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VOLUME 18 ISSUE 3 VERSION 1.0



GLOBAL JOURNAL OF MEDICAL RESEARCH: K
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INTERDISCIPLINARY

VOLUME 18 ISSUE 3 (VER. 1.0)

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GLOBAL JOURNAL OF MEDICAL RESEARCH: K
INTERDISCIPLINARY
Volume 18 Issue 3 Version 1.0 Year 2018
Type: Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals
Online ISSN: 2249-4618 & Print ISSN: 0975-5888

The Role of Time Dilation for Consciousness

By Nergis Üstoğlu
Maltepe State Hospital

Abstract- There will be no sense of consciousness, time concept and perception of change as long as the momentary coding of now in the external space does not co-exist with time dilation. Exact linear coding, at best, could be a copy of the outer space, but it does not contain consciousness. The spatial properties of the system enable spontaneous and instantaneous experiencing time and motion. The structuring in the micro-environment, which is different from what our senses can perceive, has a different and relative 'time' of this universe. This space and time create the information called consciousness.

GJMR-K Classification: NLMC Code: WL 341



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The Role of Time Dilation for Consciousness

Nergis Üstoğlu

Abstract- There will be no sense of consciousness, time concept and perception of change as long as the momentary coding of now in the external space does not co-exist with time dilation. Exact linear coding, at best, could be a copy of the outer space, but it does not contain consciousness. The spatial properties of the system enable spontaneous and instantaneous experiencing time and motion. The structuring in the micro-environment, which is different from what our senses can perceive, has a different and relative 'time' of this universe. This space and time create the information called consciousness.

I. INTRODUCTION

The cortical layer with pyramidal neurons in the dendrites appears in the deeper and faster area for information processing in soma cells. Microtubules are composed of cylindrical dynamic polymers comprised of Fibonacci sequence and tubulin proteins with helical geometry. The exploration of quantum vibrations in microtubules in brain neurons and the demonstration that EEG rhythms derived from deep microtubule vibrations support this theory (6). Quantum conductance is enhanced by mechanical vibration and microtubules that have been observed to have their own vibration sets (11, 12).

Microtubule information processing occurs with hierarchical modular fractal-like structures. The human brain contains large telescopic frequencies modulating the amplitude of high ones. The physiological architecture of these undiscovered frequency models is different from the other dynamics in nature (2.8). It is associated with quick restructuring. This may be turning into a self-conscious, self-contained, self-comprehending, non-linear, non-causal, self-apprehending data in a different space by carrying the external knowledge into the micro-space in these structures that become repetitive as they get smaller.

Observation occurs at the moment that we call "now". The observer must be in a dilated "now moment" to perceive time and space, and therefore the movement. Relatively more dynamic spatial qualities are required for a relatively dilated "now". The nervous system bio-structure allows this. At the micro level, the concept of time in this space, which is different from what we perceive, is also dilated and relativistic.

Benjamin Libet showed in his experiment that the cerebral activity readiness potential (RP) of the subject started at least a few hundred milliseconds before the subject decided to do a motor movement. He

wanted them to determine the time on the fast-moving clock when they consciously decided to move their fingers. He noticed that the subject made conscious decisions about 200 milliseconds before the finger movement, but what was more interesting was that he observed cerebral readiness potential in the EEG about 350 milliseconds before this conscious decision moment. It has been concluded that conscious actions were actually initiated by unconscious processes. The conscious intention was actually an illusion. (7)

All of the RP that start early may be conscious. That is to say; free will can be caused by the relatively dilated time of the system rather than illusion. Just like faster aging and elapsing of time for a stationary observer in comparison to a traveler moving close to the speed of light; and slower aging, slower thinking, and slower time for the traveler close to the speed of light, in an external observation. In the Libet experiment, the brain readiness potential has been thought as the relatively fast going traveler. He has a dilated long time according to the one measured by the stationary observer. The external one is found in a few hundred milliseconds. The brain, like the observer close to the speed of light, will perceive with its inner clock that the duration is short. It decides in a short "now" moment. The shortest self-moment of the consciousness, at the moment that we call "now", corresponds to a longer external time span and all the data obtained in the meantime are processed in this short but objectively dilated time span.

Gray observed in 2004 that; "The speed of the ball after a serve is so great, and the distance over which it has to travel so short, that the player who receives the serve must strike it back before he has had time consciously to see the ball leave the server's racket" and claims that "conscious awareness comes too late to affect his stroke." (13)

In practice, though, tennis players claim that they see the movements of the ball consciously. The cerebral activity that starts before the beginning of the conscious action will not give enough time to meet the ball. At the moment when the ball leaves the hand of the rival, the brain mobilizes, consciously, when the photon coming from the ball alerts the visual system. However, the time of external events is determined longer, including the self-imaging methods of the brain or EEG. Consciously, seeing the exit of the ball, exists throughout the entire period detected with EEG. Subjectively, this period is much shorter in the brain's inner clock.

