Epidemiology Morbidity Patterns of University Students-(1999 -2006) Reviewing the Hospital Information System (HIS)

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Abstract :

As the epidemiology concerns the study of patterns and distribution of diseases and determination of risk factors in human communities to offer the preventive measures, the medical data drawn from health organizations is the important source for this "Descriptive Longitudinal" study which analyses the university hospital outpatients data registered for the university students through eight (8) years to: measure the diagnostic and therapeutic activities accessible, determining the most frequent and important health problems and their patterns, and investigating the existing health services and information system used.

The main characteristics of this study period are ; the continuous increase of frequency of students to the outpatients to more than 40% of the total university students with highest female rate 52%, the respiratory 18% and gastrointestinal 16% are in the top of diseases distributed. and the study detect that more than 75% of dermatological, 70% urological, and 20% respiratory cases are not diagnosed due to bad registration system and lack of health personnel training.

More concerns is recommending to the health of students as important part of community, and the institution of information technology system with simple programs suitable for actual needs and training of personnel as part of total quality management to be accredited organization.

Key words : Epidemiology, morbidity patterns, university students, hospital information system

Introduction:

Descriptive studies usually describe the distribution of disease and morbidity patterns and the relationship between disease and certain variables such as place, time and person. Information derived from descriptive studies are essential both for public health managers and epidemiologists alike. For health managers the knowledge of patterns and load (burden) of disease helps in the prioritization of objectives and the proper allocation of resources. This type of study usually utilizes data derived from various sources such as: population censuses, biostatistics records, medical records in hospitals and private clinics, and also figures available at the national level about food or drug consumption etc. As these data are routinely collected and are readily available for researchers, we find that descriptive studies are less costly and less time-consuming compared to analytic studies [1]. Health information obtained from

hospitals or other health institutions (health centers) help in the planning and increase of the health care quality, although it only describes the tip of the iceberg leaving most of the disease load submerged under the surface hidden in the community.

It is obvious that an effective and advanced system for data collection and analysis which provides necessary information in time, is essential for a proper decision-making process. Information about the major causes of morbidity and mortality is of utmost importance for the planning, monitoring and evaluation of health services, and the conventional sources for descriptive studies, as was mentioned above, include routine registration of biostatistics data, hospital and health center data notification systems of infectious diseases and epidemiological surveys. Unfortunately these important sources are poor in most of the developing countries[2].

Zawia University was establishment in 1983 as a part from Tripoli University and started by faculty of Education. In 1988, it became officially independent Libyan university, called Zawia University, with five Faculties namely: Social Science; Science; Engineering and Informatics; Agriculture & Languages. Nowadays, Zawia University has others faculties: Sports; Arts; Economics and Political Science; Medical Technology; Dental; Medicine; Pharmacy; Law; and Faculty of Natural Resources, with total number of about 47.000 student.

University Medical Service is an old institution which dates back to 1956 in Khartoum University which was closely related to London University. At that time there was a felt need for a small health unit to care for the few numbers of students, and the Department of Community Medicine in the Faculty of Medicine shouldered this task. In 1965 the World Health Organization (WHO) recommended that university students

constitute a population sector with special characteristics and health problems deserve independent services. Sudan was a pioneer in Students' health services preceded only by the developed countries. In 1957 a small unit, a medical assistant, a laboratory and nurse was located in the University [3]; it was called Students' Health Services and as, the establishment and the development of this unit was not at all easy [4]. It took about 57 years to develop these services from a small medical unit into the well organized comprehensive medical institution of today.

Hospital Information System (HIS) :

A high quality HIS is a computerized system designed to facilitate the management of all the medical (clinical) and administrative information ,and to improve the quality of health care. In another functional definition the system is defined as the applications which support the health care processes by enabling professionals and specialists or even patients the direct access to the system , allowing them to use the entry systems to reach the medical records and information systems pertaining to the patients etc. Another definition of the HIS is a wide system or a net of systems designed to support the flow of information between departments.

THE HOSPITAL INFORMATION NET: All these definitions stress that the system should work in harmony and be integrated with other non-medical systems such as accounting system , personnel etc. in addition to the clinical medical systems[5].

Objectives:

The main objectives of this descriptive study was to measure the diagnostic and therapeutic activities of the students' health services in eight years, analyze the outpatient records which were collected within the study period, to estimate the incident (new) cases of diseases and to detect

disease patterns. It also aims at analyzing the current information system adopted .

