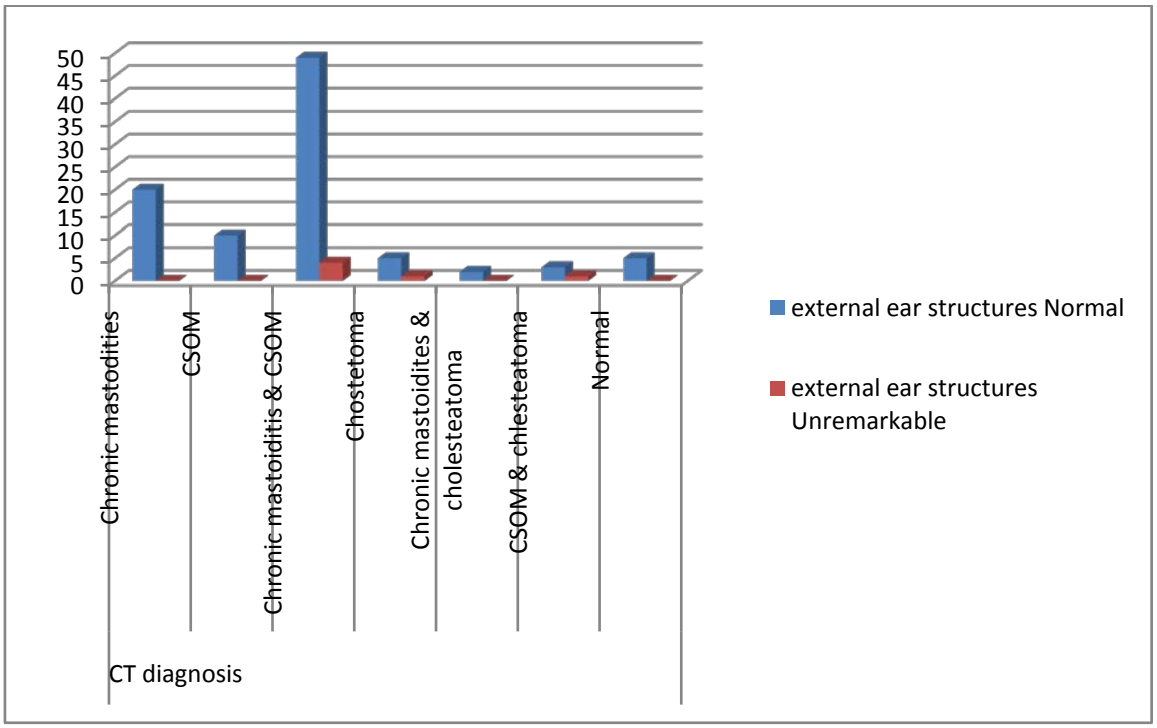

Figure (4.24) : Shows CT diagnosis &external ear structure changes Cross tabulation

IV. Discussion

This study was performed in 100 patients (58 female & 42 male) their ages between (15 -70 years) whom suspected of mastoid air cells pathologies and they were referred to CT department centers for CT scan of the temporal bones using 4 MDSCT (Toshiba Medical System) and the results as the following:

The gender distribution was 58 female & 42% male as explained in figure (4.1). 41% of them were diagnosed clinically as having CSOM (figure 4.2) while by CT 28% of them were diagnosed of having chronic mastoiditis & CSOM , 8% were diagnosed of having CSOM, 2% having chronic mastoiditis and 2% having cholesteatoma &CSOM as shown in table(4.1) & figure (4.14).

44 % of patients were diagnosed clinically as having chronic infection (figure 4.2), while by CT, 19% of them were diagnosed as having chronic mastoiditis &CSOM, 14% as having chronic mastoiditis,7% as having cholesteatoma & CSOM and 4% as normal.

10% of patients were diagnosed clinically as having chronic mastoiditis, while by CT they were diagnosed as follows; 6 % of them having chronic mastoiditis & CSOM and 4% of them having chronic mastoiditis, figure (4.14).

5% of patients were diagnosed clinically as having cholesteatoma (figure 4.2), also by CT they were diagnosed as having cholesteatoma (figure 4.14). This means that cholesteatoma can be diagnosed clinically and by CT. The high variations between clinical and spiral CT diagnosis, represent the accuracy of spiral CT in diagnosing mastoid air cells diseases. The signs & symptoms was; 77% of patients were having ear pain, discharge & swelling (figure4.3), all of them were diagnosed by CT as having chronic mastoiditis & CSOM, 23% of patients were having ear pain & loss of hearing, most of them (13patients) were diagnosed as having chronic mastoditis &CSOM and the others (10 patients) were diagnosed as having cholesteatoma (table 4.2 & fig 4.15).

The side of lesions in 49% of patients was bilateral (fig 4.4), most of them were diagnosed by CT as chronic mastoiditis & CSOM (table 4.3&fig 4.15), 26% of them at the right side and 25% at the left one.

The pathological changes on the mastoid bone was explained as 13patients with mastoid bone sclerosis (fig 4.5) all of them were diagnosed by CT as having chronic mastoiditis & CSOM , 6 patients with mastoid bone erosion 4 of them were diagnosed by CT as having cholesteatoma & 81 patients with normal mastoid bones ,as shown in table (4.4 & fig 4.17).

The mastoid air cells changes as follows; 61% of patients were absent pnematization (figure 4.6), 53 patients of them were diagnosed by CT as having chronic mastoiditis & CSOM while 8 patients were diagnosed as having cholesteatoma, 32% of patients with decreased pnemataization, 29 patients of them were diagnosed by CT as having chronic mastoiditis & CSOM while 3 patients were diagnosed as having cholesteatoma and 7 patients with normal pnematization as shown in table (4.5 & figer 4.18)). This result indicate that the helical CT had effective role in diagnosing

mastoid air cells changes and it was superior to the clinical diagnoses.

The middle ear cavity opacification noted on 78% of patients (fig 4.7) 67 patients of them were diagnosed by CT as having chronic mastoiditis &CSOM while 11patients of them were diagnosed as having cholesteatoma. (Table 4.6 & fig 4.19). This was also indicate the efficiency of helical CT to detect middle ear cavity opacification.

The ossicular changes were detected in 29% of patients, 14% of them with partial erosion, while 15% of them with total erosion as shown in figure (4.8).21 patients of them were diagnosed by CT as having chronic mastoiditis & CSOM while 8patients of them were diagnosed as having cholesteatoma. (Table 4.7 & fig 4.20).

These results were compared with the previous study of (Keskin 2011) who was studied 56 patients by helical CT and he found that there was 43 patients of ossicular erosion in their middle ear cavity whom diagnosed with CSOM in 13 patients of them with cholesteatoma and 30 without cholesteatoma. Scutum changes were detected in 16% of patients, 8% patients of them with partial erosion & another 8%patients with total erosion of the scutum as shown in fig (4.9), 12 patients of them were diagnosed by CT as having cholesteatoma while 4 patients of them were diagnosed as having chronic mastoiditis & CSOM (Table 4.8 & fig 4.21).

This study also relative to (Keskin 2011) who detect 35 patients of scutum erosion by helical CT, 28 patients of them were confirm by surgery.

The tegmen timpani erosion were detected in only 2% of patients as shown in table (4.9) & fig (4.22). Also this result was compared with (Keskin2011), there were no tegmen erosion in surgery among 11 patients whom diagnosed as having tegmen erosion by CT, but no tegmen erosion detected by surgery or CT among 44 patients.

Inner ear and external ear structures changes were very low (2% of patients & 6% of patients) respectively, table (4.10) & (4.11) figure (4.23 & 4.24). These results indicate that the middle ear structures were affected more than the inner and external ear structures, thus there was correlation between middle ear diseases and mastoid air cells diseases.

V. Conclusions

Spiral CT is an effective imaging modality in studying mastoid air cells diseases and their complications. The diseases of mastoiditis with CSOM had higher frequency and also their complications (ossicular erosion, scutum erosion, and loss of hearing). There was correlation between mastoid air cells diseases and middle ear diseases, and with the help of spiral CT it is possible to acquire multiple slices and understand the complex relationships of anatomic structures. CT with a spatial resolution below 1 mm, ≤ 2 mm slice thickness, wide window, having bone – detail reconstruction program, target reconstruction and high quality image reconstruction programs is very efficient in studing of mastoid air cells and middle ear pathologies. Using 3D, multi-planar reformation ~MPR! Techniques would be benefited to detect and diagnosed the complications of mastoid air cells diseases. The advent of high-resolution CT scanning has revolutionized diagnostic imaging of the temporal bone. Spiral CT scanning offers the greatest structural definition of any currently available imaging modality.

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The Effect of CDC Case Definition for HIV/AIDS on Mortality among Adolescents and Adults in the United States

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Abstract - Understanding the definition and meaning of HIV/AIDS have implications not only for HIV/AIDS research, clinical practices but also the overall impact on mortality. The definitions of HIV/AIDS have changed in addition to the concepts and terminology associated with when talking about the history of HIV/AIDS. Previous study utilized World Health Organization (WHO)case definition of HIV/AIDS in predicting the relative effectiveness of HIV among individuals with tuberculosis (Kennedy, Campbell and Malinda, 2004).Their findings suggest that WHO case definitions significantly predicted HIV/AIDS among TBpositive HIV-positive participants compared to TB positive and HIV-negative participants(Kennedy, Campbell and Malinda 2004). Previous studies also indicate that WHO (1986) case definitions of HIV/AIDS, although well developed and assessed its uses were prevented by the proliferation of counseling and HIVtesting centers, particularly in the developing countries (Harries 1990; Lipson at al. 1995).

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The Effect of CDC Case Definition for HIV/AIDS on Mortality among Adolescents and Adults in the United States

Adansi Amankwaa

I. Introduction

Understanding the definition and meaning of HIV/AIDS have implications not only for HIV/AIDS research, clinical practices but also the overall impact on mortality. The definitions of HIV/AIDS have changed in addition to the concepts and terminology associated with when talking about the history of HIV/AIDS. Previous study utilized World Health Organization (WHO)case definition of HIV/AIDS in predicting the relative effectiveness of HIV among individuals with tuberculosis (Kennedy, Campbell and Malinda, 2004).Their findings suggest that WHO case definitions significantly predicted HIV/AIDS among TB-positive HIV-positive participants compared to TB positive and HIV-negative participants(Kennedy, Campbell and Malinda 2004). Previous studies also indicate that WHO (1986) case definitions of HIV/AIDS, although well developed and assessed its uses were prevented by the proliferation of counseling and HIV-testing centers, particularly in the developing countries (Harries 1990; Lipson at al. 1995).

In contrast, other research shows the need to update case definitions of existing diagnosis criteria of the oral manifestations of HIV published in 1992 and 1993 (Shiboski et al., 2009). It was argued that the proposed case definitions were designed for large scale but not HIV/AIDS oral diseases that can be used by other researchers. It is important to note that changes in case definitions were largely due to clinical evidence. With no cure for the disease current case definitions are still been updated. Consequently, different case definitions and their conceptualizations may differentially affect the accuracy of diagnosis and mortality. To examine this possibility, further investigation is necessary in order to fully understand how CDC case definitions affect mortality. Specifically, I examined not only the effects of case definitions on mortality since time of diagnosis of HIV infection but also controlled for characteristics of patients. This article, therefore, extends current knowledge about AIDS related mortality by examining the relative risk of mortality of AIDS patients since their infection using CDC surveillance data.

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II. Background

Over the years CDC compiled clinical signs and symptoms for diagnosing HIV/AIDS since it was first identified in 1981. At first, the disease was associated with "opportunistic infections" – a term used to describe AIDS symptomatology. The disease was initially observed only in persons with drug-suppressed or otherwise severely compromised immune systems. However, as new understanding of the disease emerged, the initial definition was revised to reflect medical practice as well (CDC, 1986). In 1983 the Centers for Disease Control and Prevention (CDC) published its first set of guidelines for AIDS reporting (CDC MMWR, 1983). These guidelines were changed and updated in 1985, 1987 and 1993.

In 1984, the CDC renamed the first identified human T-lymphoid tropic type III virus as human immunodeficiency virus (HIV). To understand the nature of this powerful and untreatable disease, the CDC intensified its research to track the disease. The results of scientific research culminated in subsequent changes to the CDC surveillance definition for AIDS as more information about the virus and symptoms associated with it became available. This definition was also modified in 1985. In 1987, the CDC AIDS case definition was again revised to include a broader spectrum of diseases characteristically found in persons with HIV infection and the presumptive diagnosis of selected diseases (CDC MMWR 1987).Finally, in 1993 the CDC revised the definition of AIDS once again to include pulmonary tuberculosis, recurrent pneumonia and or cervical cancer (definitive and presumptive diagnoses) and severe HIV-related immune suppression.

Each of the revised case definitions for AIDS remarkably affected the distribution of AIDS cases reported. The differences incase definition for AIDS affected the number reported by gender, sexual orientation, IV-drug users, and by race (MMWR, 1989). Although HIV/AIDS-related deaths have been extensively estimated and or documented (CDC MMWR, 1999), mortality differences with respect to case definitions have not been examined. Given the differences in case definition of HIV/AIDS, it is worthwhile to examine the relative risk of mortality associated with varying definitions of AIDS.

III. Methods

a) Data

The data cover all patients in the CDC database between 1980 and 2002 [7]. Specifically, the CDC gathers data on HIV/AIDS from individual states and health departments in the country. The data also include changes in AIDS definition. However, only cases meeting the 1993 surveillance definition are included in the data set. The purpose of data collection on AIDS is primarily to monitor both trends and the scope of severity of morbidity due to HIV. In order to ensure data quality, the CDC carefully and continuously reviews data obtained from health departments of various states in order to ensure its consistency with standards of medical care for HIV-infected persons. Surveillance data include variables such as: age of patient, the CDC AIDS case definition revisions met by the patient, sexual classification of patient, race of patient, country of birth, AIDS-related deaths, mode of exposure to HIV, patient had more than one risk factor (i.e., additional risk factors), region of residence, and other behavioral risk factors.

IV. Measures and Variables

In this analysis, country of birth is represented here by a categorical variable coded as "1" foreign born and "0" U. S. born. Race is classified into five categories with white as the reference group, Black, Hispanic, and Asian Pacific Islanders and other racial groups coded as 1.Sexual classification consists of four categories with -- adult/adolescent male has sex with other men-- as the reference category. Time since diagnosis was computed from date since diagnosis was ascertained by the CDC for each AIDS-indicator disease and calendar year 2002.

The data set used in this study included cases which met CDC case surveillance definitions. Each of the categories used in this study included whether patients met any of the seven definitions provided below. Cases that meet more than one of the definitions provided were classified into the category list first. The following are seven case definitions for AIDS by CDC (see MMWR, 1992 for details):

1) Pre 1985 CDC case definition for AIDS included: *Pneumocystis carina* pneumonia, Kaposi's sarcoma, and other opportunistic infections.
2) In 1985 CDC expanded the definition to include three distinct types of lymphoma and opportunistic infections -- those caused by bacteria, fungi, protozoa, and other infectious agents.
3) In 1987 CDC again revised AIDS definition and placed emphasis on HIV infection status and 12 diseases diagnosed definitively
4) In 1987 CDC included in its definition for AIDS diseases diagnosed presumptively. Diseases classified under diagnosed presumptively include: Candidacies of esophagus, Cytomegalovirus retinitis, Mycobacteriosis Kaposi's sarcoma, lymphoid interstitial pneumonia, Pneumocystis carinapneumonia and Toxoplasmosis.
5) 1993 pulmonary TB, recurrent pneumonia, and invasive cervical cancer … definitive diagnosis but also retain 23 clinical conditions in the AIDS surveillance case definition of 1987.
6) 1993 presumptive diagnosis.
7) 1993 severe HIV related immune suppression.