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The mind encodes all the possibilities that come from the external macro-cosmos in its structure. The information of this universe is not the substance; it is the no calculation requiring, self-reflecting, inherently, inclusive and comprehensible micro-space information "Quela". The conscious that computes via the connections between the neurons in bio-structures and embedded in the "now" uses the information that contains awareness.

It has been observed that the visual system was not stable. One of the unexplained movements in vertebrates and invertebrates is small active eye movements that occur even in full fixation. These movements terminate the instability of visual information. The first direct measurement of microscopic eye movements (1, 4, 9) allows continuous and very smooth change of view, with the unintentional, continuous activity of the small eye movements, which are not noticed by the observer and exist even during visual fixation. For the system to maintain a high-resolution image, the eye must be moving. Suppression of miniature eye movements causes fading in the retinal image within a few seconds. (5, 10)

Visual perception is assumed to be based on a sensory data obtained during fixation and fixation pauses. The image reflected on the retinal photoreceptors changes every few hundred milliseconds and the photoreceptor response changes on each new one. (14)The system ignores immediate cortical output after a saccade, up to **200 ms**, known as saccadic suppression.

Unlike the camera, the movement of the foveal photo-receptors during natural vision may be necessary for the understanding of time and motion in a dilated "now". In Libet experiment, the RP that started a few hundred milliseconds before the conscious decision complies with the scan time of saccadic eye movements. In the "now" moment, the information obtains new inputs through saccadic movements in the same period after the dilated moment of the brain as a result of external measurements. The image reflected on the retinal photoreceptors changes per a few hundreds of milliseconds, as much as the dilated time of the brain measured as readiness potential, and the photoreceptor response changes in each new image. The retinal photoreceptors receive new inputs after each saccade. The sampling of visual information is related to periodical re-synchronization of external and conscious perception because of temporal and spatial relativity and because it is more rhythmic than continuous.

Analysis moving from Paradox: (15)

Zenon of Elea claimed that visual movement is an illusion. In the arrow paradox, the flying arrow is at rest, which result follows from the assumption that time is composed of moments. He says that "if everything, when it occupies an equal space, is at rest, and if that

which is in locomotion is always in a now, the flying arrow is therefore motionless." (Aristotle Physics, 239b.30)

The distinction between two different space units is necessary for the perception of motion. Suggesting that the physical part of the arrow, in non-measurable, differential time interval is to be seen is a paradox of the proposition. The unmeasurable differential part corresponds to the unmeasurable moment. However, at least two different space-time units should be observed within the same moment for the movement to be perceived. The only resolution of the paradox is possible when the what is sensed by the observer as "now" coincides with a moment dilated in the conscious. As the brain can tell apart two points only when they are in the same space, two sequential moments can only be comprehended in a dilated cognitive moment. This relativity is required for the perception of movement which is then necessary for the change of space given time. In this situation, the brain can observe the dialectic in the space-time which is primary for its perceiving power.

The human eye can detect wavelengths between 380 and 700 nm on average. The observer cannot detect wavelengths below 380 nm. Therefore, it is imperative that the subjective and objective time has different frames of reference to observe the visible light within the moment. In a subjective "now", the two discrete objective points of the arrow must be contained.

In the relativity formula $(\Delta S)^2 = (c\Delta t)^2 - (\Delta x)^2$, the smallest average visible wavelength is 380 nm.

$(380 \text{ nm})^2 = (2.99792458 \cdot 10^{17} \text{ nm / sec})^2 T^2 - 0$, Since the cognitive perception of the photon coming to the retina at **380 nm** frequency will be point-based, $x = 0$, it has to be dilated,

$$T = 1.267543561753 \times 10^{-15} \text{seconds.}$$

If we define the moment as a point in time, it should correspond to a concrete time, such as $1.267543561753 \times 10^{-15}$, in comparison with its dimensionless, abstract value. In the dilated state of consciousness, more than one point is observed in more than one moment without dimension in the outer space-time. In the four-dimensional space-time, the quantitative frequency in the 380nm length forms the perception of the purple color ontologically, corresponding to only one point-space in the cognitively dilated moment.

The two points and the point-time of the arrow, which are necessary for the perception of the movement of Zenon's observer, are observed only due to a certain measurable and dilated "now" in the consciousness. The brain's topology processes the four-dimensional space-time in a single instant through overlapping. As consciousness observes a point in space, it also

recognizes consecutive moments over time. The relativity of the mind concerning its environment, allows it to form a time concept by sensing the multiple time units around it.