Materials and Methods :

Study Design : A longitudinal study designed to examine the data of Khartoum University Student Health Services along a study period of eight years .Data source was the hospital-based records covering the period from the first of January 1999 –the end of December 2006. The preliminary data analysis was carried out by the statistical department of the students' services , converting daily data flowing from different hospital departments and sections into monthly and yearly reports.

The study population was the university of Khartoum students who attended, during the study period, the central clinic (the Clinic) and the other peripheral clinics such as Shambat (Faculty of Veterinary Medicine , and Agriculture) and the Faculty of Education clinic etc. **Variables** measured were: numbers of students attending the clinics each year, frequencies of the various diseases diagnosed (infectious, non-infectious diseases) ,patients admitted to hospital beds, technical facilities available to statistical personnel, level of the training and skills of the statistical personnel. **Statistical analysis**: Descriptive statistical methods were applied to convert data into frequencies and proportions, using Excel software the results were displayed in graphics

Results and Discussion:

During the study period a total of (334633) students attended Khartoum university clinics [mean yearly attendance = 41829) ,the annual attendance increased steadily from 25000 in 1999 to a peak of 60678 in 2004. The tremendous increase in the number of patients reflects the

increase in university students population which is a direct result of the higher education uprising which was implemented , resulting in the consequent increase in the admission to the university and an additional number of new public and private universities were opened and added to the list of the existing universities. In addition to the general admission, which depends on the score of the students , some universities implemented the special admission where marginal students pay high fees which while making a considerable revenue it also adds more burden on the universities. The Students' Health Services which started small is now a well-developed institution which provides its target population with primary health care plus the secondary level specialized services. It also added positively to the academic stability in the university through providing students and staff with an acceptable level of health insurance, but the most important positive contribution is that the university supervises the quality and authenticity of medical reports particularly those issued at examination times. The university was determined from the start to give its students the right of free medical care taking into consideration the current high cost of the health care and the low economic capability of the students. But the university alone is not in a position to shoulder this burden unless it is assisted by other specialized bodies such as the Students' Care Fund which is a body established by the Government to support the students. Students themselves should also play a more positive role in financing their own services through their students' unions.

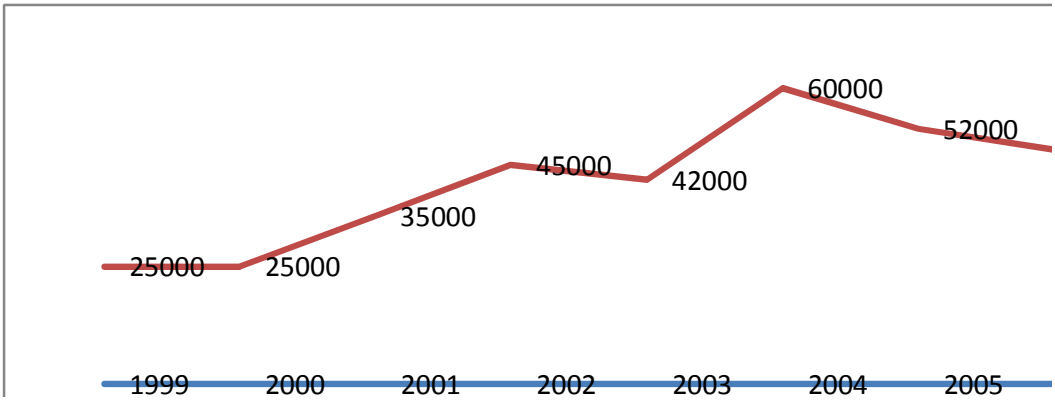

Figure1: Students patients attending university clinics (1999 -2006)

At outpatient Clinics 75% of the student patients who attended the university health services in the period 1999-2006 were examined and treated by the general practitioners (GP's), only 12% were referred to specialist clinics .