Table 1 : Variable Definitions

Variable	Definition
Race	Race of respondent 1=White 2=Black 3=Hispanic 4=Asian/Pacific Islander 5=American Indian/Alaskan Native
Case definition revisions patient meets	1. Pre 1985 *Pneumocystis carina* pneumonia, Kaposi's sarcoma, and other opportunistic infections 2. 1985 expanded to include Kaposi's sarcoma , three distinct types of lymphoma and opportunistic infections -- those caused by bacteria, fungi, protozoa, and other infectious agents 3. 1987 diagnosed definitively 4. 1997 diagnosed presumptively

	5. 1993 pulmonary TB, recurrent pneumonia … definitive diagnosis 6. 1993 presumptive diagnosis 7. 1993 severe HIV related immune suppression
Age	*1. 0-19 years* *2. 20-29 years* *3. 30-39 years* *4. 40-49 years* *5. 50+ years*
Modes of Exposure	Exposure to HIV/AIDS 0=low risk (Hemophilia, heterosexual contact, blood transfusion, mother with or at risk for HIV infection etc 1= High risk (men have sex with men, injection drug use, MSM and drug use)
Additional Risk Exposure	Indicates if patient had more than one risk of exposure to HIV 0=single exposure 1=additional exposure
Sexual Classification	Sexual preference 0=had sex with both men and women, heterosexual 1= have sex with other men
Sex with Infected HIV/AIDS person	Sex with a person known to be infected with HIV/AIDS 0=No 1=Yes
Place of Birth	Country of birth 0=foreign born 1=U.S. born
Death	Vital Status of patient 0=Survive 1= died

The data for the analysis is "right" censored due to death (i.e., a case right-censored when time of death is known only to have occurred after time t). Patients whose death notification had not been received by CDC at the time of compilation of the data are coded 0 indicating the patient is alive while patients with death certificate are classified as dead. In this study the status variable is equals death or survival. For details regarding vital status classification see Morbidity and Mortality Weekly Report, 1997 and 1998.

b) Analytical Techniques

Two types of statistical analyses were used in this study. First, descriptive statistics such as percentages and Chi square test of independence were calculated. Second, because time of diagnosis is clearly a critical dimension of AIDS-related deaths, time at risk was therefore estimated from date of diagnoses to 2002. Since deaths for those in the surveillance data relates to time of diagnoses (time-to-failure), Cox Proportional Hazards are deemed appropriate for analysis. Therefore, Cox Proportional Hazards model was used to estimate those in surveillance who had not experienced the event between1980 and 2002. The probability of the endpoint (death, or any other event of interest, e.g. recurrence of disease) is called the hazard. The statistical analyses are structured in order to analyze differences in mortality and mode of exposure as depicted in Equation 1. The hazard is modeled as:

$$h(t) = h_0(t) \times \exp(b_1X_1 + b_2X_2 + b_3X_3 + \ldots. + b_kX_k) \qquad \text{Eq. 1}$$

Where $h_0(t)$ is the baseline hazard at time t, representing the hazard for a person with the value 0 for all the predictor variables. X_1 ... X_k represent the CDC AIDS case definition revision met by the patient, age at diagnosis, race, had sex with a person known to be infected with HIV or to have AIDS but whose risk factor is unknown, and country of birth. These are the predictor variables.

By dividing both sides of the above equation by $H_0(t)$ and taking logarithms, we obtain:

$$h(t) = \{ h(t) / h_0(t)\} = (\beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \ldots. + \beta_k X_k) \qquad \text{Eq. 2}$$

We call $h(t) / h_0(t)$ the hazard ratio. The coefficients $\beta_i...\beta_k$ are estimated by Cox regression, and can be interpreted in a similar manner to that of multiple logistic regression. With country of birth, a covariate (risk factor) coded 1 if present and 0 if absent, the quantity $\exp(\beta_i)$ can be interpreted as the instantaneous relative risk of death, at any time, for patients with the risk factor present compared with individuals who survived, given that both individuals are the same on all other covariates. On the other hand, for a covariate that is continuous, then the quantity $\exp(\beta_i)$ is the instantaneous relative risk of an event, at any time, for an individual with an increase of 1 in the value of the covariate compared with another individual, given that both individuals are the same on all other covariates.

The study examined three models describing the effects of case definitions of HIV/AIDS on mortality.

$$H(t) = h_0(t)\exp(\beta_1 \text{ CDHIV/AIDS}) \qquad (1)$$

$$H(t) = h_0(t)\exp(\beta_1 \text{ CDHIV/AIDS} + \beta_2 \text{Race} + \beta_3 \text{Age} + \beta_4 \text{Place of birth}) \qquad (2)$$

$$H(t) = h_0(t)\exp(\beta_1 \text{ CDHIV/AIDS} + \beta_2 \text{ Race} + \beta_3 \text{Age} + \beta_4 \text{Place of birth} + \beta_5 \text{Sex class} + \beta_6 \text{Sex with HIV}^+) \qquad (3)$$

Model 1 tests the effects of the CDC case definitions of HIV/AIDS (CDHIV/AIDS) on the instantaneous relative risk of death, at any time, for patients with the risk factor present compared with individuals who survived. The remaining two models include the CDC case definitions of HIV/AIDS, race, age, place of birth, sexual classification and had sex with infected HIV/AIDS person. All three models were modeled with time-varying covariates.

V. Results

Descriptive Findings: AIDS definitions, Race and Sexual behavior

Table 2: provides descriptive statistics for case definitions, race, sexual classification, patient had sex with infected AIDS person, and place of birth. Each of the variables percentage is shown with actual number of deaths in parenthesis. A comparison of the percentage of deaths varies with each revised definition. However, the findings suggest that the percentage of deaths decreased from a high of 54.9 for patients who meet pre-1985 CDC case definition compared to all subsequent definitions. A chi square procedure for independence was used to discover the relationship between the vital status of patients and case definitions (see Table 2). The overall chi square for independence, χ^2 (*of* 6, N=16,383)= 3063.10, p< .000, suggested that vital status of patient and case definitions of HV/AIDS were related. This implies that vital status of patient is influenced by case definition.

Table 2 : Vacate Distribution: Risk Factors, Characteristics By Survival

Variable	Vital Status of Patient		
	% Survives	% Died	χ^2 Test
AIDS Case meets			2974***
1985 definition	25.6	57.7	
1987 definition	13.4	22.7	
1993 definition	61.0	19.6	
Race			119.63***
White	37.4	45.7	
Black	41.6	36.4	
Hispanic	19.6	17.0	
Other	1.4	0.9	
Age of Patient			16.976***
0-19	1.8	1.2	
20-29	16.4	16.2	
30-39	43.5	43.6	

40-49	27.5	26.8	
50+	10.8	12.2	
Sexual Classification			182.25***
Had sex with men	34.1	43.4	
Had sex with both	11.6	11.9	
Heterosexual male	32.9	29.2	
Female both	21.4	15.6	
Sex with Infected HIV/AIDS person			269.69***
No	25.4	32.4	
Yes	16.7	8.9	
unknown	57.9	58.8	
Place of Birth			1.291
Foreign Born	13.9	13.3	
US Born	86.1	86.7	

*** p< .000

Table 2 also shows that AIDS patients who had a single risk of exposure were more likely to die than those who have additional risks of exposure. The probability that an individual AIDS patient chosen at random has sex with a person known to be infected with HIV or to have AIDS but whose modes of exposure is unknown and died from the virus is 8.9% compared to 32.4% of those who reported that they did not. Furthermore, the results displayed in Table 2 indicate that the relationship between patient's vital status and race is very strong. A chi square test of independence suggest that AIDS patients race is significantly related to vital status, χ^2 of 3, N=16,186)= 119.63, p< .000.

Covariates and their Differences across Racial categories

Table 3: shows summary statistics for age groups, case definition and multiple risk factors, and race. In this analysis, the effects of age case definition on the vital status of patients were examined while controlling for race. For instance, among AIDS patients who died of the disease, 68.9% who met case definition for 1985 were white compared to 49.2% blacks, 21.1% Hispanic and 63.4% other population groups. However, the percentage of patient's deaths associated with case definitions for 1987 and 1993 were higher for all racial groups compared to whites.

Information in Table 3 further illustrates the relationship between patients who had sex with persons known to have HIV and their vital status while controlling for race. The table shows that non-white patients who reported having sex with a person known to be infected with AIDS were more than twice as likely to die as White. For example, for those who died of AIDS-related complications,4.4% were whites, 12.6% black, 13.1% Hispanic and 10.8% were other racial minorities. The percentages are also noticeably different across racial groups for those who reported that they did not have sex with a person known to be infected with HIV. The results in Table 3 suggest that the percentage of deaths associated with those who reported that they did not have sex with a person known to be HIV positive was higher compared to those who did. Thus, regardless of patients' racial background, those who reported not having sex with a person known to be HIV positive were more likely to die than those who reported that they had sex with a person known to be HIV positive. Further evidence suggest that there is a relationship between patient status and whether or not respondents had sex with a person known to be infected with AIDS. The analysis suggests that patient's vital status is statistically related to modes of exposure when race is held constant. Overall, race is still a significant predictor of patient's vital status.

Table 3 : Age Group at Diagnosis of the First AIDS-Indicator Opportunistic Condition by Patient Status by Race/Ethnicity

Variables	Race of Respondent							
	White		Black		Hispanic		Other	
	% Survives	% Died	% Survives	% Died	% Survives	% Died	% Survives	% Died
Age Groups								
0- 19	1.0	0.5	2.3	1.9	2.6	1.8	1.0	1.2
20-29	15.4	16.3	16.2	15.7	18.5	17.4	23.1	14.6

30-39	46.0	43.5	40.6	43.1	44.5	44.7	48.1	45.1
40-49	27.4	26.5	29.4	27.7	24.4	25.5	18.3	24.4
50+	10.3	13.2	11.6	11.5	10.0	10.6	9.6	14.6
Definition								
Case meets pre 1985	28.9	68.9	24.5	49.2	21.1	45.6	32.7	63.4
Case meets 1987	12.1	17.1	12.5	25.7	17.4	31.1	13.5	20.7
Case meets 1993	59.0	14.0	62.9	25.1	61.4	23.2	53.8	15.9
Had sex with a person known to be HIV+ [b]								
No	32.7	39.2	19.3	25.5	23.4	27.6	36.5	41.9
Yes	9.2	4.4	21.1	12.6	22.1	13.1	13.5	10.8
Multiple Risk Factors [c]								
Patient has one risk factor	77.8	83.8	65.7	75.0	69.7	76.9	66.0	76.8
Patient has additional risk factors	14.7	12.7	14.1	15.8	16.8	17.6	12.6	17.1
Patient's HIV risk factor is not reported or identified	7.5	3.4	20.1	9.3	13.5	5.5	21.4	6.1

[a]Age groups: Whiteχ^2 =19.905; df=4; p = .001

CDC Defintion for AIDS – Whites χ^2 =1568.98; df=2; p= .000; Black χ^2 =925.32; df=2; p = .000; Hispanic χ^2 =448.281; df=2; p = .000; Other χ^2 =28.654; df=2; α = .000

[b]Had sex with HIV+ person: White χ^2 =80.77; df=2; p = .000; Black: χ^2 =97.419; df=2; p = .000; Hispanic: χ^2 =42.14; df=2; p = .000; Other: NS

[c]Multiple Risk Factors: White χ^2 =64.33; df=2; p = .000; Black χ^2=148.79, df=2, p =.000; Hispanic χ^2 =55.24; df=2; p = .000and Other χ^2 =8.66; df=2; p = .013

Figure 1 : Vital Ststus of Patient

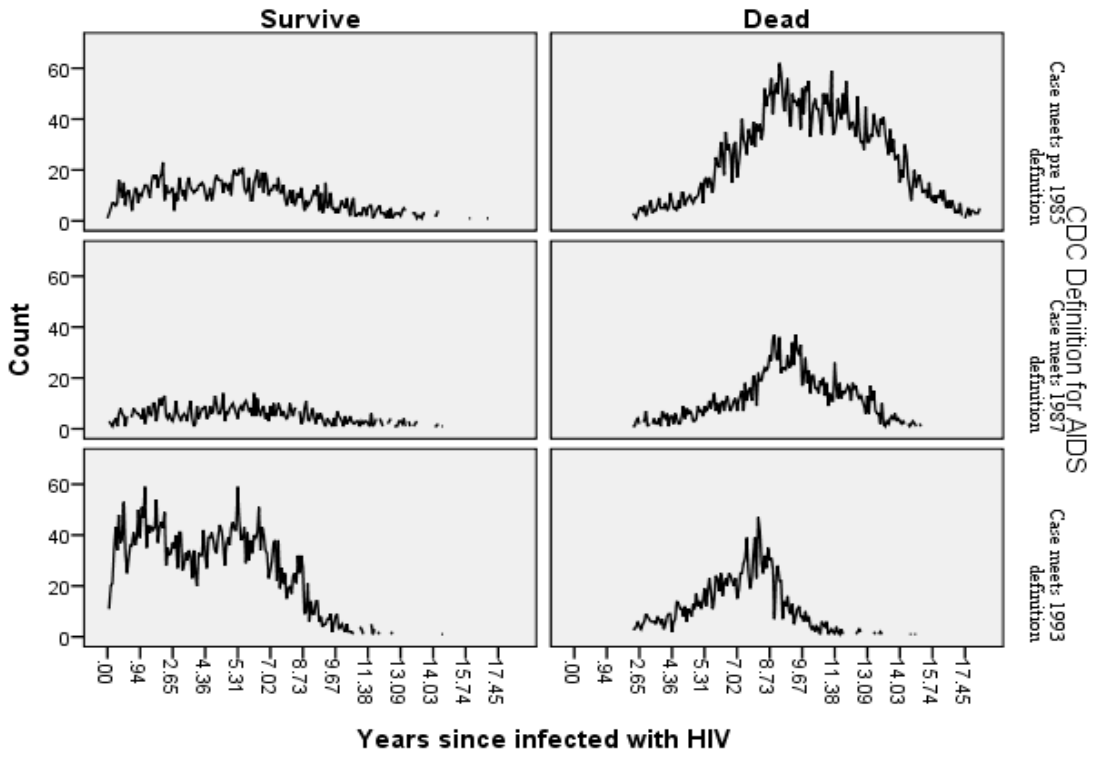


Figure 1: extends the analysis one step further by exploring patient's mortality patterns, cases definitions and years since infection. Figure 1 shows that mortality peaked between 7 and 8 years after infection for all the three summarized CDC case definitions. Of the three CDC case definitions, the number of HIV/AIDS related-deaths was higher for cases that met the pre 1985 definition compared to 1987 and 1993. Interestingly, the time it took from infection until patient's death varied with the CDC case definition.

Table 4 : Relative Risks of Hive/Aids Related Deaths in the United States

Cover its	Model 1		Model 2		Model 3		Model 4	
	Exp B	CI	Exp B	CI	Exp B	CI	Exp B	CI
Case definition revisions patient meets	1.000		1.000		1.000		1.000	
1. Pre 1985	0.730***	644-	2.160***	1.88-	2.012***	1.595-	1.925***	1.525-
2. 1985		.829		2.477		2.539		2.432
3. 1987 diagnosed definitively	0.940	.820-	1.085**	1.02-	1.251***	1.121-	1.272***	1.139-
	0.927‡	1.077	1.126	1.160	0.919	1.396	0.971	1.420
4. 1987 diagnosed presumptively		.850-		0.97-		0.709-		0.748-
		1.011		0..313		1.192		1.260
5. 1993 pulmonary TB, recurrent pneumonia … definitive diagnosis	0.874‡		0.834*		0.646**		0.673**	
	0.688*	.747-	0.947	0.687-	0.931	0.465-	0.944	0.484-
	0.978	1.023	0.906*	1.013	0.889	0.897	0.883	0.936
6. 1993 presumptive diagnosis		.487-		0.799-		0.698-		0.708-
		.972		1.123		1.241		1.260
7. 1993 severe HIV related immune suppression		.712-		0.811-		0.741-		0.735-
		1.344		1.011		1.067		1.060
Race of respondent								
1=White			1.000				1.000	
2=Black			1.179**	1.02-			1.151	0.938-
3=Hispanic			0.911	1.369			0.941	1.411
4=Asian/Pacific Islander/Other				0.813-				0.804-
			1.134***	1.021			1.184***	1.101
				1.061-				1.073-
				1.211				1.306
Age								
1. < 19 years			1.000				1.000	
2. 20-29 years			1.683***	1.484-			1.684***	1.148-
3. 30-39 years			0.898**	1.908			0.839	2.469
4. 40-49 years			0.971	0.807-			0.986	0.607-
5. 50+ years			0.964	1.000			0.968	1.160
				0.901-				0.807-
				1.046				1.204
				0.922-				0.882-
				1.008				1.063
Place of Birth								
0=foreign born			1.000				1.000	
1=U.S. born			0.943***	0.895-			0.946	0.870-
				0.993				1.029
Sexual Classification								
1. Adult/adolescent male had sex with other men					1.000		1.000	
					1.258***	1.160-	1.167***	1.072-

2. Adult/adolescent male had sex with both men and women					0.925*	1.363	0.970	1.270
3. Adult/adolescent heterosexual male					0.973	0.859-0.997	1.003	0.900-1.046
4. Female (both adult/adolescent and pediatric)						0.898-1.054		0.925-1.087
Sex with Infected HIV/AIDS person								
0=No					1.000		1.000	
1=Yes					1.264***	1.182-1.353	1.287***	1.202-1.378
-2 Log Likelihood	148979.547		149910.91		54844.159		54742.83	
Chi-square (df)	1053.109 (6) ***		1363.416 (14) ***		484.271 (10) ***		592.659.166 (18 ***	

***$p = .000$; ** $p = .001$; $.03 \geq$* $p \leq .02$; ‡$.06 \geq p \geq .06$

Multivariate Models of Case Definitions and Mortality

Table 4 presents results for the Cox proportional hazard models analyses of CDC case definitions of HIV/AIDS and relationships of covariates such as race, age, sexual classifications and place of birth. In Model 1, where case definition is the only covariate, mortality risks from time of diagnosis until death tend to decrease with each additional year compared to pre 1985 case definition. Relative risks are much lower for each revised definition for every year increase since time of infection. For example, a hazard ratio of 0.730 ($p< .0001$) suggests that there is a 27% ($p< .0001$) decrease in mortality for every additional year since infection for those who were diagnosed in 1985 compared to pre 1985. As expected, the hazard ratios for 1993 CDC case definition for presumptive diagnosis is 31.2% ($p < .03$) lower than pre 1985 for each year since infection.