The brain of an archer works as if someone who travels close to the speed of light perceives the movement of a person on the earth in an accelerated manner. In evolutionary terms, it would be advantageous to have more information than the environment to sustain existence. Time dilation allows obtaining more inputs.

Zenon's paradox cannot be solved with an absolute time approach. For time consciousness, the subjective space-time must dilate to encompass external space-time. It is the relativity between the mind and the universe that creates the sense of time. The mind follows the object of its own which is a part of the universe relatively at the moment. It perceives the external space and the bodily sensation which is a part of it, as long as it is more dynamic and relativistic.

II. CONCLUSION

At the moment we say "now", the coding parallel to the external information cannot create consciousness. Conscious is a phenomenon that demonstrates itself for the "now". Therefore, a temporal relative dilation of "now" is necessary in a space that is different, more self-contained, and self-comprehending than we perceive. For the movement to come out in the "now", the observation of the shift in the space within the dilated time that we call moment is a necessary condition. A few hundred milliseconds of readiness potential detected in the EEGs might stem from the temporal expansion.

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GLOBAL JOURNAL OF MEDICAL RESEARCH: K
INTERDISCIPLINARY
Volume 18 Issue 3 Version 1.0 Year 2018
Type: Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals
Online ISSN: 2249-4618 & Print ISSN: 0975-5888

Intestinal Parasitic Infections between Patients Attended to Soba University, Khartoum, Sudan, July-September 2016

By Mosab Nouraldein Mohammed Hamad

Elsheikh Abdallah Elbadri University

Abstract- Background: Intestinal parasitic infections are amongst the most common infections throughout the world. It is estimated that some 3.5 billion people are affected, and that 450 million are ill as a result of these infections, the majority being children.

Rationale: Intestinal parasitic infections lead to nutritional deficiency and impaired physical developments which will have negative consequences on cognitive function and learning ability.

Objective: To detect prevalence of intestinal protozoa among patients attended to soba university hospital during the period of the study.

Material and Method: Descriptive, cross sectional study, stool specimens were collected from 113 patients attended to Soba university hospital and examined by wet preparation and concentration techniques.

Discussion: Our result represent that the level of sanitation is moderate compared with other studies mentioned above, but we need to perform stool concentration methods to confirm this suggestion.

Result: 15.92% of stool specimens examined were positive for intestinal parasites.

Conclusion: Further studies are required with large sample size, long duration and stool concentration techniques.

Keywords: prevalence, intestinal parasites, patients.

GJMR-K Classification: NLMC Code: WA 240



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I. INTRODUCTION

Intestinal parasitic infection is the common parasitic infection worldwide, particularly in the developing countries, due to overcrowding, bad sanitation and contamination of drink water resources in that area from the world. Children are the most affected group because of low immunity due to malnutrition, infections, pollution, inadequate health care facilities and conflicts.

Most of intestinal parasitic infections are transmitted through drinking of contaminated food or drinking polluted water and the behavior of local population, whom defecate in the night soil, due to absence of well-constructed latrines enhance the spreading of that type of parasitic infections between the individuals of such community.

Study done by Curval LG et al, in Midwest Brazil, showed that; the overall prevalence was 20.2%.⁽¹⁾

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Study done by Astal Z in Khan Younis Governorate, Gaza strip, showed that the general prevalence of intestinal parasites was 34.2%.⁽²⁾

Study done by korzeniewski K, in eastern Afghanistan, showed that; 38.8% of the study population were infected with intestinal parasites.⁽³⁾ Study done by Abolfath Shojaei Arani, in a population in South of Tehran, Iran, showed that; prevalence period of 10.7%.⁽⁴⁾

Study done by A. Dudlova et al, in Slovakia, showed that; the prevalence of gastro- intestinal parasitic infection was 6.81%.⁽⁵⁾ In study done by David NA Aka et al, in Abidjan, Cote Divoire, showed that the overall prevalence of intestinal parasitic infection was 19.3%.⁽⁶⁾

II. RATIONALE

Intestinal parasite infections lead to several complications, however, most of cases were being asymptomatic carriers and usually tend to be chronic. Helminthic infestation lead to nutritional deficiency and impaired physical developments which will have negative consequences on cognitive function and learning ability.

III. OBJECTIVES

To detect prevalence of intestinal parasites among hospital patient admitted to Soba University hospital.

IV. MATERIAL AND METHODS

a) Study Design

Descriptive, cross sectional study.

b) Study Period

From July to September 2016.

c) Study Area

Soba University hospital, Sudan.

d) Sample Size

113 Stool Samples.

e) Study Population

Patients with abdominal pain attended to soba university hospital, from July to September 2016.

f) Ethical Consideration

All participants were consent to participate in the study.