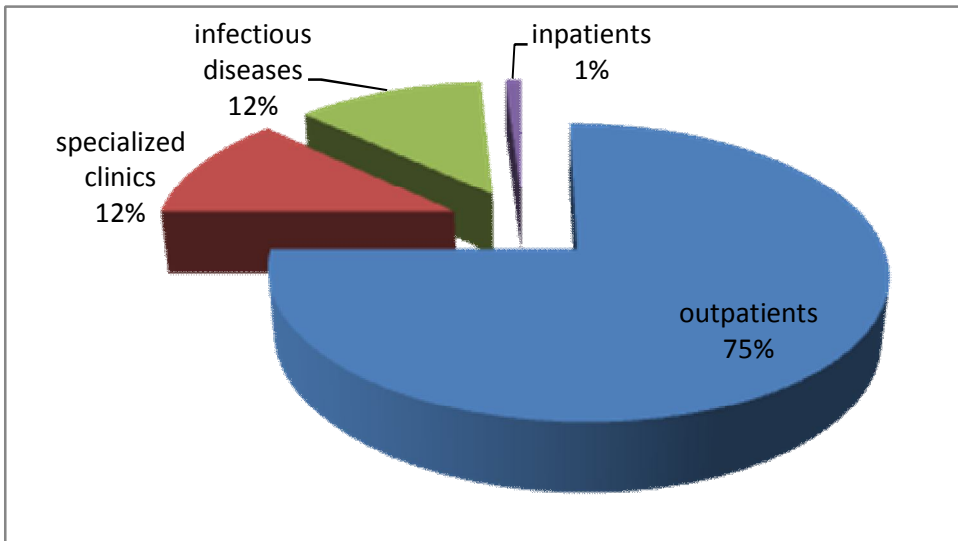

Figure (2) : Distribution of student patients (1999 -2006)

The general practitioners examined and diagnosed (161444) cases within the study period of eight years, the following table shows the pattern of students morbidity :

System	Number of cases	%
Respiratory	29781	(18)
GIT	26356	(16)
ENT	25317	(15.6)
Malaria	17400	(11)
Urinary	14550	(9)
Dermatology	9351	(5.7)
Neurology	9085	(5.6)
Miscellaneous	29636	(18)
Total	161444	(100)

Table (1) : Morbidity pattern of students attending the OP department (1999-2006)

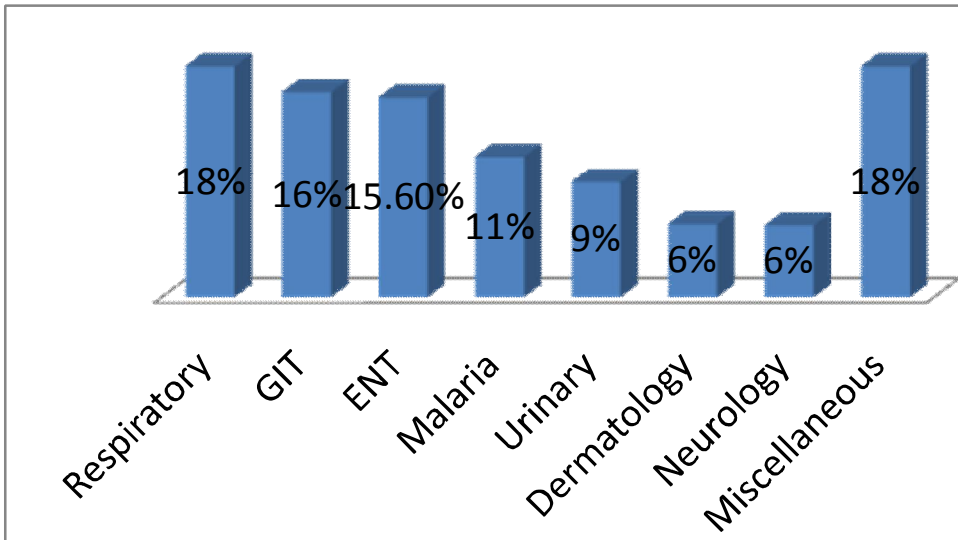

Figure (3) :Disease pattern in students (1999 -2006)

Table (1) and Graph (3) illustrate that respiratory diseases were the commonest health problem in students , 51% of the respiratory cases (15601) were due to the viral common cold, cough 8% , bronchial asthma 6% , a number of 5876 respiratory cases (20%) were unlabeled (undiagnosed). To compare the present morbidity patterns in Khartoum university students with those in the past we did not find in the literature a longitudinal study done, but in one cross-sectional study conducted in 1972 by Professor Bashir Hamad [2] 1829 cases of students who attended the university clinic in the year 1964/65 were analyzed. He found that respiratory cases constitute 11% (198 cases out of 1829), in 1964/65 Professor Hamad found also that cases of psychoneurotic and allied disorders were on the top 12.4% (227 cases out of 1829), within the period of our study the prevalence of psychoneurotic disorders among students was also steadily increasing with the mean of 593 cases per year. The at-risk population of students had grown hundred times compared to the 1960's.