In addition to Model 1, we implemented a series of models attempting to control for patients socio-demographic characteristics: race, age, place of birth, sexual classification and whether patients had sex with HIV/AIDS infected person. Model 2 for example adjusts for demographic factors (i.e., race, age and place of birth). The results show that mortality hazard ratios increased for 1985 and 1987 CDC case definitions compared to pre 1985, while hazard ratios for both 1993 remain stable. With respect to mortality, 1985 CDC case definition is associated with1.16% ($p< .0001$) increase in risk for every year increase since infection compared to the pre 1985 (reference category).

Model 3 introduces behavioral indicators (sexual classification and had sex with infected HIV/AIDS persons). Model 3 shows that the inclusion of behavioral factors did not diminish the effects of case definitions on the relative risks of mortality. Finally, Model 4 includes the full set of independent variables. Once again, the effects of CDC case definitions remain the same. Net of all the controls, with the exception of 1985 and 1987 diagnosed definitively, the hazard ratios were negative suggesting reduced mortality hazard.

The hazard function of time patients were diagnosed with AIDS until death are displayed in figures 2a and 2b. From the hazard curve, it is clear that predicted hazard function (where the hazard is mortality and time is years since infection) were indeed different for the case definitions of HIV/AIDS. In fact, the longer the time since patients were first diagnosed with AIDS the more their relative risk of mortality decreased. However, patient's relative risk of mortality varied according to case definition when holding constant other covariates.

Figure 2a

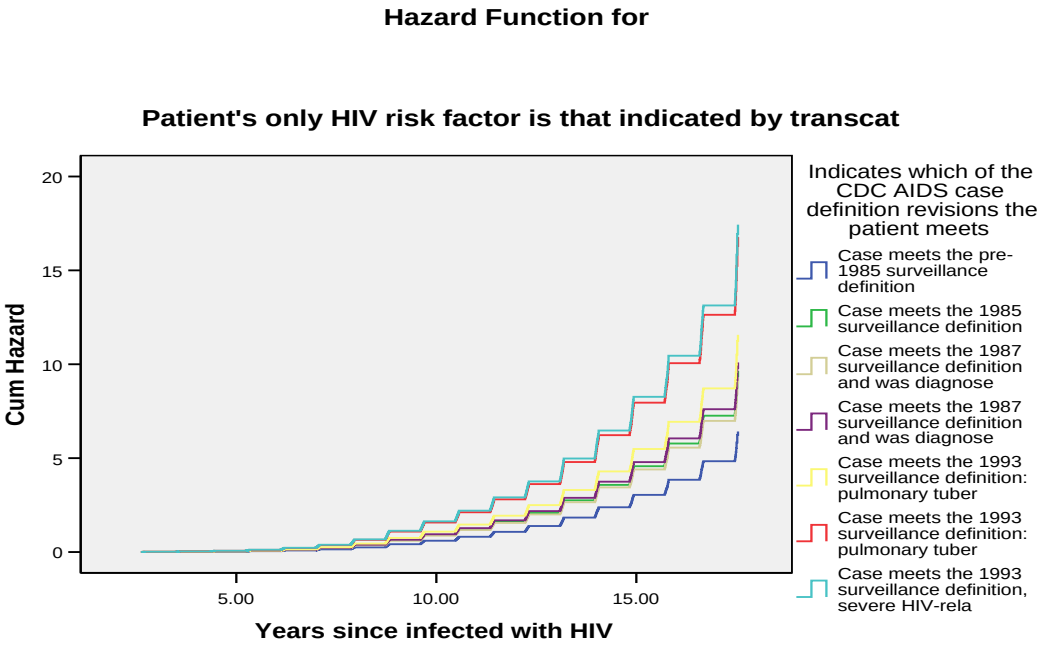
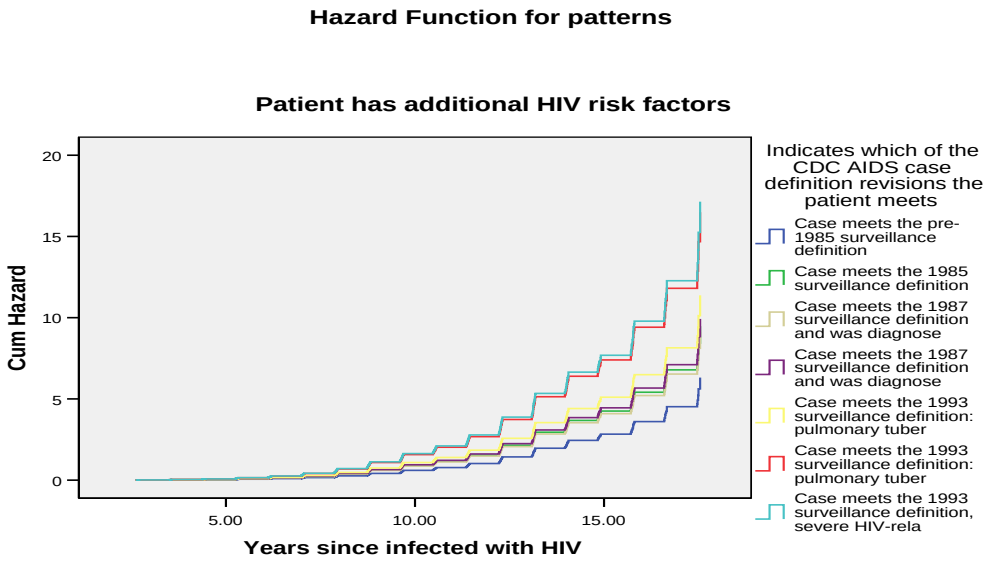


Figure 2a



VI. Discussion and Conclusions

The purpose of this study was to examine the relative risks of CDC case definition of HIV/AIDS on mortality. Our results presented in Model 1 (Table 4) indicate considerable lower hazard ratios for subsequent CDC case definitions of HIV/AIDS compared to pre 1985 for every increase in years since infection .The results suggest that CDC case definitions are associated with mortality risk in a graded manner.

To determine why CDC case definitions are associated with mortality, we controlled for socio-demographic variables. Our inclusion of socio-demographic covariates: age of patients at time of diagnosis, race, place of birth, and had sex with known HIV positive person at least illustrates the link between relative risk of mortality and CDC case definitions. Although mortality risk associated with HIV/AIDS may be declining with the introduction of anti-retroviral drugs and incessant publication of related health risks, there is

evidence from this study to suggest that mortality differences based on CDC case definitions may be attributable to socio-demographic factors. The overall model fits well as indicated by the -2 Log likelihood test of statistical significance as shown in Table 4.

Although the results suggest that the differences in AIDS definition affect risk of mortality, the finding may reflect the particular emphasis on "additional research information" about the virus and symptoms associated with it at that point in time. While case definitions provided by CDC are important, clearly understanding the impact of socio-demographic variables and changes in the definitions is an iterative process that needs further analysis. The point, however, should be clear: a more broadly defined and dynamic concept of HIV/AIDS may actually not lead to an increase in the risk of mortality but can be increased by socio-demographic variables.

Given the differential relative effects of case definition of HIV/AIDS on mortality, it is crucial that researchers and clinicians minimize ambiguity and clearly distinguished specific case definition of HIV/AIDS when performing HIV/AIDS analysis. At least for now, our findings highlight the importance of socio-demographic variables and serves as a useful guide for AIDS-related mortality studies in our struggle to better understand the role case definition plays in relative risks of mortality of infected persons.

VII. Conflict of Interest Statement

The contents of the manuscript represent the views of the authors and not those of the CDC. The authors did not receive any grant or funding from CDC to conduct this study.

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Helminth Infections in an Indigenous Community of Nepal: The Role of Individual and Household Socio-Economic Factors

By Gyawali, P., Khanal, S. & Soares Magalhaes, R. J
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Abstract - Background and Objective: In Nepal, gastrointestinal helminthiases are endemic in indigenous people living in low laying areas of the country. However, little is known regarding the role of different socio-economic indicators on helminth infections in these communities. The main aim of this study is to identify the relationship between socio-economic factors and helminth infection in an indigenous community in Nepal.

Method: A cross sectional survey was conducted in the Gaindakot Village Development committee, Nepal in July to August 2010. Total of 137 people of 10-60 years of age provided faecal samples for parasitology and answered a questionnaire on indicators of their socio-economic conditions.

Result: Overall 54.0% of individuals were positive for helminth infection. The higher (74.3%, 69.6%, 57.8%, 56.9% and 63.6%) infection rate was found in the people worked as a laborer, without sanitation, inadequate water source, living in a mudded house and sharing house with animals respectively. The results were statistically significant ($P < 0.05$) except water use and house type.

Keywords : *Helminth infection, Socio-economic factors, Indigenous population, Nepal.*

GJMR-F Classification : *NLMC Code: QX 200*

Strictly as per the compliance and regulations of:

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Conclusion: The individual and social behavior had important role in helminth infection. Hookworm infection could be reduced by improved sanitation facilities and the utilization of safe water sources. In addition, health education programs aimed at indigenous laborers is likely to play a significant role in the reduction of roundworm infection in the community.

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I. Introduction

Infections caused by gastrointestinal helminths are one of the most common health problems for poor people and are important causes of anaemia, malnutrition which may result in reduced physical and mental development [1, 2]. It is estimated that almost half of the worlds' population is infected by parasitic helminths at some point of their life [3]. Helminths infections are endemic in tropical and subtropical regions of the world [4] such as Nepal due to the warm and moist climate which is favourable for helminths. Socio-economic conditions can influence the social behaviour of individual with respect to access to primary health, primary education, improve sanitation and safe water, an important contributor of helminths infections [5, 6]. Helminths Infestations rate could increase into the individuals with lack of health education, poor sanitation, lack of safe water supply, primary health, household hygiene and personal behaviour [7, 8].

Indigenous population covers 38.8% of total population of Nepal. Majority of them live in extreme poverty and deprived socioeconomic conditions of landlessness. As a result, they are unable to access primary health care, basic education and safe drinking water [9, 10]. They often share their house with domesticated animals such as goat, pig, poultry, cow and buffalo. Access to sanitation is also nonexistent and waste disposal is often done at the bank of water course or at the edge of the forest [11, 12].

Gastrointestinal helminth infections rank fourth in the top ten infectious diseases in Nepal with 100% prevalence in some indigenous communities [12]. There had been very few studies conducted the epidemiology of helminth infections in Nepal [13-15]. These studies had shown the prevalence rate of helminth infection in different communities. However, there has not been a single study to date looked at the relationship between socio-economical condition and helminth infection in indigenous communities of Nepal. In this study, we aimed to quantify the role of individual and household socioeconomic indicators in helminth infection of indigenous population of Nepal. Studying these effects is important as these are modifiable factors and could improve the effect of helminth infection if acted upon.

II. Methods

a) Ethics Statement

This ethical approval to conduct the study was obtained by the Tribhuvan University, Institute of Agriculture and Animal Science Chitwan, Nepal. Prior to enroll in the study, purpose and procedure of the study

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was disclosed to all individuals (male, female and children) in their language. Written consent was obtained from all individuals participating in the study. In case of individuals under 16 years of age, written consent was signed by a parent or a caregiver on their behalf.

b) Study area and population

This study was conducted in the indigenous population of Gaindakot Village Development Committee (VDC), Nepal. It is located (27º43′15.27″N and 84º22′27.20″E) 130 km southwest from Kathmandu, capital city of Nepal. The geographical location of the survey site can be seen in Figure 1.

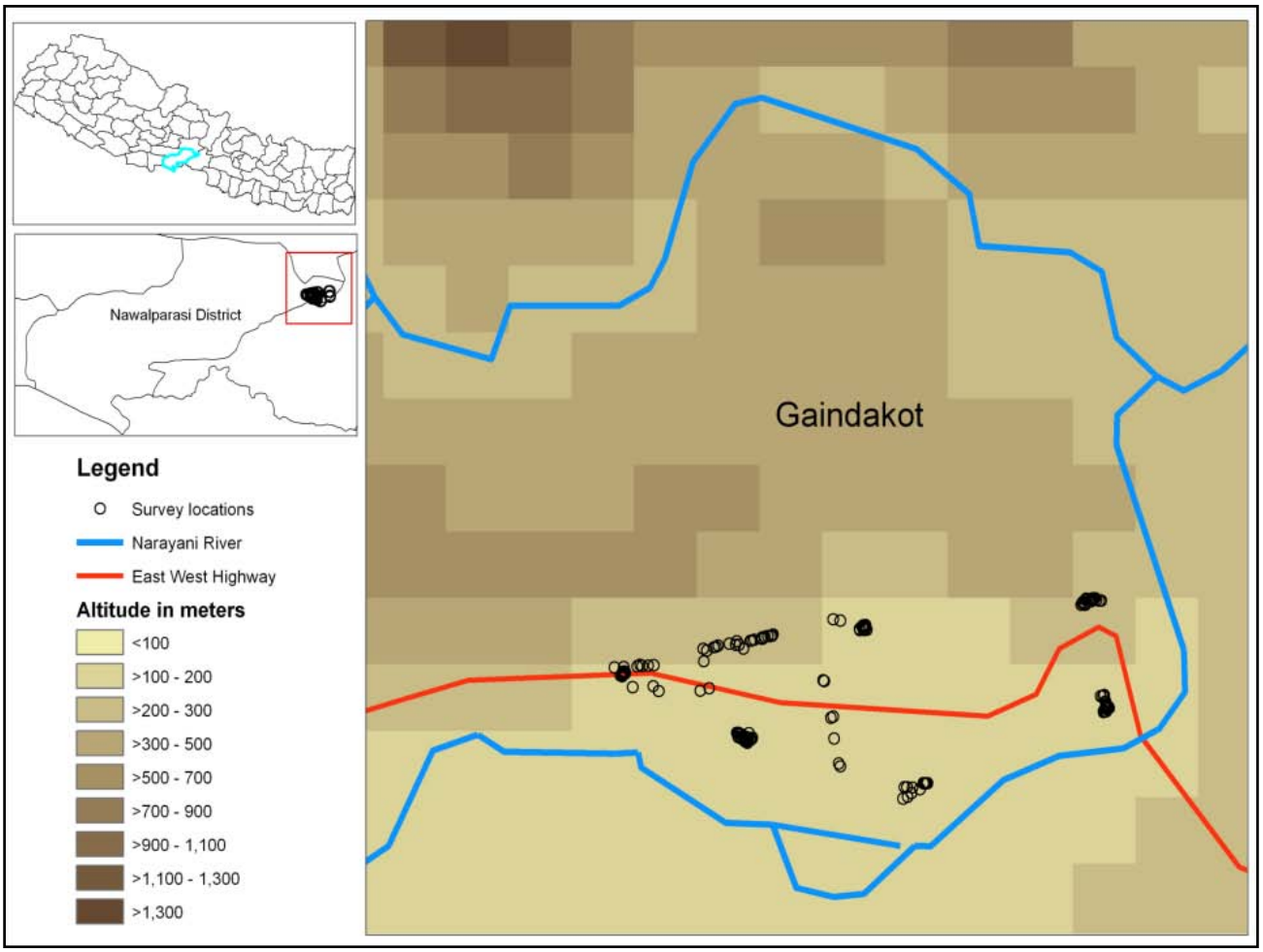

Figure 1: Study Area

Indigenous people of the study area have limited access to the health service, education and safe drinking water due to the higher cost of those services in Nepal [6]. Health care practices of these communities depend upon native plants and traditional healers known as Dhami and Jhakri who perform ancient rite of protection, blessing and healing [16].

c) Data Collection

A community based cross-sectional parasitological survey was conducted in July to August 2010. Individual and household socio-economic data such as occupation, sanitation, water source, house type and sharing house with animals were collected by mean of questionnaire. Each socio-economical variable divided in groups such as, occupation was divided in to professional (office worker), student and laborer (agriculture and construction). Similarly, sanitation was divided in to permanent, temporary and open field. Water source was divided in to pipped and open water (river, pond, lake), house type was divided in to concreted (cement and brick) and mudded (bamboo and mud), house sharing with domestic animals was divided in yes (in same house) and no (in different house). One house one individual system was applied for the study. The questionnaires were administered after consent to obtain faecal sample was signed by the individual. Labelled sterile sample vials were handed to the individual with clear instructions on how to collect

the sample. Faecal samples were collected early next morning by the research team member. The collected samples were then transported to the laboratory of Institute of Agriculture and Animal Science, Chitwan, Nepal. Magnesium floatation method [17] was applied to extract helminths eggs from samples and microscopic observation was conducted. All the results from microscopy and questionnaires were stored into a Microsoft Excel spreadsheet.

d) Statistical Analysis

Existence of helminths eggs in stool was used as the outcome variable thus all subjects were categorized into infected and not infected based on the presence of at least one parasitic helminths egg. A chi square test was conducted to test the statistical significant within the socio-economic variables. A student t-test was performed to determine the significant difference between male and female population. Pearson correlation test was conducted to establish the relationship between socio-economical variables with helminths infection rate. Multivariable statistical models were developed. Univariate logistic regression models for a Bernoulli-distributed outcome and cluster correction by neighborhood using robust standard errors were built to screen variables for inclusion in the final multivariable model.