V. METHODOLOGY

Specimen: Stool Specimen

Method of Diagnosis: Wet Preparation

VI. RESULTS

15.92% of stool specimens examined were positive for intestinal parasites.

VII. DISCUSSION

Our result represent that the level of sanitation is moderate compared with other studies mentioned above, but we need to perform stool concentration methods to confirm this suggestion.

VIII. CONCLUSION

Further studies are required with large sample size, long duration and stool concentration methods.

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GLOBAL JOURNAL OF MEDICAL RESEARCH: K
INTERDISCIPLINARY
Volume 18 Issue 3 Version 1.0 Year 2018
Type: Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals
Online ISSN: 2249-4618 & Print ISSN: 0975-5888

Quality of Life Assessment among Adult Epileptic Patients Taking Follow Up Care at Jimma University Medical Center, Jimma, South West Ethiopia: Using Quality of Life in Epilepsy Inventory-31 instrument

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Methods: Institution based cross sectional study was used. A total of 314 epilepsy patients already receiving antiepileptic drugs for at least 3 months were randomly selected and interviewed. Quality of life in epilepsy inventory-31 instrument was used to measure health quality of life. T-test, one way Anova and Pearson correlation were used to compare means and association between dependent and outcome variables. Multiple Linear regression analysis was performed to assess the association between health related quality of life and explanatory variables. P value < 0.05 was considered statistically significant in this study.

Keywords: *epilepsy, quality of life, qolie-31 instrument, jumc.*

GJMR-K Classification: *NLMC Code: WL 340*



Strictly as per the compliance and regulations of:



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Result: From the total study participants, 304 (96.8 %) were interviewed. The average total Quality of life score of domains/subscales was; Seizure worry (50.8±19.9); Overall Quality of life (59.8±20.0); Emotional wellbeing (59.1 ±14.8), Energy/fatigue (59.9 ±13.6), Cognitive function (56.0 ±15.5), Medication effects (61.5±19.4), Social functioning (63.6 ± 17.7) and total (Overall) quality of life (58.8±10.6). Sex, Residence of the client, occupational status, performing regular exercise, Doing daily activities independently, Sleep pattern, Frequency of Anti Epileptic drugs (AEDs) taken/day, Side effect of the treatment, age of the patient when Anti Epileptic drugs started, current co-morbidities and Level of anxiety and depression was significantly associated with at least one of the seven domains of Quality of life score.

Conclusion and Recommendation: Being female, Rural residence, Taking AEDs several times per day, becoming older age, side effect of treatment, current comorbidity with anxiety and depression and other disease, and also those with perceived stigma were associated with lower quality of life. On the other hand performing regular exercise, performing daily activities and enough and regular pattern of sleep were

related to better QOL. In addition to controlling seizure, interventions to address the physical, mental, psychological, social and emotional aspects for health wellbeing is likely to achieve better health outcomes for epileptic patients.

Keywords: epilepsy, quality of life, qolie-31 instrument, jumc.

I. INTRODUCTION

Epilepsy is a neurologic disorder characterized by recurrent episode of seizure. The cause of epileptic seizure is often unknown but in some people the condition is inherited also it is caused by brain damage due to different causes [1].

Epilepsy is public health problem in the world. It has been estimated that at least 70 million people suffer from epilepsy and epilepsy is responsible for 1% contribution to the global burden of diseases while this contribution is 80% in the developing countries [2,3]. The incidence rate of epilepsy is generally higher in developing countries compared to developed countries which are figured in median as 43.4/100 000 people per year and 68.7/100, 00 people per year in developing countries [4]. In Ethiopia, crude incidence of epilepsy is 64 per 100,000 [5].

Epilepsy can be associated with profound physical, psychological and social consequences [6]. It may interfere with social functioning by limiting educational opportunities, employability, and interpersonal relationships and also increase the risk of death [7].

Quality of Life (QOL) has been defined by the World Health Organization (WHO) as an individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns. It is a broad ranging concept incorporating in a complex way the person's physical health, psychological state, level of independence, social relationships, personal beliefs and their relationship to salient features of the environment [8].

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Improving the diagnosis, treatment, prevention, and social acceptability are important factors in achieving the objective of the management of epilepsy. Quality of life is recognized as an important outcome in epilepsy treatment [9].

The investigator has come across a limited study done in Ethiopia addressing quality of life among epileptic patients. Thus main aim of this study was to determine cognitive, emotional, social, physical and psychological aspect of QOL by using Quality Of Life in Epilepsy Inventory-31(QOLIE-31) instrument among adult epileptic patients taking follow up care at Jimma University Medical Center (JUMC).