Patterns of Diseases other than Respiratory:

- Gastro-intestinal tract(GIT) Diseases: were the second in frequency presented the following pattern : Dyspepsia (22%) , abdominal pain (symptom) (21%) , worm infestation (12%) , irritable bowel (11%) , diarrhoea (11%) , constipation (9%).
- Ear,Nose and throat(ENT) pattern: acute tonsillitis (40%) , pharyngitis (30%) , ear infections (30%).
- Urinary tract infections (UTI) pattern (19%): Diabetes mellitus (8%), Renal calculi (2%), Ureteric calculi (0.8%), Vesical calculi(0.6%).

- A large proportion of the urinary cases (70%) was unlabeled (undiagnosed).

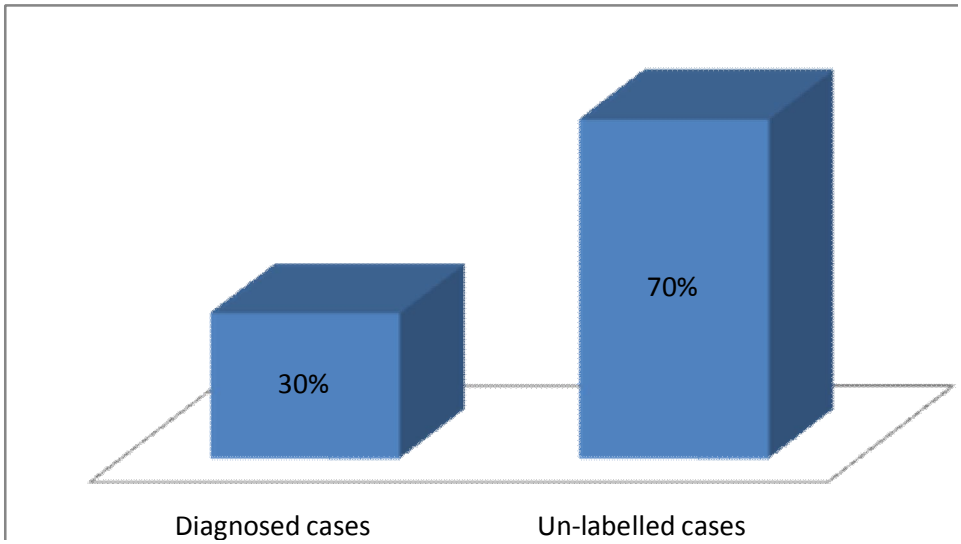

Figure (4): Urinary tract cases

This is a repeated phenomenon, the annual reports could not display the collected data completely and comprehensively, reflecting some defect in the data collection system or the inability of doctors to fill the required data forms properly. The incompletely labeled cases could have been followed to the laboratory (or other investigations), or to the specialist doctor to complete the diagnosis.

- Dermatology Pattern: Dandruff (10%), Eczema (8%), Tinea versicolor (7%). Again a large proportion of cases (75%) was not labeled with any diagnosis.
- Pattern of Neurological Diseases : The most common symptom appearing in the records was headache (81%) [7359 /9085 cases] the

records did not specify the underlying cause(s).The diagnoses of the remaining 1726 cases were not shown in the reports.

- Pattern of the Miscellaneous Diseases : Allergic conditions (18%) [5435 out of 29636], Fatigue and general weakness (18%),Trauma (14%), Fevers (14%), Abscesses (10%), Hypertension (5%), Piles (4.6%), Rheumatic joint pain (2.4%), Anaemia (3.6%).

- Sexually transmitted diseases (STD's): Compared to the 1964/65 the frequency of STD's reported in our study is extremely low. In Professor Hamad study [2] (8.6%) of the university students examined [158/1829] had syphilis or other (STD's).
- This study found only 18 cases diagnosed as syphilis in 8 years (0.07%) of all outpatient cases. We do not know exactly whether the difference is true or apparent, it may be that the students of the late years are more reluctant to report STD's diseases because of the associated stigma. A new comer , which was not known in the sixties, is the HIV infection [AIDS] and university students as part of the youth population are highly at –risk. Yet there are no confirmed data about HIV prevalence in students, and more research efforts are recommended.