III. Result

a) Data for Analysis

A total of 137 faecal samples were collected from female (n=70) and male (n=67) of different (10-60 years) age group and occupations. Occupation wise more than half (54.1%) study people were worked as a labourer; only 18.2% people were worked in office environment. Similarly, 50.4% people disposed their excreta in open fields near the river or edge of forest, 65.7% people did not have access to piped water and used open water source for everyday purpose. Furthermore, 84.7% people live in the mudded house and 56.2% share their house with domestic animals (Table 1).

Table 1: Socio-economic condition and helminth infection

Socio-economic variabls		Obs (n)	Pos (n)	+ve (%)	P-value	r
Occupation	Professional	25	8	32.0	$P < 0.05$	0.99
	Student	38	11	28.9		
	Labourer	74	55	74.3		
Sanitation	Permanent	29	9	31.0	$P < 0.05$	0.99
	Temporary	39	17	43.6		
	None	69	48	69.6		
Water source	Pipped	47	22	46.8	$P > 0.05$	1
	Open source	90	52	57.8		
House type	Concreted	21	8	38.1	$P > 0.05$	1
	Mudded	116	66	56.9		
House sharing with animals	Yes	77	49	63.6	$P < 0.05$	1
	No	60	25	41.7		

r = Pearson correlation coefficient

b) Role of individual and household socioeconomic factors

Overall, the helminth infection rate was very high (54.0%) in the community. Lack of education had significantly increased the helminth infection rate in the study population. People worked as a labourer had the highest (74.3%) rate of helminth infection followed by people worked in the office environment (32.0%) and students (28.9%). The result was found to be statistically significant *($P < 0.05$)*. Similarly, improve sanitation and water supply had played crucial role on helminth infection in the community. The infection rate was greater (69.6%) in the group of people used open field as a night soil disposal place than group of people who had temporary (43.6%) and permanent (31.0%) sanitation in place. The result was found to be statistically significant *($P < 0.05$)*. People used an open source of water for daily purposed had higher (57.8%) infection rate than pipped water user (46.8%) however the result was not found to be statistically significant *($P > 0.05$).* Similarly, household hygiene, mudded house and sharing the house with domesticated animals had proven to be favorable for helminth infection in the study area. The mudded house dwellers had higher (56.9%) infection rate than the people lives in a concreted house (38.1%) but the result was not found to be statistically

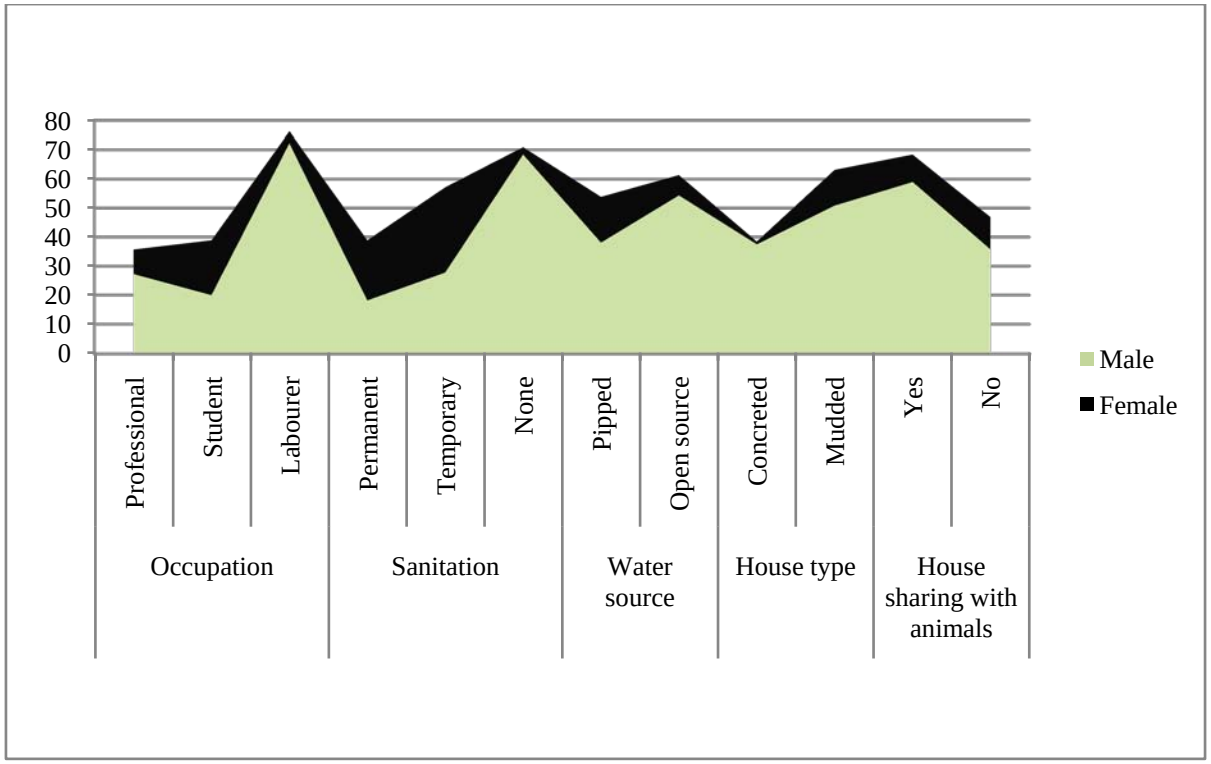

Figure 2: Gender wise infection ratio in socio-economical aspects

significant *(P > 0.05).* Similarly, sharing the house with domesticated animals had increased rate (63.6%) of helminth infection than those who did not share their house with domesticated animals (41.7%) and the results were statistically significant *(P < 0.05)* (Table 1).

Overall, the infection rate was found to be higher (58.6%) in female population in comparison to (49.3%) their male counterpart. The male dominant society had influenced the infection rate one way or another. In every aspects of socio-economical variables, females had higher infection than male (Figure 2). However, the results were not statistically significant.

The multivariable models of hookworm and roundworm infection also show that occupation was also significantly associated with hookworm and roundworm infection. While in the hookworm model students were at more risk of infection compared to professionals. In the roundworm model those with laborer were at increased risk of infection compared to professionals *(P=0.001)*. The results also showed that water source and sanitation were associated with increased risk of hookworm infection; an association was significant for sanitation *(P<0.05)*. Interestingly, hookworm infections were marginally more likely in areas closer to the river and roundworm were significantly more likely to be associated with lower altitudes *(P = 0.005)* (Table 2).

IV. Discussion

Access to improve water, sanitation facilities and personal hygiene has long been known as important contributing factors for parasitic helminth infection in communities [5, 18]. Majority of the indigenous people could not afford proper education due to the increasing cost of living in Nepal. Most of their income spent on daily needs. Working in agricultural farm,and construction has become their livelihood which increased the risk of exposing themselves with helminth contaminated soil and water [19]. The more exposure in the contamination had directed them to the higher infection rate. Due to lack of health education, people become unaware of epidemiology of helminth parasites and personal hygiene that could elevate the infection in the community people. Asaolu and Ofoezie (2003) mentioned that the health education can be used as a strong tool for reducing helminth infection and helps changing individual behaviour.

Disposing night soil on the open field means harvesting the helminth parasites because soil is good habitat for the helminths to remain viable for long period of time [13]. Inadequate sanitation increases the chance of contamination and increases the risk of helminth infection [21]. Weather events such as rainfall can wash off parasitic eggs from soil to waterways and increase

the risk of infection through water in the community. In addition, people without sanitation had to visit open places regularly to dispose the night soilcould increase the chance of contaminating helminth parasites into them. That would indicate the higher infection rate in the study people who did not have proper sanitation.

Table 2: Multivariable models of hookworm and roundworm infection

Socio-economical status		Hookworm			Roundworm		
	Variable	Coefficient	95%CI	P-value	Coefficient	95%CI	P-value
Occupation	Labours Vs Professional	0.71	-0.29 - 1.71	0.17	2.57	0.98 - 4.15	0.001
	Students Vs Professionals	1.32	-0.13 - 2.76	0.07	-	- - -	-
Sanitation	Permanent Vs Open field	-2.78	-4.59 - 0.97	0	-	- - -	-
	Temporary Vs Open field	-1.46	-2.46 - 0.45	0	-	- - -	-
Water Source	Pipped Vs Open source	-0.9	-1.98 - 0.08	0.07	-	- - -	-
House Sharing with Animals	Yes Vs No	-	- - -	-	1.31	-0.16 - 2.78	0.08
Distance to River		-79.5	164.09 - 5.1	0.07	-	- - -	-
Altitude		-	- -	-	-0.07	-0.12 - 0.02	0.005

The study demonstrated that the type of water source used by people had played an important role in helminth infection. The helminth infection was higher in those with open water sources compared to those with piped. Affordability of safe drinking water through piped infrastructures was very minimal in the study area. People used river where they disposed night soil or in underground ponds as a source of water without realizing the contamination on them. Laundering and swimming in the river is almost tradition among the study people. However, some of the study population had access of piped water, those water were collected from creeks, up on the hill and never been tested for contamination. The tradition of disposing night soil at the bank of river and edge of the forest could contaminate the pipped water source as well. The people who used open water source have higher infection because they spent more time in river and pond and expose themselves to the helminths parasites. However, the cost of pipped water forced them to find alternative water source. As a result pipped water user also visit to the river for swim and laundry purpose and ultimately victimized themself to helminth infection. Previous independent studies [22, 23] suggested time of exposure and concentration of contamination eventually increased the risk of helminth infections.

People living in a mudded house and sharing with domestic animals were more likely to have helminth infection than people lived in a concreted house. It could be the result of frequent maintenance required for mudded house than concreted house. Large volume of water and soil would require maintaining a house. Using contaminated water and soil to build and maintain the house is almost harvesting parasites in the house because helminth parasites remain viable for long time in soil [13]. By doing so, people could increase the risk of helminth infection. Sharing a house with domesticated animals is a good indicator of the poverty and poor hygienic condition of the household. Our results showed that sharing accommodation with domesticated animals were at increased risk of helminth infection. Domestic animals such as pig, poultry frequently visit to the night soil disposed area for food and can carry infective ova or larvae into the house [24] that increases the chances of exposure to parasites. Similarly, goats, cows and buffalos like to graze in the heavily grassed area. Night soils have high organic fertiliser which helps grass to thrive[25] - by grazing heavily grassed area those animals (cow, goat) can easily bring parasites to house and infect people[26]

This indigenous community was a male dominant community. Females are the most disadvantage group of member in the family, they are forced to leave school, marriy in early age and involved in household work such as cooking, cleaning,

washing, laundering as well as working as an agricultural laborer in spare time. A mudded house require regular swiping increased and thus the risk of infection. Laundering, cooking and cleaning require frequent exposed to the contaminated water for long time. This traditional custom had led increased risk of helminth infection in women. Previous studies showed that indigenous women also go to the river for laundry and in doing so they increase the chances of being exposed to parasites eggs [22, 27]. That could be the consequence of female having higher infection rate than male in all scioeconomical aspects.

Multivariable model also suggested that students (in case of hookworm) and professionals (in case of roundworm) had less risk of infection than illiterate people who worked as agriculture and construction labourer. These findings suggest that occupational exposure may be an important driver of roundworm epidemiology in this indigenous population of Nepal. These findings may also be an indirect indicator of the level of education in the population regarding roundworm and hookworm infection which has been reported to play a vital role in reducing helminth infections [5, 28].

The model showed that hookworm infection is elevated with the poor sanitary condition and marginally high with water source than other infection. This might be the case of the mode of transmission of the hookworm. Hookworm can easily transmit through the skin as well as oral ingestion but other parasites only transmit through oral ingestion [1]. This model showed that hookworm infection was marginally associated with the proximity to the river but roundworm infection was significantly associated with altitude. Based on our results hookworm infection was common closer to the river bank which may suggest exposure to hookworm larvae at river banks during walking to find night soil disposal spot every day. Furthermore, sandy soil has been shown to be favorable for the development of hookworm infective larvae [24, 29] and therefore the river bank may constitute a suitable environment for survival of hookworm larvae. On the other hand roundworm larvae require temperatures between 26-32°C to developed [30] and our finding that higher infection risk at lower altitudes might indicate suitable areas of exposure of laborers.

V. Conclusion

Helminth infections, particularly hookworm and roundworm are endemic in this indigenous population of Nepal and socio-economic conditions play an important role in helminth infections in this community. In addition, improve sanitation, improve drinking water, education can help to fight against the helminth infections. The effect of individual and household socioeconomic indicators remarkably differs between hookworm and roundworm infection. Household variables as well as individual level variables are good predictors of hookworm infection. In case of roundworm, individual level variables related to the public domain such as occupation (and possibly hygiene behavior) constitutes better predictors. Further studies are required to understand the best combination of water, sanitation and hygiene/health promotion interventions for the effective control of helminth infections in this population with important repercussion for the control of helminth infections in other indigenous communities of Nepal.

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Conflict of Interest:

The authors declare that there is no conflict of interest.

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Assessment on Magnitude of Needle Stick and Sharp Injuries and Associated Factors among Health Care Workers in East Gojjam Zone Health Institutions, Amahara Regional State, Ethiopia

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Abstract - Introduction: Needle sticks and sharp injuries (NSSIs) have been recognized as one of the occupational hazards among health care workers. Occupational exposures to percutaneous injuries are substantial source of infections with blood borne pathogens among health care workers.

Objective: The main objective of this study is to determine the prevalence and factors associated with needle stick and sharps injuries among health care workers.

Methods: An institutional based cross sectional study design was conducted among health care workers who are working at least one year in east gojjam zone health institutions. A total of 449 study subjects were selected using simple random sampling technique through lottery method and included in the study. Data was collected using pretested Amharic version questionnaire through self administered interview of study subjects. To maintain the quality of data, pretesting, use of local language and supervision of data collection process was done. The collected data was cleaned, entered and analyzed using SPSS version 17 statistical software.

Keywords : needle stick/sharp injuries, factors associated, health care workers.

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The collected data was cleaned, entered and analyzed using SPSS version 17 statistical software. Descriptive part of the result was presented using frequency tables, graphs and for the analytic part, association between dependent and independent variables was checked using binary logistic regression and p value less than 0.05 as significant level at 95% CI. Multivariate logistic regression was done to see the interaction effect of confounding variables.

Result: This study revealed that from 449 selected study participants, 432 (96.2%) were responded the questionnaire. From the total study participants, 295 (68.3%) were from health centres and 137 (31.7%) were from hospitals. The one year prevalence of sharp and needle stick injury was 22.2%. The multivariate logistic regression indicated that sex of the worker(AOR:2.46,95% CI (1.37,4.42)), monthly salary (AOR:2.96,95% CI (1.57,5.24)), information access on health and safety (AOR:2.31,95% CI (1.37,3.95)), sleeping disturbance problem(AOR:2.81,95% CI (1.57,5.04)), Job sati sfaction (AOR:0.38, 95% CI (0.23,0.65)) and Job stress (AOR:2.22,95% CI (1.32,3.74)) were the predictors of sharp and needle stick injuries. Conclusion: In this study, the prevalence of sharp and needle stick injury had showed a decrease in magnitude from the previous similar study results. Job stress, job satisfaction, having sleeping disturbance problem, having health and safety information access and low monthly salary had showed a significant association with the occurrence of sharp and needle stick injury.

Keywords : needle stick/sharp injuries, factors associated, health care workers.

I. Introduction

Needle sticks and sharp injuries (NSSIs) have been recognized as one of the occupational hazards among health care workers [1]. Occupational exposures to percutaneous injuries are substantial source of infections with blood borne pathogens among health care workers and can cause substantial health consequences and psychological stress for Health Care Workers and their loved ones [2]. Needle sticks and sharp injuries increase risk of spread of diseases like HIV, Hepatitis B and Hepatitis C [3, 4].