II. METHODS AND MATERIALS

a) Study design and population

A cross-sectional study was conducted in chronic illness clinics of JUMC between March 1/2015 – May1/ 2015. The study population was all people aged 18 years and above who had been on anti-epileptic drugs for at least 3 months with an expectation that patients would have a good experience on AEDs and possibly would knowledgeably describe seizure control features [10, 25]. By using Single population formula a total of 314 samples were selected based on a study report which shows the proportion (P) of epileptic patients who are in lower Health Related Quality of Life (HRQOL) were 45.8% [17]. The estimated 5% margin error of the true HRQOL (on 0–100 scale) with 95% Confidence interval was used with 10% non-response rate. The hospital gives follow up care for epileptic patients every Thursday, thus using systematic sampling, a sampling interval of 3 patients were enrolled and interviewed on a weekly basis for a period of 8 weeks.

b) Data collection instrument

The questionnaire had 5 parts, HRQOL instruments (QOLIE-31), Hospital Anxiety and Depression Scale (HADS), Sociodemographic, medical and personal factors.

In this study HRQOL was measured based on total score of Quality Of Life in Epilepsy (QOLIE)-31questionner. A QOLIE- 31questionner- containing 31 items categorized under seven domains covering the following concepts of health: overall quality of life, cognitive functioning, emotional well-being, social functioning, energy/fatigue, seizure worry and medication effects.

Energy/fatigue scale Assess feelings of tiredness, loss of energy and the overall impact of this issue on life Emotional well being (mood) scale assess the mood of the client such as feeling of nervousness, being calm and peaceful, happiness Social functioning domain assess how the Health limited social activities (such as visiting with friends or close relatives) Cognitive functioning scale used to assess mental activity such as thinking, reading, concentrating and memory problems

Medication effects scale assess the physical and mental effect of AED, as well as worries about the medication taken Seizure worry scale assess impact of seizures such as bothering and worries about having another seizure, hurting from seizure, embracement or social problems resulting from having seizure next time. Overall quality of life scale considers the above all domains or scales.

The score corresponding to each scale as well as QOLIE-31 total score was calculated for each patient. Each item is scored on a scale of 0 to 100, with a score of zero equivalent to maximum disability or worst quality of life and a score of 100 equivalent to no disability or a high quality of life. However, possible categories or response sets for scoring vary across questions. Examples of response sets used include (i) 0, 25, 50, 75, 100; (ii) 0, 20, 40, 60, 80, 100; (iii) 0, 33,67, 100. Hospital Anxiety and Depression (HAD) Scale was used to measure patient's current comorbidity with anxiety and depression which may affect patient's quality of life [24].

Questions on patient socio-demographics, personal factors such as (perceived stigma and sleeping pattern) and some clinical characteristics (such as partial or generalized epilepsy type) were also included in the integrated questionnaire. Medical records were reviewed to extract additional information pertaining to the date of initiation of AEDs, and type of therapy (poly-therapy or mono-therapy).

The questionnaire was administered by trained nurses hired from other hospitals and technical support was given by the Principal Investigator.

At time of data collection filled questionnaires was checked for completeness and consistency of information by the supervisor on daily basis and typing errors was manually edited.

Questionnaire was prepared in English and translated to local language. Questionnaire was pre-tested on 5% of sample size a week before actual data collection period in other public (Shenen Gibe) hospital and after pre-test necessary modification was done.

c) Variables

Dependent variables: The Seven domains of QOLIE-31 (Social function, Medication effect, Cognitive Function; Overall quality of life; Seizure worry; Emotional wellbeing and Energy/Fatigue)

Independent variables: Sociodemographic, Clinical and Personal factors.

III. DATA ANALYSIS PROCEDURE

The coded data was checked, cleaned and entered into Epi data version 3.1 and then analysed by SPSS window version 20.0.

Frequencies and percentages were used to summarize the Sociodemographic, personal factors and medical characteristics of the patients.

Independent t test and one way Anova was done to compare means, and also Pearson correlation was done between the dependent and continuous independent variables. Then those variable with $P < 0.2$ was selected for regression.

Linear regression was performed to assess the association between HRQOL and different explanatory variables. P value < 0.05 was considered statistically significant in this study.

Finally the result was presented using statement, tables and figures.

Ethical Approval

Before the data collection, ethical clearance letter was obtained from ethical review committee of Jimma University College of public health and medical sciences. The letter was submitted to the JUMC management and permission was obtained to interview as well as access patients and their medical records. The respondents were informed about the purpose of the study, and their oral consent was obtained. The respondents' right to refuse or withdraw from participating in the interview was fully maintained and the information provided by each respondent was kept strictly confidential by making each questionnaire coded and not sharing personal information of any patient to the third party.