Quality of Data included in the University's Health Services Reports:

1. Data Missing :

It was noted that the proportion of missed data is high, 75% of dermatological cases , 70% of urological cases, 20% of respiratory cases were not labeled with any diagnosis . This may be due either to the reluctance of the doctors to fill and complete the paper records, or that the statistics department personnel failed to classify the diagnoses

entered in the records by doctors because of the difficulty in reading the medical terminology .Medical terms are usually written in Latin or English , in addition the doctors' handwriting may be unreadable. The only suitable solution for this problem ,in our opinion , is to adopt computerized systems which enable doctors the direct entry of data into the system.

2. Lack of Definitive Diagnoses :

The statistics analyzed in this study tend to use disease symptoms rather than definitive diagnoses ,they include for example cough , fever , rheumatic pain ,diarrhea etc. without specifying the underlined disease or pathology. We think this is due mainly to the settings under which those tentative diagnoses are made, the doctor in the outpatient is in a hurry ,patients are crowded and no further investigations are yet available. Anyhow, the preliminary diagnosis is useful as a crude indicator of the pattern of disease distribution , but if we endeavor to make a more precise estimation of the morbidity and disease load we have to improve the quality of diagnosis. This improvement in quality can be achieved if the patients complete the necessary investigations requested by the GP, or referred to specialist clinics or have been admitted to the hospital beds.

In this context, the World Health Organization (WHO) specialized expert committees recommended in 1969 that a sort of medical audit should be implemented worldwide. A committee with the objective of reviewing medical records is recommended to be appointed in every medical institution, this committee will make sure that the final diagnosis is entered in the record by the doctor, that the results of laboratory investigations and X-rays are included and that the records and documents in all sections and departments are available and are properly kept[6].

3. Situation Analysis of the Statistics Department in the Students Health Services:

1. Reliance on a manual (Paper) system for data collection, analysis/and retrieval

   When the patient arrives in the clinic, the statistics personnel seek for their medical records (files) and cards, this usually takes some time. When the patient meets his doctor the doctor will write the findings in the file which is also time-consuming. The statistician collects the daily data in papers, analyzes them using the calculator and converts them into monthly reports.

   Data accumulates continuously therefore the manual work is slow , tedious and exposed to errors. The information required by health care managers cannot be easily reached in time to be utilized in the decision-making process. Beside that the valuable information recorded in paper may be lost or destroyed with time. The ideal solution to this situation is to implement a computer net system which connects different hospital departments with each other and with the managers of the hospital, this has been applied both in the developed and in some of the developing countries. This will solve the problems of the traditional system by facilitating the timely flow of information. Any hospital whether small or large will benefit from the computerization of the information system, and from connecting the administrative and medical sections through the net , and the application of a flexible and comprehensive software appropriate for the needs of the hospital [7] , [8].

The doctors may be reluctant to enter data immediately after examining their patients and thus introduction of the computerized system per se will not help unless a consensus is made by all medical or non-medical persons to take the necessary precautions to avoid accumulation of data. This problem faced many countries after an advanced information system was first introduced in their medical institutions, they were concerned that the time taken by the doctor or sister in operating the computer will be subtracted from the time allocated to the care of their patients. This concern was largely alleviated by advocating the new system and making the medical personnel feel and appreciate that the new system is highly beneficial. Consequently training of the personnel and their determination to use the new system and their commitment to the immediate data entry was crucial to safeguard the effectiveness of the system. The use of a software which is specially designed to be used in hospitals and is flexible enough to address the needs of individual hospitals will add to the convenience and effectiveness of the system. All ,or at least most, of the common classifications of diseases may be included as options in the software which will not consume much time , just a click by the mouse and the doctor can select the appropriate diagnosis. The rare or highly specialized diagnoses may be completed by writing on the key board.

2. Lack of trained personnel： 16 employees work in the statistical department , 3 of them are males (19%) , and 13 females (81%) .Only 19% of them are trained in biostatistics while the others have not received any training courses and they work as clerks.

The task of collecting and analyzing the data is laid on them ,and they find difficulty in identifying diseases and medical terminology written in a foreign language. Their deficiency in statistical and computer skills resulted in their reliance on the manual or paper system, even the annual reports are just written in paper without accompanying graphic presentation of the data as bar charts, pie charts etc.