Strategies are available to prevent infections due to sharps injuries including education of Health Care Workers on the risks and precautions, reduction of invasive procedures, use of safer devices and procedures and management of exposures. In the industrialized world, occupational surveillance assess and monitor the health hazards related to blood borne pathogens and prevention measures reduce the risk of transmission. In contrast, in developing countries, exposure and health impacts are rarely monitored and much remains to be done to protect Health Care Workers from such risks that cause infections, illness, disability and deaths that may in turn impact on the quality of health care [5].

Studies have shown that reductions of 83% and 89% in the number of needle sticks after the introduction of safety engineered intravenous catheters [6,7] and 74% reduction in the number of injuries from needles for drawing blood after the introduction of safety engineered alternatives [8]. A study done among Health Care Workers in Malaysian Hospital reported that, 66.1%

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had the misconception that needles should be recapped after use and 52.5%know about needleless safety devices [9].

Studies done in different countries indicated that the magnitude of needle stick or sharps injuries among HCWs was very high [9, 10, 11, 12, 13]. A study done among Health Care Workers\s in Malaysia in 2008 indicated that the prevalence of needle stick or sharps injury was 23.5% [9]. Also studies done among HealthCare Workers in a general hospital in Malaysia in 2005, Saudi Arabia in 2002, Nepal in 2003 and Iran in 2009 showed aprevalence rate of 24.9%, 74%, 74% and 39.4% respectively [10, 11, 12, 13].

Needle stick injury exposure in African countriesis higher than elsewhere and a significantpublic health issue due to the fear of occupational infections faced by ill paid, ill protected and overworked health-care workers. Similar studies in Ethiopia show that 32% of the needle stick injuries were reported in the Sidama zone, 31% in north western Ethiopia and 66% in 52of the health facilities. [22]

Certain groups of individuals are at greater risk than others because of the nature of their work. [16]. Medical, dental, nursing and midwifery workers are at higher risk for occupational exposure to blood borne pathogens via sharp injuries [13]. A study conducted among Malaysia hospital workers reported that medical assistants appeared to face the highest risk of needle stick injury followed by nurses, doctors and health attendants [18]. On the other side, numerous studies have found nurses to be the commonest group of Health Care Workers experiencing needle stick injuries [16].

Out of the total of 94 documented and 170 possible cases of occupational HIV infection had been identified worldwide up to 1997, nearly two thirds of cases were reported from the United States [20]. This could be due to the fact that most countries, especially those with a high population prevalence of HIV infection, have never instituted surveillance systems that would capture data on such case [21]. Needle stick and sharp injuries need to be reported to the relevant authorities so as to facilitate and ensure appropriate counselling; prophylaxis orearly treatment .But most health care workers expose themselves with unnecessary risk of not reporting thus depriving themselves of the benefit of intervention [9].

Ethiopian government is currently expanding health institutions in all parts of the country and a number of health professionals are employed in these institutions to provide health car services. Their working environment must be safe and free from occupational hazardse specially from Needle stick and sharp injuries. But asfar my knowledge is concerned there is no scientific study which indicates the magnitude of the problem and its determinant factors in Amahara regional state. As a result this study is designed to investigate the prevalence and associated factors of Needle stick and sharp injuries among health care workers in governmental health institutions east gojjam zone. The result of the research is very important for policy makers, program implementers and workers to reduce the problem.

II. Methodology

a) *Study Design*

An institutional based cross sectional study design was conducted among health care workers.

b) *Study area and period*

This study was done among Health Care Workers in east gojjam zone from September to October 2012. The capital city of east gojjam zone, Debre Markos own is found 292 kilometers away from Addis Ababa, capital city of Ethiopia. East gojjam zone is one of the 11 zones in the Amahara regional state. According to the 2007 census report, it has a total population of 2,152,671 of which 1,066,094 are males and 1,086,577 were females. According to east gojjam zone health bureau report, the zone has two hospitals and 32 health centers.

c) *Source Population*

Source population are all clinical health care workers who are working in east gojjam zone governmental hospitals and health centers.

d) *Study Population*

Study population are the selected Health Care providers who are working at least for one year in hospitals and health centers.

e) *Sample size determination*

Sample size was determined using the following single population proportion formula with an assumption of significance level 95%, degree of error 5% and proportion of Needle Stick and Sharps Injuries among health care workers was 23% [9].n = (1.96)2 (0.23) (0.77) = 272(0.05)2 Since we have used multiple stages to get the study subjects, the sample size must be multiplied by a design effect of 1.5 and with 10% contingency for non-response rate, a total of 449 study subjects were included in the study. First, health care facilities were divided into two i.e health centres and hospitals..Proportional allocation was done for hospital and n= (Z _/2) 2 *P (1-P)d2 health centre workers and using random sampling technique 8 health centres from the total 32 health centres and one hospital from the total two hospitals were selected. Finally, proportional allocation was done for each professional category and study subjects from each health institution was selected randomly.

f) *Data Collection*

A pretested and structured Amharic version questionnaire was used to conduct self administered

interview among the selected Health Care Workers. Data was collected through self administered questionnaire. Data collection process was supervised by one supervisor from each health institution. Data was collected on sociol demographic characteristics of respondents, work environment determinant factors and behavioral determinant factors. Job stress and job satisfaction of respondents was assessed using standardized workers response questionnaire scales.

g) Study Variables

The outcome variable of this study is needle stick and sharp injury status and the explanatory variables are

- ***Socio demographic factors*** like sex, age, religion, ethnicity, marital status, level of education, monthly salary, work experience in years
- ***Work environment determinants*** like health and safety information access, and injection safety training, workplace supervision, working department
- ***Behavioural determinants like*** Alcohol consumption, khat chewing, cigarette smoking, sleeping disorder, job satisfaction, job stress and personal protective equipment use.

h) Operational Definition

- ***Needle sticks and sharps injury:*** Any kind of injury which is occurred on the health care worker in relation to his/her job in the health institution within 6 months period.
- ***Job Satisfaction:*** A worker who have scored above or equal to the mean score was considered to have job satisfaction and below the mean score was considered to be dissatisfied by his/her job.
- ***Job Stress:*** A worker who have scored above or equal to the mean score was considered to have a problem of job stress and below the mean score was considered to have job stress.
- ***Health and Safety Information:*** A worker who have got any kind of information in-one year period through any kind of media about health and safety of health care workers.
- ***Health and Safety Training:*** Trainings given to a worker about health and safety to health care workers.
- ***Work Place Supervision:*** workers perceived regular supervisions done by health and safety responsible bodies in the department and working rooms.
- Sleeping problem: The presence of sleeping problems when the worker is at work in the health care unit.

i) Data management and quality control

The question naire was administered through Amharic version questionnaire. Sort of orientation was given on he aim of the study and procedures how to fill the questionnaire. Pre testing was doneon 10% of the sample size who are working in health institutions not included in the study and modifications of the questionnaire were under taken. The collected data was checked for completeness every day by the supervisors and principal investigator.

j) Data processing and analysis

Data was entered and analyzed using SPSS version 16 windows and descriptive statistics, binary logistic regression and multiple logistic regressions was computed at 95% CI to identify predictors of needle stick and sharps injury status with p value less than 0.05 as a significant level. Crude and adjusted odds ratios with confidence interval were calculated to see the presence of the association with the outcome variable and to observe the interaction effects of confounding variables, respectively.

k) Ethical Clearance

Ethical clearance was obtained from the institutional review board of Debre Markos University. Permission to conduct the research was also obtained from, east gojjam health desk and from respective districts and health institution. Verbal consent was obtained from each study participants. Participation were informed through SSS the questionnaire about the interview based on willingness, the right to withdraw at any time and confidentiality was ensured using code numbers, not using identifiers and keeping questionnaires locked.

III. Result

a) Socio demographic characteristics

From the total 449 study subjects, 432 (96.2%) of them were included in the study. Among these 295 (68.3%) were from health centres and 137 (31.7%) were from hospital. The mean and median age of the workers is 33.32 and 26 + 1.3 years, respectively. From the total 8respondents 247 (57.17%) were male health care workers and 402 (93%) were Orthodox Christians by religion. One hundred ninety four (45%) were married and the mean monthly salary of workers is 1528 Ethiopian Birr. Workers have a mean work experience of 6.2 years in health institutions. From the total health care workers included in the study 212 (49 %) were nurses by profession. The table below indicates the socio demographic characteristics of health care workers.

Table 1 : Socio demographic characteristics of health care workers in west gojjam zone, Amahara regional state, Ethiopia, November 2012

Variables	Category	Number	Percent
Sex of worker	Male	247	57.17
	Female	185	42.82
Age of worker	Above mean (>33.3 years)	374	86.57
	Below mean (≤33.3 years)	58	13.43
Religion	Orthodox	402	93.06
	Muslim	13	30.09
	Protestant	17	3.93
Marital status	Married	194	44.90
	Single	216	50
	Divorced	22	5.1
Monthly salary	Above the mean (>1528 ETB)	236	54.63
	Below the mean (≤1528 ETB)	196	45.37
Work experience	Above the mean (>6.2 years)	339	78.47
	Below the mean (≤ 6.2 years)	93	21.53
Educational status	Less than grade 10	6	29
	Certificate	9	20
	Diploma	64	206
	First degree	15	77
	Medical doctor	2	4
Health care worker Profession	Cleaner	76	17.6
	Nurse	212	49.0
	Health officer	43	10.0
	Medical doctor	5	1.2
	Midwifery	18	4.2
	Laboratory	63	14.6
	Other*	15	3.5

*it refers to pharmacy, environmental health, optometry

b) Working Environment Characteristics

From the total health care workers, 295 (68.3%) were working in health centres and 328(75.9%) worked in the night shift the previous years. From the total respondents, 231 (53.47%) had got information about infection prevention and 357 (82.64%) knew that there is a safety rules and regulations in their institution. One hundred forty three (33.1%) had got training on infection prevention and 184 (42.6%) had been supervised by the concerned bodyon the application of infection prevention principles and rules. Among the total respondents, 360 (83.3%) have safety box in their working rooms to dispose infectious wastes including needle stick and sharp materials and 87 (20.1%) of the respondents had reported that there are contaminated needle stick and sharp materials around their working area. From the total respondents, 304 (70%.4) had reported the safety box had torn out.

Table 2 : Workers behaviour characteristics of health care workers in west gojjam zone, Amahra regional state, Ethiopia, November 2012

Variable	Response	Number	Percent
Working institution	Health centre	295	68.3
	Hospital	137	31.7
Night shift work	Yes	328	75.9
	No	104	24.07
Health and safety information access	Yes	231	53.47
	No	199	46.06
Training on infection prevention and control	Yes	143	33.10
	No	289	66.89
Supervision by other bodies	Yes	184	42.59
	No	248	57.41
Knowledge on safety rules and regulations	Yes	357	82.64
	No	75	17.36
Presence of safety box in the room for recapped needles	Yes	360	83.3
	No	72	6.7
Presence of contaminated needles and sharp materials in the working area	Yes	87	20.1
	No	345	79.9
Condition of the safety box in the room	Overfilled	54	12.5
	Torn out	304	70.4
	Empty	55	12.7
	Other	19	4.4

c) Workers behaviour characteristics

From the total respondents, 90 (20.8%) have a problem of sleeping disturbance during worktime and 26 (6%) and 19 (4.4%) of the respondents chew khat and smoke cigarettes, respectively. One hundred ninety five (45.14%) of the workers were satisfied by their job and(55.8%) have job related stresses. From the total study participants, 397 (91.9%) believe that needle stick and sharp injury is a preventable problem and 403 (93.3%) believes that sharp and needle stick injury have high risk of infectious diseases. Two hundred sixty one (60.4%) used Personnel protective equipment and/or gloves when it was necessary.

Table 3 : Workers behaviour characteristics of health care workers in west gojjam zone Amahra regional state, Ethiopia, November 2012

Variables	Category	Number	Percent
Sleeping disturbance problem	Yes	90	20.83
	No	342	79.17
Khat chewing	Yes	26	6.02
	No	403	93.3
Smoke cigarettes	Yes	21	4.8
	No	411	95.2
Job satisfaction index	Above the mean score	195	45.14
	Below the mean score	237	54.86
Job stress index	Above the mean score	241	55.79
	Below the mean score	191	44.21
Belief on preventability of needle stick and sharp injury	Preventable	397	91.9
	Not preventable	35	8.1
Belief on risky nature of needle stick and sharp injuries	High risk	403	93.3
	Moderate risk	25	5.8
	Low risk	4	1
PPE and glove use practice when necessary	Never	34	7.9
	Some times	53	12.3
	Most of the time	84	19.4
	All of the time	261	60.4

d) Prevalence and factors associated with sharp and needle stick injury

In the last one year, a total of 96 (22.2%) health care workers had experienced at least one sharp and needle stick injury and from these 38.2 injuries were not reported totally to the concerned body.

i. *Socio demographic factors*

In the bivariate analysis, workers age, religion, educational status, marital status and work experience did not show any kind of association with the occurrence of needle stick and sharp injury among health care workers in health institutions. However, sex of the worker (COR2.13, 95% CI: 1.31, 3.14) and monthly salary of worker (COR 1.91, 95% CI: 1.19, 3.07) had showed a significant association with sharp and needle stick injury.

In multivariate analysis, the result revealed that males have a probability of more than two times in experiencing needle stick and sharp injury compared with females (AOR 2.46, 95% CI: 1.37, 4.42) . Also workers who can earn monthly salary of below 1528 ETB have a probability of about three times more likely to be injured due to sharp and needle sticks (AOR 2.96, 95% CI:1.57,5.24).

ii. *Work environment factors*

In the bivariate analysis of work environmental factors, health care workers who are working at hospitals are 1.86 times probability of affected by needle stick and sharp injuries (COR1.86, 95% CI: 1.17,2.98). Also infection prevention and safety information access (COR2.11, 95% CI: 1.33, 3.35) and getting training on infection prevention and safety (COR 2.19, 95% CI: 1.28, 3.77) had significant association with the occurrence of sharp and needle stick injury in health care workers. Health care workers who had got information on infection prevention and safety had a probability of more than 2 times in experiencing injury compared with their counterparts. Similarly health care workers who had no trainings on infection prevention and safety are more than two times probability of having needle stick and sharp injuries. Regular supervision of health care workers working site reduces the occurrence of sharp and needle stick injury among health care workers by 1.75 times (COR 1.75, 95% CI:1.09,2.93).

In the logistic multivariate analysis of cofounder variables which are significant in the bivariate analysis, only provision of information on infection prevention and safety remains statistically significant. Workers who had got information on infection prevention are more than two times probability of reducing sharp and needle stick injury (AOR 2.31, 95% CI:1.37, 3.95).

iii. *Behavioural Factors*

Among the worker behaviour related factors in the bivariate analysis, sleeping disturbance problem (COR 0.36, 95%CI: 0.22, 0.61), job satisfaction (COR

0.32, 95% CI: 0.19, 0.52) and job stress (COR 2.33, 95%CI: 1.46, 3.70) showed a significant association with the occurrence of needle stick and sharp injuries. Workers who have been stressed due to their work have 2.33 times probability of experiencing sharp and needle stick injury and similarly hose who have not been satisfied by their job have a 68% probability of experiencing injury. However, khat chewing, and smoking cigarettes have no any statistical significant association with the occurrence of needle stick and sharp injuries. On the other side, khat chewing (COR 1.63, 95%CI: 0.55, 4.84) and smoking cigarettes (COR0.55, 95% CI: 0.22, 1.41) have no statistical significant association with the occurrence of needle stick and sharp injury in health care workers.

In the logistic multivariate analysis, only job satisfaction (AOR 0.38, 95%CI: 0.23, 0.65) and Job stress (AOR 2.22, 95%CI: 1.32, 3.74) are statistically significant with the occurrence of sharp and needle stick injury. Workers who are not satisfied by their job are 62% more likely to exercise sharp and needle stick injury compared with their counter parts. Also who are who are stressed due to their job are more than two times to experience sharp and needle stick injury compared with workers who do not stressed due to their job.