IV. RESULT

Socio-demographic, Clinical and Personal Characteristics of the respondents

From the total 314 study participants enrolled, 304 were interviewed. Of the total respondents, 177 (58.2%) were male; the average age was 28 years and only 133 (43.8%) were currently married. Majority of the participants, 198(65.1%), at least able to read and right and 124 (40.8%) of them were Farmers; 207(68.1%) of them were Rural dwellers. Cost of treatment for epilepsy among 260 (85.5%) participants was free.

Regarding the seizure type, 271 (89.1%) subjects had generalized onset seizure and 33 (10.9%) has focal onset (partial) seizure. 260 (85.5%) respondents has at least one seizure per year and 44 (14.5%) of them were seizure free at least for a year. The average age of the respondents when they get epilepsy and age of the pt when AEDs started was 18 and 21 years respectively. Concerning the type of AEDs, 191 (62.8%) and 90 (29.9%) respondents take one and two AEDs respectively. Also 165 (54.3%) and 136 (44.7%) respondents take AEDs once and twice per day respectively. Out of the total respondents, 119 (39.1%) reported side effect of the AED treatment; 104 (34.9%) of them reported complications related to epilepsy. 63 (20.7%) and 56 (18.4%) clients has current comorbidities (other than depression and anxiety) and previous history of hospital admission respectively (Table 1).

From the total respondents, 100 (32.9%) of the respondents have expressed perceived stigma due to the disease (epilepsy); 266 (87.5%) of the respondents were reported they are compliant to self care and 259 (85.2 %) perform daily activities (work) independently. Also 227 (74.7 %) of clients have reported family support in their day to day life. Concerning substance abuse 66 (21.7%) of the client ever used substance and 47 (15.5 %) were using substances currently. Regular physical exercise and enjoying recreational activities are practiced among 52 (17.1%) and 132 (43.4 %) of the respondents. 237 (78%) of clients get enough and regular sleep daily (Table 2).

According to Hospital Anxiety and depression scale (HAD scale, 106 (35%) and 88 (29 %) of patients has abnormal score of anxiety and depression respectively (Table 3).



Table 1: Clinical characteristics of the respondents at

Variable	Categories	Frequency	Percentage %
Seizure type	Generalized onset seizure	271	89.1
	Focal onset seizure	33	10.9
Seizure frequency	≥1 seizure per year	260	85.5
	Seizure free for a year	44	14.5
Number of AEDs	One	191	62.8
	Two	91	29.9
	Three	20	6.6
	Four	2	0.7
Frequency of AEDs taken per day	One	165	54.3
	Two	136	44.7
	Three	3	1
History of current comorbidity	Yes	63	20.7
	No	241	79.3

Table 2: Personal Characteristics of Respondants at JUMC, Jimma, Ethiopia, 2015 (n= 304)

Variable	Categories	Frequency	Percentage %
Perceived self esteem	Yes	234	77
	No	70	23
Perceived Stigma	Yes	100	32.9
	No	204	67.1
Compliance to Self-care	Yes	266	87.5
	No	38	12.5
Family support	Yes	227	74.7
	No	77	25.3
Regular Exercise	Yes	52	17.1
	No	252	82.9
Recreational activities	Yes	132	43.4
	No	172	56.6
Enough and regular sleep	Yes	237	78.0
	No	67	22.0

Table 3: Respondants current level of anxiety and depression measured by HAD scale. (n=304)

Variable	Categories	Frequency	Percentage (%)
Level of anxiety	Normal	74	24.3
	Borderline abnormal	124	40.8
	Abnormal	106	34.9
Level of depression	Normal	92	30.3
	Borderline abnormal	124	40.8
	Abnormal	88	28.9

Mean scores of QOL domains of QOLIE-31 among epileptic patients at JUMC, Jimma, Ethiopia, 2015. (n= 304)

The average total QOL score of domains/subscales was as follows: Seizure worry (50.8±19.9); Overall QOL (59.8±20.0); Emotional wellbeing (59.1 ±14.8), Energy/fatigue (59.9 ±13.6), Cognitive function (56.0 ±15.5), Medication effects (61.5±19.4), Social functioning (63.6 ± 17.7) and total (Overall) quality of life (58.8±10.6). 153 (50.3%) have Overall HRQOL score of Greater than the mean and 151(49.7%) have Overall HRQOL score of less than the mean.

Factors associated with socio-demographic, personal characteristic and clinical factors with the seven domains of QOL

On bivariate analysis the factors found to fulfill the minimum requirement (p-value<0.2 in this study) were entered in to linear regression for further analysis in order to control confounding effects.