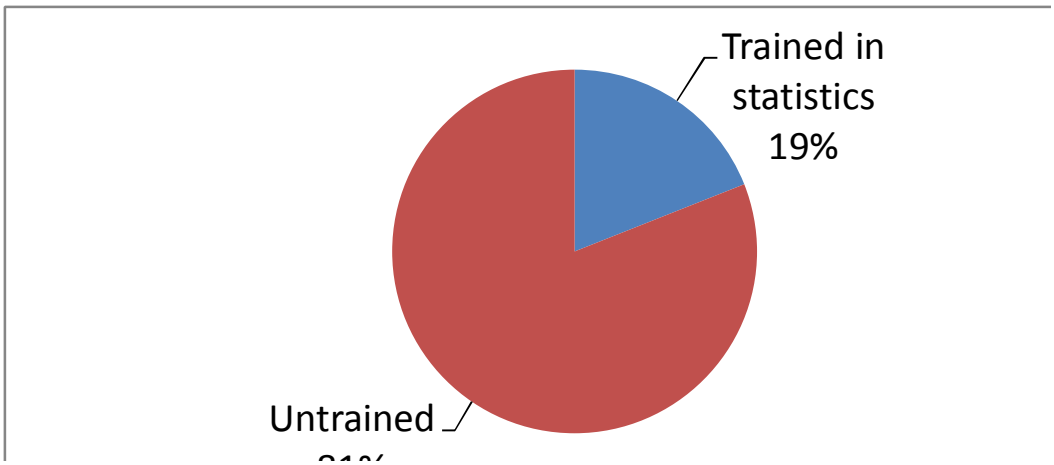

Figure (5): Statistics Department Personnel

3. Low computer skills : There is no computer in the department , all the work was done on paper. 9 persons only (56%) can operate the computer, (44%) have no computer experience. The Medical Records Department in any medical institution anywhere in the world is not, of course, a place where to throw the patients' papers, complete or incomplete, and then lose an invaluable time trying to extract them. It actually represents the central nervous system of the hospital and can be utilized by health care managers as the most important source of

information. Medical records departments have been converted into information management departments in many developing countries , India may be taken as a good example of that [9].

2006/2007	2007/2008	2008/2009	2009/2010	2010/2011	2011/2012	2012/2013
26235	30701	36559	40246	42559	45376	47322

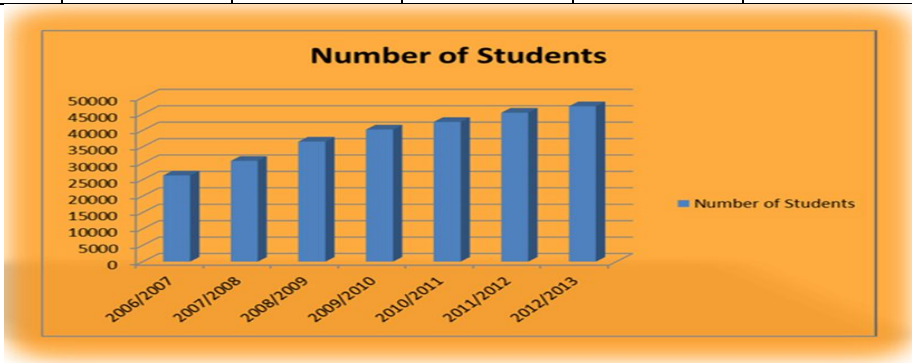

Table 2 & Figure (6) Number of students in Zawia university

Reviewing the data in Zawia University and the teaching hospitals belongs to it:

At the University; there is a gradual increase of total number of the students admitted each year (Table 2, figure6) with needing of primary health care services and improper of information technology systems for health services.

At the teaching hospital; there is not special health sectors for students, deficient hospital information system and net, and missing medical records.

Conclusion and Recommendations

1. Data extracted from the outpatient department of Khartoum University students health services, and analyzed in this study are preliminary, lacking precision, and did not include the final diseases' diagnosis.
2. The statistics department, in its present situation, is backward since it depends on paper system and manual work and most of the personnel are not trained in statistical methods and techniques.
3. Data from University of Zawia needs to be organized with employment of primary health services for students, and information technologies appliance.
4. There are a lot of gaps in the information included in the paper records and reports. A high proportion of data missing was noticed.
5. The only sound solution we can see for the problem of low information quality is to apply a computerized information system, link the medical, non-medical and the administration via a net, and train doctors and non –medicals to use the system properly and effectively.
6. Application of total quality management (TQM) in all universities' sectors to improving students revenue.

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