Table 4 : Factors associated with sharp and needle stick injury among health care workers in west gojjam zone, Amahara regional state, Ethiopia, November 2012

Variables	Category	Injury status		COR (95 % CI)	AOR (95 % CI)
		Yes	No		
Sex of worker*	Male	68	179	2.13 (1.31,3.14)	2.46 (1.37, 4.42)
	Female	28	157	1	1
Age of worker	Above mean (>33.3)	85	289	1	
	Below mean (≤33.3)	11	47	1.26 (0.62,2.53)	
Religion	Orthodox	88	314	1	
	Muslim	4	9	0.63 (0.19,2.10)	
	Protestant	4	13	0.29 (0.29,2.86)	
Educational status	Less than grade 10	6	29	2.42 (0.36,16.34)	
	Certificate	9	20	1.11 (0.17,7.22)	
	Diploma	64	206	1.61 (0.29,8.99)	
	First degree	15	77	2.57 (0.43,15.3)	
	Medical doctor	2	4	1	
Marital status *	Married	29	165	0.27 (0.035,2.09)	0.11 (0.01,0.99)
	Single	66	150	0.11 (0.01,0.82)	0.5 (0.23,0.54)
	Divorced	1	21	1	1
Monthly salary*	Above the mean (>1528)	64	172	1	1
	Below the mean (≤1528)	32	164	1.91 (1.19,3.07)	2.96 (1.57,5.24)
Work experience*	Above the mean (>6.2)	80	259	0.67 (0.37,1.22)	0.87 (0.44,1.72)
	Below the mean (≤ 6.2)	16	77	1	
Institution type *	Health centre	55	240	1	
	Hospital	41	96	1.86 (1.17,2.98)	1.58 (0.91,2.77)
Night work shift	Yes	74	254	0.92 (0.54,1.58)	
	No	22	82	1	
Health and safety information access*	Yes	38	193	1	1
	No	58	141	2.11 (1.33,3.35)	2.31 (1.37,3.95)
Training on infection prevention*	Yes	20	123	1	
	No	76	213	2.19 (1.28,3.77)	1.04 (0.57,1.92)
Supervision by concerned bodies *	Yes	34	151	1	1
	No	82	165	2.20 (1.39,3.46)	1.42 (0.76,2.65)
Sleeping disturbance problem*	Yes	34	56	1	
	No	62	280	0.36 (0.22,0.61)	2.81 (1.57,5.04)
Khat chewing	Yes	4	22	1.63 (0.55,4.84)	
	No	92	311	1	
Smoke cigarettes	Yes	7	14	0.55 (0.22,1.41)	
	No	89	332	1	
Job satisfaction index*	Above the mean score	64	131	0.32 (0.19,0.52)	0.38 (0.23, 0.65)
	Below the mean score	32	205	1	
Job stress index*	Above the mean score	38	203	2.33 (1.46,3.70)	2.22 (1.32,3.74)
	Below the mean score	58	133	1	

IV. Discussion

The study revealed that the one year prevalence of needle stick and sharp injury is 22%. This finding is similar with a study done in Malaysia hospital in 2010 (23.5%) [9] and in 2005(24.9%) [10]. However this result is lower than studies in Saudi Arabiain 2002 (74%) [11], Nepal in 2003 (74) [12] and Iran in 2009 (39.4%) [13]. These differences are due to the fact that there are interventional efforts in infection prevention and safety activities.

The statistical analysis in this study indicates that male workers are more victims as compared with female workers. This may be due to the fact that females are better in safety precautions compared to males. But another study in Malaysia indicated that there is a significant association between sex of the worker and the occurrence of sharp and needle stick injury among health care workers. [10].This difference may be disparities in socioeconomic development of workers. In this study age of the worker did not showed a significant association with the prevalence of sharp and needle stick injury. However, a study in Malaysia indicated that there is a statistical difference based on sex of worker [10].

This study revealed that three hundred ninety seven of health care workers (91.9%) believe that needle stick and sharp injury is a preventable public health problem but only 261 (60.4%)used Personnel Protective Equipment during their work. It also indicated that from the total workers 328 (75.9%) works in night shifting hours and 90 (20.8%) have a problem of sleeping disturbance which has a significant role in exposing to sharp and needle stick injuries. The statistical analysis result indicates that working at night shift have no significance association with prevalence of needle stick and sharp injuries. But having sleeping disturbance problem during work have a statistically significant effect on prevalence of sharp and needle stick injury.

This study indicated that 231 (53.47%) had got information on infection prevention from different sources. However, only 143 (33.1%) had got formal trainings on infection prevention and safety in the last one year. Getting information on health and safety has a statistically significant association with the prevalence of sharp and needle stick injury but getting training on infection prevention and safety has lost its significance in the logistic multivariate analysis. From the total health care workers working sites, only 184 (42.6%) had been supervised and there is a statistical significance difference on the prevalence of sharp and needle stick injury. In this study divorced health care workers and workers who earn below the mean monthly salary are statistically victims to sharp and needle stick injury. Different studies indicated that job satisfaction and stress had a great role on the prevalence of sharp and needle stick injury. This study revealed that 195(45.14%) of workers had been satisfied by their job and 241 (55.79%) had been stressed in relation to their job. Job satisfaction and job stress had showed statistically significant association with the prevalence
of sharp and needle stick injury.

V. Conclusion and Recommendation

In this study the prevalence of sharp and needle stick injury is low and had showed a decrease in magnitude from the previous study results. Job stress, job satisfaction, having sleeping disturbance problem, having health and safety information access and low monthly salary had showed a significant association with the occurrence of sharp and needle stick injury.

Therefore to reduce this problem among health care workers:

1. Regular provision of information by ministry of health, regional health office and different nongovernmental organizations on infection prevention and safety should be strengthened at all levels through different means to health care workers.
2. Ministry of health, Health care institutions management and regional health burea should strengthen mechanisms to improve job satisfaction of workers.
3. Efforts by Ministry of health, Health care institutions management, regional health bureau and the worker him/herself should be strengthened to reduce job stressors among health care workers.
4. For workers who are working in night shifts should get sleep health education.
5. Low rate paid workers are victims of sharp and needle stick injury. Therefore special attention should be given to these workers in the infection prevention activities.
6. The effectiveness of infection prevention training is not as such attractive in reducing injuries. Therefore, the training modality, training type, materials, methods and in general the setup should be assessed totally to make it an effective protective method.

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Weight Loss Program in Patients with Atherosclerosis: A randomised Controlled Clinical Trial

By Kuat P. Oshakbayev, Kenneth Alibek, Igor O. Ponomarev, Meruyert A. Gazaliyeva, A Dukenbayeva Bibazhar, Pernekul Oshakbayev, Baglan K. Zhumabekova, Sholpan Kaliyeva & Kairat Shakeyev

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Abstract - Atherosclerosis(AS) is one of the most common disease sleading tosevere clinical complications. Atherosclerosis forms pockets of fat and lipid deposit sunder the mucous tunic of blood vessels, which cause progressive vasoconstriction until total luminal blockage occurs. [1]Many "Civilization diseases" such as coronary artery disease (CAD), arterial hypertension (AH), diabetes mellitus (DM), psoriasis, gout, and such conditions as hyper lipidemia, hyperglycemia, dyslipidemia, hyperinsulinemia, hypercortisolemia, hyperuricemia, and microalbuminuria are connected with AS development. In these regards, the problem of developing a proven clinical solution for this prevalent disease process is a socially significant one.[1,2]

During the last 20 years, ASmorbidity has been globally increasing.[2,3] Mortality from AS complications, which account for 75-85% of general mortalityinwhole,[4] is simultaneously increasing.Thus AS is one of the global problems of conventional medicine.

Keywords : *atherosclerosis, fatty overweight, low-calorie, fat-free diet, weight loss therapy.*

GJMR-F Classification : *NLMC Code: WG 550*

Strictly as per the compliance and regulations of:

Weight Loss Program in Patients with Atherosclerosis: A randomised Controlled Clinical Trial

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List of Abbreviations

AH - arterial hypertension

AS - Atherosclerosis

BP - blood pressure

BMD - bone mass density

BMI - body mass index

CAD - coronary artery disease

CI - confidence interval

DBP - diastolic blood pressure

DM - diabetes mellitus

FOW - fatty overweight

IGT - impaired glucose tolerance

LPs - lipoproteins

M±SEM - mean ± standard error of the mean

OR - odds ratio

PICS – postinfarctioncardiosclerosis

SBP -systolic blood pressure

TGs – triglycerides

WCf - waist circumference

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Abstract -

Item	Description
Background	Mortality from atherosclerosis (AS) complications, which account for 75-85% of general mortality in whole, is simultaneously increasing. Recently published studies have revealed the close correlation between AS and overweight.
Objective	The purposes of the current study were to study the result of a weight loss program in AS patients using a randomized clinical design.
Design	A randomized controlled prospective clinical cross-sectional trial.
Methods and Participants	97 people were enrolled, among them 71 patients (34 females) with various manifestation of AS aged 46.4±3.6 years (patient group), and 26 healthy volunteers subjects (12 females) aged 48.5±2.2 years as a healthy control group. Statistical analysis was performed using SPSS for Windows version 17.0 (SPSS: An IBM Company, Armunk, NY).
Results:	With increased fat mass, impedance indicators and metabolic age were increased accordingly and significantly ($p<0.001$).The weight loss program reduced fat from26.75±2.94 kg to 15.76±2.98 kg, ($p=0.005$). Metabolic parameters including blood pressure, and glucose, cholesterol, and triglyceride serum levels improved significantly ($p<0.001$). Hemoglobin levels ($p<0.001$) and bone mass density ($p<0.001$) also increased significantly. Echocardiography demonstrated an increased ejection fraction from 56.3±1.1% to 72.1±1.3% ($p<0.0001$) and systolic output from 65.4±1.8 ml to 89.6±1.7 ml ($p<0.0001$) in weight loss AS

Item	Description
	patients.
Conclusions	Weight loss approach on a caloric restriction, low-fat vegetables and salt diet and includes a physical activity is a effective method of treating clinical AS manifestations. Endogenic atheromatouslipids are used during weight loss therapy, and it will reduce underlying AS processes.

Keywords : atherosclerosis, fatty overweight, low-calorie, fat-free diet, weight loss therapy.

I. Introduction

Atherosclerosis(AS) is one of the most common disease sleading to severe clinical complications. Atherosclerosis forms pockets of fat and lipid deposit sunder the mucous tunic of blood vessels, which cause progressive vasoconstriction until total luminal blockage occurs.[1]Many "Civilization diseases" such as coronary artery disease (CAD), arterial hypertension (AH), diabetes mellitus (DM), psoriasis, gout, and such conditions as hyper lipidemia, hyperglycemia, dyslipidemia, hyperinsulinemia, hypercortisolemia, hyperuricemia, and microalbuminuria are connected with AS development. In these regards, the problem of developing a proven clinical solution for this prevalent disease process is a socially significant one.[1,2]

During the last 20 years, ASmorbidity has been globally increasing.[2,3] Mortality from AS complications, which account for 75-85% of general mortality in whole,[4] is simultaneously increasing. Thus AS is one of the global problems of conventional medicine.

One of the scientific ways of working out of effective treatment strategies for AS requires the development of novel conceptions based on the accumulated scientific facts and knowledge in the field sof AS etiology and pathogenesis. For the last 20-30 years, several dozenhypotheses have been offered toexplainthe origin and progression of AS processes. However, to date, none of these has been universally recognized and proven in practice.[5,6]

Recently published studies have revealed the close correlation between AS and overweight.[7,8] The purposes of the current study were to study the result of a weight loss program in AS patients using a randomized clinical design.

II. Methods and Participants

a) Study Design

A randomized controlled prospective clinical trial.

b) Participants

We enrolled a total of 97 people, among them 71 patients (34 females) with various manifestation of A Saged 46.4±3.6 years (patient group), and 26 healthy volunteers subjects (12 females) aged 48.5±2.2 years as a healthy control group.

Thirty-one of the patients (16 females, aged 42-82 years, mean 54.6±2.8 years) with various AS manifestations were randomly recruited for the weight loss program. The clinical picture of the AS patients included: Leriche's disease (athero sclerosis of the coxo femoralartery) in 4 patients, CAD with anamnesis of the disease until 21 years of age was present in12 patients, CAD with postin farction cardiosclerosis (PICS) was present in 6 patients, cerebral stroke had occurred in 7patients,and Alzheimer's disease affected 2 patients. All 31 patients had AH, and of these 19 had DM and 12 had impaired glucose tolerance (IGT;Table 1) All enrolled AS patient shad abdominal lobesity.

The comparison group (control group) included 30 AS patients (aged 26-70 years, mean 47.5±1.9 years, including 14 females) who were receiving a conventional (traditional) drug therapy that included hypoglycemic (metformin 500-1500 mg per day, exenatide5-10 μg per day), lipid lowering (atorvastatin 40mg per day), antihypertensive (lisinopril 20mg per day, calcium channel blockers referring to benzodi-azepines 90mg per day), anti-inflammatory (acetylsalicylate acid up to 2 g per day and/or thienopyridine class anti platelet agent 75 mg per day)treatment, and symptomatic therapy. The study was carried out between October 2009 and April 2012 at the scientific research of cardiology and internal diseases (in Almaty, the Republic of Kazakhstan) and at the republican scientific center for emergency medicine (in Astana, the Republic of Kazakhstan).

Inclusion criteria included: written informed consentfor participation in the study; dyslipidemia (bloodserumhigh-density lipoprotein <1.0 mmol/L, or triglycerides(TGs) ≥1.7 mmol/L or cholesterol ≥5.6 mmol/L); waist circumference (WCf) in men >94.0 cm or in women >80.0 cm; overweight (body fat%>21);blood pressure (BP)>140mmHg of systolic blood pressure (SBP) and >95 mmHg of diastolic blood pressure (DBP), or ongoing treatment with antihypertensive drugs, fasting glucose >6.1 mmol/L or treatment with glucose-reducing drugs; absence of contraindications to weight loss; the possibility of treatment for 6 months and dynamic observation for 1 year.

c) Outcome Measures

The primary efficacy end point of the trial was full recovery from atherosclerotic diseases for 12 months. The secondary efficacy end point of the trial was data imaging methods (Doppler-ultrasound, computed tomography scans) and measurement of clinical presence status.

d) Randomisation

An independent statistician unconnected with clinical practice used computer generated random numbers (SPSS for Windows version 17.0: An IBM Company, Armunk, NY) to prepare randomisation lists. The block randomization was two (one on conventional drug therapy, one on weight loss therapy) with stratification by sex, age (47.81±2.3 and 45.7±2.26; p=0.199) and baseline body mass index (BMI) (30.15±1.38 and 29.35±1.36; p=0.34).

Methods we diagnosed prior CAD and PICS by case history and by electrocardio graphic changes of ischemia in patient anamnesis. We diagnosed AH by blood pressure readings and from medical records. Abdominal obesity was assessed WCF using the standards for the Asian nationality by the International Diabetes Federation.[9] the weight loss intervention study period was between 2-6 months in duration, depending on the individual patient clinical course, disease severity, and disease stage. Physical activity was assessed as the number of steps taken by patients, as determined by an individual pedometer from Hoffmann-La Roche, Ltd (Basel, Switzerland). Mental status was defined by the method the test of numbers binding by Reitano.[10]

The structure of lean and fatty mass before and after the weight loss program was determined with aTanita-SC330S Body Composition Analyzer (Tanita Corp., Tokyo, Japan). We defined anthropometrical indicators including age (years), weight (kg), BMI (kg/m^2). We also evaluated body composition parameters, including as fat mass (in % of total body weight and total kg), visceral fat rating (units), fat free mass (kg), total body water (in % and kg), muscle mass (in % and kg), bone mass (in % and kg), metabolic age (years), basal metabolic rate (kcal per day), and bioimpedance (Ohms).General clinical study of blood and urine chemistry, liver and kidneys function tests, and imaging methods (GE Vivid 7 Ultrasound ;GE Healthcare Worldwide USA, Michigan),bone densitometry (Lunar Achilles Express Ultrasound; GE Healthcare USA, Madison), and computed tomography scans(AG Siemens Soma tom Emotion 6, Germany, Muenchen) were performed.

We employed weight loss therapy using the weight loss program was conducted by administering a caloric restriction, fat-free vegetables and salt diet and includes an increased physical activity.[11-14] Participants were asked to reduce their meals to no more than 1200-1500 kcal per day. Behavioral weight loss intervention was achieved by a request to walk no less than 10,000 steps per day. Doses of previous symptomatic conventional drugs have been decreasing from the second/third days of the treatment beginning, and up to full withdrawn from the fifth/seventh days of the treatment beginning, as clinical symptoms were improved. A combination of in-person conversations and telephone calls were conducted during the 6-month study period. Weight loss results were assessed by WCf and body mass (kg).

Ethics .Ethical Committee of Scientific research institute of cardiology and internal diseases approved the study. Approval Number is the Protocol #9 from 06.02.2009.Board Affiliation: Health Ministry of the Republic of Kazakhstan Statistics. The two-sample Student's t-test and odds ratios (ORs) with 95% confidence intervals (CIs) were used. The study data are presented in Tables as mean ± standard error of the mean (M±SEM). The correlation analysis (r) and multinomial logistic regression model ORs with CIs were used. P-values of <0.05 was set as significant. Statistical analysis was performed using SPSS for Windows version 17.0 (SPSS: An IBM Company, Armunk, NY) and Microsoft Excel-2010 in updating Lapach, et al (2000).[15]

III. Results

We compared the patient and control groups with respect to metabolic age, basal metabolic rate, anthropometrical data, and body composition (Table 2).