The results of linear regression analysis showed Sex, Residence of the client (urban or rural), occupational status, performing regular exercise, Doing daily activities independently, Sleep pattern, Frequency of AEDs taking/day, Side effect of the treatment, age of the patient when AEDs started, current co-morbidities and Level of anxiety and depression was significantly

associated with at least one of the seven domains of QOL score (table 4-8).

Overall quality of life domain: was significantly associated with level of depression (P= 0.006) (Table 6).

Seizure worry domain: of quality of life was significantly associated with occupational status, performing regular exercise, Perceived stigma because of the illness, current co-morbidities, Level of anxiety and level of depression(P<0.05) (Table 4).

Emotional wellbeing domain: was significantly associated with Sex, Perceived stigma because of the illness, Level of anxiety and depression (P<0.05) (Table 6).

Energy/Fatigue domain: was significantly associated with Level of anxiety and depression (P<0.05) (Table 6).

Cognitive Function domain: was significantly associated with Residence of the client (urban or rural), frequency of AEDs taking per day, Side effect of the treatment, current comorbidity, Having enough and regular sleep, and Level of anxiety and depression(P<0.05) (Table 7).

Medication effect domain: was significantly associated with level of anxiety and depression, Doing daily activities independently, Perceived stigma because of the illness and age of the patient when AEDs started (P<0.05) (Table 8).

Social functioning domain: was significantly associated with level of anxiety and depression, frequency of AEDs taking per day and current co-morbidity (P<0.05) (Table 5).

Table 4: Multivariable analysis result of variables predicting the seizure worry of QOLIE-31 instrument among epileptic patients at JUMC, Jimma, Ethiopia. 2015 (n= 304)

QOLIE-31 domains	Variables	Unstandardized B	P	95% CI for B	
				Lower Bound	Upper Bound
Seizure worry	Constant	48.568	.000	32.502	64.635
	Current co-morbidities Yes No	-9.889	.001*	-15.548	-4.229
	Performing regular physical exercise Yes No	6.409	.040*	.305	12.513
	Housewife Non housewife (ref)	-18.154	.001*	-29.010	-7.298
	Student Non student (ref)	-8.753	.028*	-16.536	-.970
	Anxiety No anxiety(ref)	-7.653	.012*	-13.606	-1.700
	Depression No depression(ref)	-8.598	.005*	-14.591	-2.605

Dependent variable: Seizure worry domain

Non housewives: Those without occupation, Merchants, Farmers, Daily laborers, Governmental employees and Students

Non students: Those without occupation, Merchants, Farmers, Daily laborers, Governmental employees and Housewives

*Note: *represents variables having statistically significant association. ref: Represents "reference"*

Table 5: Multivariable analysis result of variables predicting social functioning domain of QOLIE-31 instrument among epileptic patients at JUMC, Jimma, Ethiopia, 2015. (n= 304)

QOLIE-31 domains	Variables	Unstandardized B	P	95% CI for B	
				Lower Bound	Upper Bound
Social functioning Domain	Constant	78.122	.000	71.392	84.851
	Frequency of AED taking /day Once/day ≥2 times/day	5.581	.004*	1.769	9.393
	Current comorbidities Yes No	-6.060	.011*	-10.731	-1.389
	Anxiety No Anxiety(ref)	-8.365	.002*	-13.602	-3.128
	Depression No depression(ref)	-6.485	.017*	-11.809	-1.160

Dependent variable: social functioning domain

Note: *represents variables having statistically significant association.

ref: Represents "reference"

Table 6: Multivariable analysis result of variables predicting the Emotional wellbeing, Energy/Fatigue and Overall QOL domains of QOLIE-31 instrument among epileptic patients at JUMC, Jimma, Ethiopia, 2015. (n= 304)

QOLIE-31 domains	Variables	Unstandardized B	P	95% CI for B	
				Lower Bound	Upper Bound
Emotional wellbeing domain	Constant	60.594	.000	50.876	70.312
	Sex Male Female(ref)	4.368	.007*	1.228	7.507
	Perceived stigma Yes No	-6.406	.000*	-9.733	-3.079
	Anxiety No anxiety(ref)	-8.528	.000*	-12.705	-4.351
	Depression No depression(ref)	-9.481	.000*	-13.739	-5.224
Energy/ Fatigue domain	Constant	67.487	.000	64.024	70.951
	Anxiety No Anxiety(ref)	-5.136	.014*	-9.212	-1.060
	Depression No depression(ref)	-8.112	.000*	-12.356	-3.867
Overall QOL domain	Constant	48.954	.000	37.354	60.554
	Depression No depression(ref)	-6.899	.006*	-11.807	-1.991

Dependent variable: Emotional wellbeing domain, Energy/Fatigue domain, Overall QOL domain

Note: *represents variables having statistically significant association.

ref: Represents "reference"