As seen in Table 2, there were no significant differences between the patient group and the control group regarding passport age, weight, and height. The patient group had a significantly higher BMI on the order of an extra≈3.5 kg/m^2 compared with the healthy group. Fat mass was significantly higher in the patient group compared with the healthy group, on the order of≈12.1% or≈10.0 kg. Table 2 makes clear the inverse relationship between fat mass percentage and muscle masspercentage: The greater the fat mass percentage, the lower the muscle mass percentage.

The patient group also had significantly raised visceral fat rating (3.6U), metabolic age (≈6.6 years), basal metabolic rate (≈240 kcal/day), and bioimpedance (≈35 ohms) than did the control group. Increased body fat mass is associated with an accordingly increased impedance.

The healthy group displayed a significantly greater percentage of total body water on (≈8%), percentage of muscle mass (≈11.5%, and percentage of bone mass (≈0.3%) than the patient group. The regression linear analysis strongly correlated the relationships between fat mass and muscle/water/bone masses in the patients group (n=71) (Figure 1).

As seen in Figure 1, there are significant inverse regression correlations between fat mass in percentage and muscle mass, total body water, and bone mass ($p<0.0001$). This data analysis provides evidencethat fat mass could be a main risk factor for AS patients.

We studied the regression correlation between the levels of obesity (fat mass in % and visceral fat level

in units) and the metabolic age in the patient group (n=71) (Figure 2). As seen here, increased parameters of obesity (fat mass in % and visceral fat level in units) are significantly correlated with increased metabolic age ($p<0.0001$).

We began the weight loss program with the patient group (n=31) that had been randomly assigned into this category. As a result of the treatment, average weight lost varied from6 to 18kg. Weight loss led to positive changes of the cardiovascular diseases symptoms: SBP and DBP decreased in 94.4% of patients ($p<0.001$), more than 19% from the initial state (Table 3).

Table 3 shows that in the control group such parameters as SBP, glucose, cholesterol and triglyceride serum levels were improved significantly ($p<0.001$). However, the traditional treatment in AS patients did not lead to a significant improvement in DBP ($p=0.289$), blood hemoglobin levels ($p=0.281$), and bone mass density (BMD; $p=0.405$). It is noteworthy that in the main weight loss group we observed more significant ($p<0.001$) declines in SBP, DBP, glucose, cholesterol, and triglyceride levels. There was a significant increase in hemoglobin levels ($p<0.001$) and BMD ($p<0.001$).

Therapy by maintaining the weight loss program led to weight loss ranging between9-16 % from the initial state ($p=0.035$).Importantly, the weight loss achieved in these 31 patients was due to reduction of fatty mass only (before 26.75±2.94 kg, and after15.76±2.98 kg, $p=0.005$; Table 4).

The data of Table 4 show that the weight loss in AS patients was due to significant fat loss (before 29.87±2.01%, and after 20.23±2.55%). The percentages of water and muscle masses had tendency to increase at the study endpoint. We noted with fat mass loss does not change lean body mass. And the weight loss in the patients was due to loss from the overweight abdominal component.

During the first 2-3 days of the treatment, the patients noticed an intense sense of hunger, slight dizziness, weakness, lower extremity and abdominal muscle tremors, a sensation of heating or fever in the umbilical are a and/or in the solar plexus area, and psychogenic fear due to alt ered habitual food intake. All of these uncomfortable sensations disappeare don subsequent days.

Urine was becoming cloudier and intensely colored (dark) starting from Days 3-5 after initiating the weight loss treatment that was not present before, and persisted for several days. Microscopy of urocheras revealed that urine cloudiness was mainly been due to the organic salts such as oxalates, urates, phosphates, and carbonates of calcium and magnesium. An increase ederythrocyte sedimentation rate and elevated leukocyte count was observed between Days 4-6 after weight loss program initiation.

Regression of clinical AS symptoms was also gradually observed in patients; physical and mental working ability of the patients increased, and AS patients noticed a physical relief. Doppler-ultrasound imaging data revealed that blood flow in the lower extremities was restored and gastrocnemius musclemass increases were noted in four patients with Leriche's disease. The clinical picture of angina pectoris was reduced with an OR of 1.52 (95% CI 1.24–1.81; $p=0.034$), exercise tolerance was improved, and objective electrocar-diographyindicators of cardiovascular function were improved. Ejection fraction increased from 56.3 ±1.1% to 72.1 ±1.3% ($p<0.0001$) and the systolic output increased from 65.4 ±1.8 ml to 89.6 ±1.7 ml ($p<0.0001$) in CAD patients. All patients including those of with transient ischemic attack and with Alzheimer's disease noticed improvement of memory, and decreased mental fatigue with and OR of 1.47 (95% CI 1.18–1.77; $p=0.039$).

As clinical symptoms have been improving, the doses of previous symptomatic drugs were decreased from the second/third days of the treatment beginning and were withdrawn from the fifth/seventh days of the treatment beginning. The observation period was up to1 year and there was no recurrence of clinica lAS manifestations. Shed weight was usually not regained during this time period. Appropriate clinical AS symptoms occasionally and gradually relapsed in patients that regained at fatty overweight (FOW), but the weight lossre-therapy reversed these clinical symptoms.

IV. Discussion

Cardiovascular risk due to AS depends on visceral obesity developing over time.[16]Much attention has been paid to understanding the interactions of plasma lipoproteins (LPs), blood monocytes and the with arterial endothelium.[17] The genetic theory of AS development cannot be the complete underlying cause of AS disease, because corresponding parameters may be changed within the same persons, including inflammatory, immunologic, endothelial, metabolic and otherdisorders.[18-20]

The results of our study suggest that in the patient with AS compared with the healthy people a fat mass was significantly higher on the order of ≈12.1%. The patient group had significantly raised metabolic age (on≈6.6 years), basal metabolic rate (on≈240 kcal/day), and bioimpedance (on≈35 ohms) than did the healthy people. The regression linear analysis strongly significant inverse correlated the relationships between fat mass in percentage and muscle/water/bone masses in the body of the patients ($p<0.0001$). The more a percentage of fat mass the less percentage of

muscle/water/bone masses. Also increased parameters of obesity (fat mass in % and visceral fat level in units) are significantly correlated with increased metabolic age ($p<0.0001$). This data analysis provides evidencethat fat mass could be a main risk factor for AS patients.

The concept of insulin atherogeneity supports an independent atherogenic role for hyperinsulinemia.[21] In patients with simultaneously increased levels of very low density of LP sand TGs, high concentration of insulin were found after anoraltest for glucose tolerance.[22]

The nutriceptive-metabolic theory of AS has been developed recently. There exist substantial amounts of scientific data indicating an interrelation-between AS and visceral obesity.[23] Researchers[35] indicate that accumulation of visceral adiposity along with hyperinsulinemia and insulin resistance may be considered as fundamental signs of AS. One characteristic metabolic abnormality in insulin resistance is a high blood concentration of free fatty acids, both fasting and also postprandial. Permanently elevated free fatty acid concentrations in insulin resistance is a way to damage of vascular structures, endothelial function, and hinders insulin-mediated glucose metabolism.[24] Young persons with FOW have hyperinsulinemia, insulin resistance, and impaired fat toleranceeven on the background of normal glucose tolerance.[25] Intake of excess fats and carbohydrates leads to overload of the blood transport system and increased fatre serves. The fat deposit in organisms leads to aging of lipids.[26,27]

Exogenously-induced alimentary (postprandial) hyperlipidemia that develops after food intake is a suspected origin of AS.[28] Alimentary hyperlipidemia usually develops after each food intake and lasts for 6 hours or more.[29] A direct connection between the levels of postprandial lipidemia/hypertriglyceridemia and atherogenic changes after fatty overload manifested in angiographic coronary AS changes was revealed.[30] Alimentary hyperlipidemia is a physiological process whose primary function is transport of nutritional lipids into storage depots. However, if the depot is in the stage of "overstock," the duration of postprandial hyperlipidemia is increased and develops into an intolerance to nutrients.[31,32]

A treatment program focused on weight loss therapy using the weight loss program including a very low-calorie, fat-free vegetables and salt diet with an adjustment to eating behavior and increased physical activity method by metabolizing "old lipids".[12,14]The weight loss program leads losses of 9-16 % of the initial body mass ($p=0.035$). Weight loss led to positive changes of cardiovascular diseases symptoms ($p<0.001$), glucose/cholesterol/triglyceride levels. Also there was a significant increase in hemoglobin levels ($p<0.001$) and BMD ($p<0.001$).Our results are similar to database.[33,34]

Need to note, the weight loss was due to loss from the overweight abdominal component and reduction of fatty mass only whereas lean mass was not significantly changed. There also was a significant improvement of physical capability of individuals. During the first some days of the weight loss treatment in the patients noticed adverse effects connected with symptoms of endogenous metabolic intoxication. But all of these symptoms disappeared then.

The weight loss method lead to significant regression of clinical AS symptoms in observed patients. There was reduced an angina pectoris clinical picture ($p=0.034$), were improved objective electrocardiography indicators, an ejection fraction ($p<0.0001$), a systolic output ($p<0.0001$), an exercise tolerance and memory ($p<0.05$), decreased mental fatigue ($p=0.039$).

There was noted that with weight loss the disease clinical symptoms were improved and doses of previous symptomatic drugs were decreased from the second/third days of the treatment beginning, and up to full withdraw of its from the fifth/seventh days of the treatment beginning. If weight was not regained then clinical AS symptoms were not relapsed.

Growth of non-communicable diseases in the modern human is directly proportional with growth of the FOW prevalence.[35]Due to current super-nutrient status of humans, we now accumulate more fat than we can use.[36] The balanceis disturbed towards permanent lipid accumulation, wherein FOW become sun used by the body. But the process of fat accumulation does not occur infinitely, and fat in a storage depot may be qualitatively changed over time.[37,38]

The more FOW participates in an organism's metabolism, the more FOW creates the metabolic burden for proper functioning of thatorganism.[39] Trophic feeding, excretion of metabolic products, correction of thermoregulation, provision of biologically active substances (e.g., hormones, enzymes, and mediators) are all necessary for providing the vital activity of the fatty resources. All of these mechanisms create an additional burden to the synthetic, immunological, antitoxic, and other functions of an organism's internal orgas.[40]

Obviously, the depositing function of an organism is not without limits. With increased fatty stores, the metabolic burden for transport function of and organism increases accordingly.[41]

Accumulation of FOW in an organism requires appropriate spaces for deposition. The process of fat deposition occurs by the physicochemical "in duration" (hardening) of lipids.[42] This lipid in duration is a process that occursin AS development.[43] The AS plaque

development process is not a random phenomenon, but it is a logical result of aging of fatty stores. Lipid aging occurs because they have remained unused by the body over a long period of time. The protective homeostatic mechanisms could be body temperature, blood pressure, or insulin resistance, which increase the rate of biochemical metabolism.[44,45]Consequently, the AS processes could be considered physiological, in which an organism exists in conditions of excess nutrient intake on the background of unused FOW.

Isolated struggles with clinical expressions of AS lesions such as CAD, AH, DM, hyperglycemia, microalbuminuria, and hyperlipidemia did not influence the risk of cardiovascular disaster and decrease mortality, though it did improve patient quality oflife.[46]Improvement of therapeutic and diagnostic methods has not lead to definitive cures of human chronic non-communicable diseases.[47,48]

V. Conclusion

We observed that the more fat mass is stored in organism the less a muscle, bone and water masses are present. Increased fat mass in an organism is an impedance indicator, and impedance and metabolic age are significantly increased, accordingly.

Weight loss therapy using the weight loss program including a caloric restriction, fat-free vegetables and salt diet with an increased physical activity is a performance method of curing the clinical manifestations of AS. The weight loss treatment led to positive changes of diseases symptoms, improve in laboratory and instrumental parameters in patients with AS. The weight loss programs lead to loss of adipose tissue only. If the "old" lipids are used during weight loss-mediated FOW reduction it will be possible to influence AS processes, as desired.

Study limitation. Published studies into the possible role of fatty overweight in AS etiology are limited in scope and number. We acknowledge that the current randomized clinical trial had a small sample size, and that future studies into the exact relationship between fatty overweight and AS development should be carried out on a larger scale.

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Authors' Contributions

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Igor O. Ponomarev:design and performance, scientific executor, treatment and diagnosis of the patients, invention patent fulfillment, scientific analysis.

Meruyert A. Gazaliyeva:preparation e-version statistical data in Excel, collect of the clinical material, bibliography search and review, scientific analysis, statistical advancing, writing the paper.

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PernekulOshakbayev: design, bibliography search and review, scientific analysis.

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Table 1 : Demographic details of the study patients (n=31) who were recruited for the weight loss program

Groups	Gender	Number
Patients with Leriche's disease	M	3
	W	1
Patients with CAD	M	5
	W	7
Patients with CAD+PICS	M	3
	W	3
Patients with cerebral stroke	M	3
	W	4
Patients with Alzheimer's disease	M	1
	W	1
Patients with AH	M	15
	W	16
Patients with DM	M	10
	W	9
Patients with IGT	M	5
	W	7
Total	M	15
	W	16

Abbreviations: M, men; W, women; CAD, coronary artery disease; AH, arterial hyper tension; PICS, postinfarction cardiosclerosis; DM, diabetes mellitus; IGT, impaired glucose tolerance.

Table 2 : Anthropometrical data, metabolic data, body composition in study groups

Parameters	Patientgroup(n=71)		Healthy group(n=26)		t-test	P-value
	M	SEM	M	SEM		
Passport age (years)	46.45	2.29	48.55	3.69	0.484	0.315
Weight (kg)	83.90	2.70	75.61	4.45	1.687	0.057
Height (cm)	167.93	1.12	169.27	1.99	0.587	0.279
BMI (kg/m^2)	29.75	0.78	26.22	1.37	2.239	0.014
Fat mass (%)	32.40	1.28	20.27	2.67	4.097	0.00004
Fat mass (kg)	28.34	1.61	17.64	3.18	3.002	0.0017
Visceral fat rating (Unit)	10.04	0.73	6.40	0.70	3.599	0.0003
Fat free mass (kg)	54.80	1.53	58.37	2.04	1.400	0.08
Total body water (kg)	40.91	1.16	41.22	1.63	0.155	0.44
Total body water (%)	48.70	0.80	56.18	2.01	3.458	0.0004
Muscle mass (kg)	52.05	1.46	55.39	1.96	1.367	0.087
Muscle mass (%)	64.19	1.21	75.74	2.56	4.079	0.00005
Bone mass (kg)	3.16	0.07	3.01	0.10	1.229	0.111
Bone mass (%)	3.77	0.09	4.01	0.10	1.784	0.039
Metabolic age (years)	49.00	1.73	42.35	2.60	2.129	0.018
Basal metabolic rate (kcal/day)	1661.6	46.45	1419.8	52.77	3.439	0.0004
Bioimpedance (ohms)	502.10	10.30	467.42	9.11	2.522	0.0067

Abbreviations: BMI, body mass index; M, mean; SEM, standard error of the mean

Table 3 : Blood pressure, blood hemoglobin, serum glucose and lipid levels, and bone mineral density before and after completion of the weight loss program (n=31) and the control group who received traditional therapy (n=30)

Study Groups		SBP, mmHg	DBP, mmHg	Hemoglobin gram/L	Glucose, mmol/L	Cholesterol, mmol/L	Triglycerol, gram/L	BMD, Units
Control group, n=30	before treatment	149.4 ±3.4	94.8 ±2.2	132.1 ±2.2	6.40 ±0.49	5.60 ±0.1	2.15 ±0.05	74.0 ±2.9
	after treatment	137.6 ±5.1	93.1 ±2.1	134.0 ±2.4	5.27 ±0.37	5.24 ±0.16	1.92 ±0.09	73.2 ±1.6
Weight loss patient group, n=31	before treatment	150.1 ±3.9	99.3 ±2.9	129.5 ±2.67	6.42 ±0.46	5.73 ±0.13	2.31 ±0.1	71.6 ±2.79
	after treatment	121.8 ±2.1	81.6 ±1.8	140.3 ±1.6	4.37 ±0.38	4.26 ±0.15	1.62 ±0.09	97.9 ±2.8
P before and after treatment in controls =		0.03	0.289	0.281	0.036	0.031	0.015	0.405
P before and after treatment in main group		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

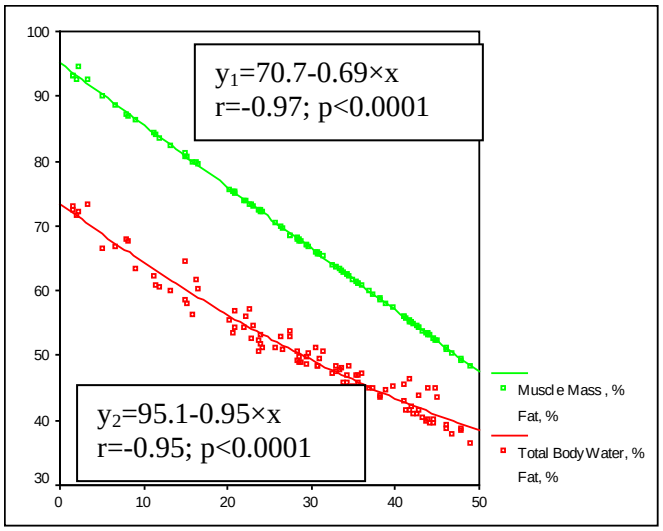
Abbreviations: SBP, systolic blood pressure; DBP, diastolic blood pressure; BMD, bone mass density. Data are presented as means ± SEM

Table 4 : Before and after weight loss therapy in the AS patient group (n=31)

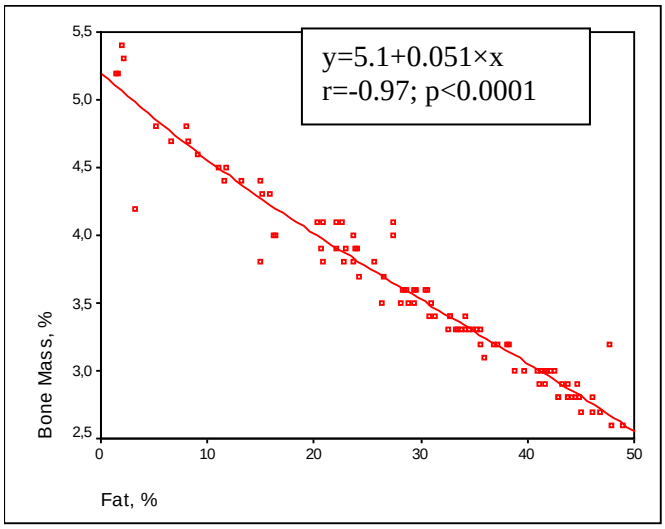
Parameters	Before the weight loss therapy (n=31)		After the weight loss therapy (n=31)		t-test	P-value
	M	SEM	M	SEM		
Passport age (years)	48.11	2.10	-	-	-	-
Weight (kg)	89.56	4.59	77.91	4.39	1.834	0.035
BMI (kg/m^2)	30.15	1.38	26.23	1.30	2.068	0.021
Fat mass (%)	29.87	2.01	20.23	2.55	2.969	0.0019
Fat mass (kg)	26.75	2.94	15.76	2.98	2.625	0.005
Visceral fat rating (units)	11.73	1.26	8.02	1.64	1.794	0.038
Fat free mass (kg)	62.81	2.18	60.82	2.01	0.671	0.25
Total body water (kg)	43.98	1.69	43.11	1.58	0.376	0.35
Total body water (%)	49.11	1.41	55.33	1.99	2.553	0.0061
Muscle mass (kg)	58.56	2.11	57.55	1.91	0.355	0.36
Muscle mass (%)	65.39	1.87	73.87	2.49	2.723	0.0038

Bone mass (kg)	3.26	0.12	3.05	0.10	1.344	0.091
Bone mass (%)	3.64	0.09	3.91	0.08	2.282	0.012
Metabolic age (years)	56.82	3.89	47.78	3.67	1.669	0.047
Basal metabolic rate (kcal/day)	1837.53	67.42	1495.44	64.01	3.680	0.0002
Bioimpedance (ohms)	505.00	10.22	477.54	8.95	2.021	0.023

Abbreviations: BMI, body mass index; M, mean; SEM, standard error of the mean

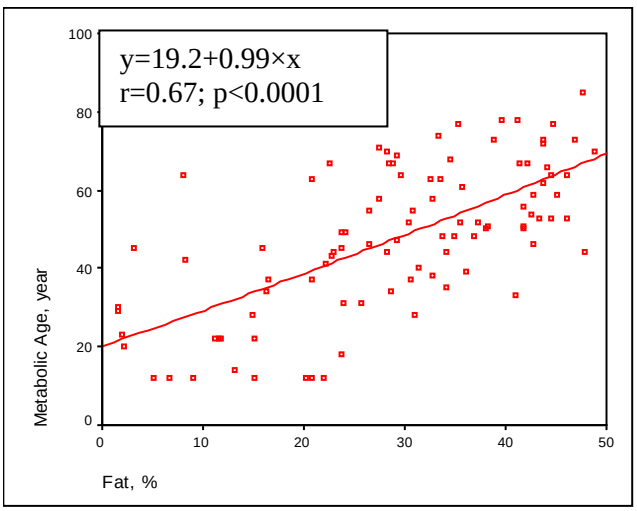


A)Note : x=fat mass (in %); y_1=muscle mass (in %); y_2=total body water (in %);(n=71)

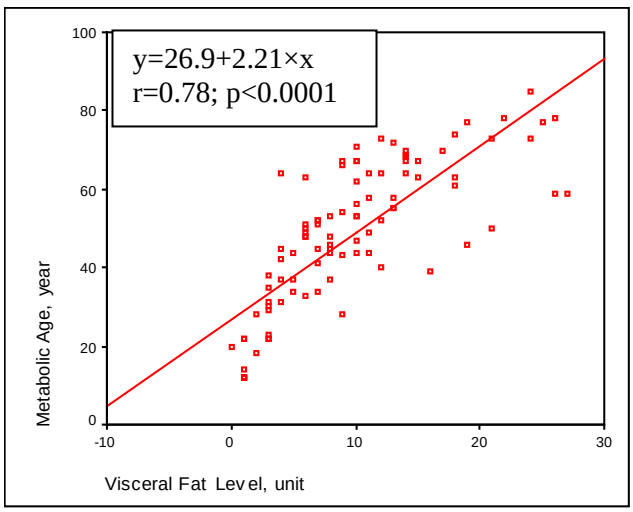


B)Note : x=fat mass (in %); y=bone mass (in %); (n=71)

Figure 1 : The regression correlation between fat mass (in %)and: A)muscle mass (in %), total body water (in %); and B)bone mass (in %) in the patients group (n=71)



A) Note: x=fat mass (in %); y=metabolic age (years); (n=71)



B) Note: x=visceral fat level (units); y=metabolic age (years); (n=71)

Figure 2 : Correlation between metabolic age (years) and: **A)**fat mass (in %); and **B)** visceral fat level (units)in the patients group (n=71)

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The recommended size of original research paper is less than seven thousand words, review papers fewer than seven thousands words also.Preparation of research paper or how to write research paper, are major hurdle, while writing manuscript. The research articles and research letters should be fewer than three thousand words, the structure original research paper; sometime review paper should be as follows:

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(b) A brief Summary, "Abstract" (less than 150 words) containing the major results and conclusions.

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(e) Resources and techniques with sufficient complete experimental details (wherever possible by reference) to permit repetition; sources of information must be given and numerical methods must be specified by reference, unless non-standard.

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(h) Brief Acknowledgements.

(i) References in the proper form.

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A major linchpin in research work for the writing research paper is the keyword search, which one will employ to find both library and Internet resources.

One must be persistent and creative in using keywords. An effective keyword search requires a strategy and planning a list of possible keywords and phrases to try.

Search engines for most searches, use Boolean searching, which is somewhat different from Internet searches. The Boolean search uses "operators," words (and, or, not, and near) that enable you to expand or narrow your affords. Tips for research paper while preparing research paper are very helpful guideline of research paper.

Choice of key words is first tool of tips to write research paper. Research paper writing is an art.A few tips for deciding as strategically as possible about keyword search:

- One should start brainstorming lists of possible keywords before even begin searching. Think about the most important concepts related to research work. Ask, "What words would a source have to include to be truly valuable in research paper?" Then consider synonyms for the important words.
- It may take the discovery of only one relevant paper to let steer in the right keyword direction because in most databases, the keywords under which a research paper is abstracted are listed with the paper.
- One should avoid outdated words.

Keywords are the key that opens a door to research work sources. Keyword searching is an art in which researcher's skills are bound to improve with experience and time.

Numerical Methods: Numerical methods used should be clear and, where appropriate, supported by references.

Acknowledgements: Please make these as concise as possible.

References

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Even though low quality images are sufficient for review purposes, print publication requires high quality images to prevent the final product being blurred or fuzzy. Submit (or e-mail) EPS (line art) or TIFF (halftone/photographs) files only. MS PowerPoint and Word Graphics are unsuitable for printed pictures. Do not use pixel-oriented software. Scans (TIFF only) should have a resolution of at least 350 dpi (halftone) or 700 to 1100 dpi (line drawings) in relation to the imitation size. Please give the data for figures in black and white or submit a Color Work Agreement Form. EPS files must be saved with fonts embedded (and with a TIFF preview, if possible).

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1. Choosing the topic: In most cases, the topic is searched by the interest of author but it can be also suggested by the guides. You can have several topics and then you can judge that in which topic or subject you are finding yourself most comfortable. This can be done by asking several questions to yourself, like Will I be able to carry our search in this area? Will I find all necessary recourses to accomplish the search? Will I be able to find all information in this field area? If the answer of these types of questions will be "Yes" then you can choose that topic. In most of the cases, you may have to conduct the surveys and have to visit several places because this field is related to Computer Science and Information Technology. Also, you may have to do a lot of work to find all rise and falls regarding the various data of that subject. Sometimes, detailed information plays a vital role, instead of short information.

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16. Use proper verb tense: Use proper verb tenses in your paper. Use past tense, to present those events that happened. Use present tense to indicate events that are going on. Use future tense to indicate future happening events. Use of improper and wrong tenses will confuse the evaluator. Avoid the sentences that are incomplete.

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21. Arrangement of information: Each section of the main body should start with an opening sentence and there should be a changeover at the end of the section. Give only valid and powerful arguments to your topic. You may also maintain your arguments with records.

22. Never start in last minute: Always start at right time and give enough time to research work. Leaving everything to the last minute will degrade your paper and spoil your work.

23. Multitasking in research is not good: Doing several things at the same time proves bad habit in case of research activity. Research is an area, where everything has a particular time slot. Divide your research work in parts and do particular part in particular time slot.

24. Never copy others' work: Never copy others' work and give it your name because if evaluator has seen it anywhere you will be in trouble.

25. Take proper rest and food: No matter how many hours you spend for your research activity, if you are not taking care of your health then all your efforts will be in vain. For a quality research, study is must, and this can be done by taking proper rest and food.

26. Go for seminars: Attend seminars if the topic is relevant to your research area. Utilize all your resources.

27. Refresh your mind after intervals: Try to give rest to your mind by listening to soft music or by sleeping in intervals. This will also improve your memory.

28. Make colleagues: Always try to make colleagues. No matter how sharper or intelligent you are, if you make colleagues you can have several ideas, which will be helpful for your research.

29. Think technically: Always think technically. If anything happens, then search its reasons, its benefits, and demerits.

30. Think and then print: When you will go to print your paper, notice that tables are not be split, headings are not detached from their descriptions, and page sequence is maintained.

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33. Report concluded results: Use concluded results. From raw data, filter the results and then conclude your studies based on measurements and observations taken. Significant figures and appropriate number of decimal places should be used. Parenthetical remarks are prohibitive. Proofread carefully at final stage. In the end give outline to your arguments. Spot out perspectives of further study of this subject. Justify your conclusion by at the bottom of them with sufficient justifications and examples.

34. After conclusion: Once you have concluded your research, the next most important step is to present your findings. Presentation is extremely important as it is the definite medium though which your research is going to be in print to the rest of the crowd. Care should be taken to categorize your thoughts well and present them in a logical and neat manner. A good quality research paper format is essential because it serves to highlight your research paper and bring to light all necessary aspects in your research.

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Key points to remember:

- Submit all work in its final form.
- Write your paper in the form, which is presented in the guidelines using the template.
- Please note the criterion for grading the final paper by peer-reviewers.

Final Points:

A purpose of organizing a research paper is to let people to interpret your effort selectively. The journal requires the following sections, submitted in the order listed, each section to start on a new page.

The introduction will be compiled from reference matter and will reflect the design processes or outline of basis that direct you to make study. As you will carry out the process of study, the method and process section will be constructed as like that. The result segment will show related statistics in nearly sequential order and will direct the reviewers next to the similar intellectual paths throughout the data that you took to carry out your study. The discussion section will provide understanding of the data and projections as to the implication of the results. The use of good quality references all through the paper will give the effort trustworthiness by representing an alertness of prior workings.

Writing a research paper is not an easy job no matter how trouble-free the actual research or concept. Practice, excellent preparation, and controlled record keeping are the only means to make straightforward the progression.

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To make a paper clear

· Adhere to recommended page limits

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- Separating a table/chart or figure - impound each figure/table to a single page
- Submitting a manuscript with pages out of sequence

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· Keep on paying attention on the research topic of the paper

· Use paragraphs to split each significant point (excluding for the abstract)

· Align the primary line of each section

· Present your points in sound order

· Use present tense to report well accepted

· Use past tense to describe specific results

· Shun familiar wording, don't address the reviewer directly, and don't use slang, slang language, or superlatives

· Shun use of extra pictures - include only those figures essential to presenting results

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Choose a revealing title. It should be short. It should not have non-standard acronyms or abbreviations. It should not exceed two printed lines. It should include the name(s) and address (es) of all authors.

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The summary should be two hundred words or less. It should briefly and clearly explain the key findings reported in the manuscript--must have precise statistics. It should not have abnormal acronyms or abbreviations. It should be logical in itself. Shun citing references at this point.

An abstract is a brief distinct paragraph summary of finished work or work in development. In a minute or less a reviewer can be taught the foundation behind the study, common approach to the problem, relevant results, and significant conclusions or new questions.

Write your summary when your paper is completed because how can you write the summary of anything which is not yet written? Wealth of terminology is very essential in abstract. Yet, use comprehensive sentences and do not let go readability for briefness. You can maintain it succinct by phrasing sentences so that they provide more than lone rationale. The author can at this moment go straight to shortening the outcome. Sum up the study, with the subsequent elements in any summary. Try to maintain the initial two items to no more than one ruling each.

- Reason of the study - theory, overall issue, purpose
- Fundamental goal
- To the point depiction of the research
- Consequences, including definite statistics - if the consequences are quantitative in nature, account quantitative data; results of any numerical analysis should be reported
- Significant conclusions or questions that track from the research(es)

Approach:

- Single section, and succinct
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- Center on shortening results - bound background information to a verdict or two, if completely necessary
- What you account in an conceptual must be regular with what you reported in the manuscript
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- Explain the value (significance) of the study
- Shield the model - why did you employ this particular system or method? What is its compensation? You strength remark on its appropriateness from a abstract point of vision as well as point out sensible reasons for using it.
- Present a justification. Status your particular theory (es) or aim(s), and describe the logic that led you to choose them.
- Very for a short time explain the tentative propose and how it skilled the declared objectives.

Approach:

- Use past tense except for when referring to recognized facts. After all, the manuscript will be submitted after the entire job is done.
- Sort out your thoughts; manufacture one key point with every section. If you make the four points listed above, you will need a least of four paragraphs.

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- Shape the theory/purpose specifically - do not take a broad view.
- As always, give awareness to spelling, simplicity and correctness of sentences and phrases.

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Materials:

- Explain materials individually only if the study is so complex that it saves liberty this way.
- Embrace particular materials, and any tools or provisions that are not frequently found in laboratories.
- Do not take in frequently found.
- If use of a definite type of tools.
- Materials may be reported in a part section or else they may be recognized along with your measures.

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- Report the method (not particulars of each process that engaged the same methodology)
- Describe the method entirely
- To be succinct, present methods under headings dedicated to specific dealings or groups of measures
- Simplify - details how procedures were completed not how they were exclusively performed on a particular day.
- If well known procedures were used, account the procedure by name, possibly with reference, and that's all.

Approach:

- It is embarrassed or not possible to use vigorous voice when documenting methods with no using first person, which would focus the reviewer's interest on the researcher rather than the job. As a result when script up the methods most authors use third person passive voice.
- Use standard style in this and in every other part of the paper - avoid familiar lists, and use full sentences.

What to keep away from

- Resources and methods are not a set of information.
- Skip all descriptive information and surroundings - save it for the argument.
- Leave out information that is immaterial to a third party.

Results:

The principle of a results segment is to present and demonstrate your conclusion. Create this part a entirely objective details of the outcome, and save all understanding for the discussion.

The page length of this segment is set by the sum and types of data to be reported. Carry on to be to the point, by means of statistics and tables, if suitable, to present consequences most efficiently.You must obviously differentiate material that would usually be incorporated in a study editorial from any unprocessed data or additional appendix matter that would not be available. In fact, such matter should not be submitted at all except requested by the instructor.

Content

- Sum up your conclusion in text and demonstrate them, if suitable, with figures and tables.
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