Table 7: Multivariable analysis result of variables predicting the Cognitive function domain of QOLIE-31 instrument among epileptic patients at JMC, Jimma/Ethiopia, 2015 (n= 304)

QOLIE-31 domains	Variables	Unstandardized B	P	95% CI for B	
				Lower Bound	Upper Bound
Cognitive function domain	Constant	85.745	.000	72.511	98.979
	Residence Rural Urban (ref)	-5.255	.003*	-8.722	-1.788
	Frequency of AEDs taking/day Once/day ≥2 times /day (ref)	4.122	.011*	.941	7.302
	Side effects of AEDs Yes No	-3.568	.029*	-6.766	-3.370
	Current comorbidities Yes No	-4.997	.014*	-8.987	-1.008
	Enough and regular sleep Yes No	3.866	.046*	.062	7.669
	Anxiety No anxiety (ref)	-6.792	.002*	-11.126	-2.457
	Depression No depression (ref)	-11.902	.000*	-16.278	-7.526

Dependent variable: Cognitive function domain

Note: *represents variables having statistically significant association.

ref: Represents "reference"

Table 8: Multivariable analysis result of variables predicting the Medication effect domain of QOLIE-31 instrument among epileptic patients at JMC, Jimma/Ethiopia, 2015 (n= 304)

QOLIE-31 domains	Variables	Unstandardized B	P	95% CI for B	
				Lower Bound	Upper Bound
Medication effect domain	Constant	77.888	.000	69.932	85.844
	Doing daily activities Independently Yes No	7.496	.012*	1.678	13.314
	Perceived stigma Yes No	-5.372	.019*	-9.838	-.906
	Age of the patient when AEDs started	-.723	.020*	-1.329	-.116
	Anxiety No Anxiety(ref)	-11.375	.000*	-17.249	-5.501
	Depression No depression (ref)	-7.926	.006*	-13.567	-2.286

Dependent variable: Medication effect domain

Note: *represents variables having statistically significant association

ref: Represents "reference"

V. DISCUSSION

Epilepsy has a great influence on the three levels of quality of life (physical, mental and social health), where the social functioning has a significant role in obtaining a good QOL.

In the current study, sex is associated with emotional well-being function. It was found that among

the Male patients emotional well-being domain of QOL score were higher than female a counterpart which is similar with the Indian studies [11, 12]. These women came from both urban and rural areas in economic transition. This may indicate that biological and psychological factors (family issues, personal life, and motherhood) may play a more important role. Therefore,

future studies need to find the reason for this lower quality of life in women with epilepsy.

In this study, residence of patient was associated with cognitive aspect quality of life. Those clients living in rural area has lower quality of life. This may be related to information difference about the disease and treatment, higher cost and distance to reach health institution among the rural residents and also may be higher social isolation in the rural area. This result is similar with previous studies done in Kenya and India [13, 14].

Seizure worry domain of quality of life is associated with occupation of the patient. According to study quality of life is decreased among housewife and students. The groups are dependent to other family members for economic dependence. This study is similar with previous studies [13, 15, 16, 25].

Regarding clinical factors, frequency of AEDs taking per day was a factor associated with cognitive function and social function domains. Quality of life is higher among patients who were taking AEDs once a day (QD) than two or greater times per day. Similarly different literatures [10, 15-18] suggested that polytherapy receiving patients had lower mean QOL score as compared to their counterpart.

In this study cognitive aspect of quality of life was associated with Side effect of the treatment. Those patients who reports side effect of current AEDs has lower quality of life. This finding is concurrent with previous study done including Uganda and South Korea with the same instrument [3, 10, 19].

In current study medication effect and social function domain of quality of life has association with patient's age when AEDs started. Quality of life decreased as among clients who started AEDs at older age which is similar with study finding from South Korea [15]

According to this study, overall HRQOL score and all domains of quality of life score is decreased among patients experiencing current comorbidity. Having current anxiety and depression decreased overall HRQOL score than those without anxiety and depression. This was consistent with the result of most studies which assessed comorbidities as well as level of anxiety and depression [17, 19-23].

Concerning personal factors of the patients, current experience of having enough and regular sleep associated with higher cognitive function domain of QOL. Also Emotional wellbeing, medication effect and social function domain of quality of life score was lower among patients who experienced perceived stigma because of the illness which is in line with previous studies [10, 15, 17]. Another finding of this study was performing regular exercise was associated with better score of seizure worry domain of quality of life scale. Also Medication effect domain was associated with doing daily activities independently.

VI. CONCLUSIONS AND RECOMMENDATIONS

Being female, Rural residence, Taking AEDs several times per day, becoming older age, side effect of treatment, current comorbidity with anxiety and depression and other disease, and also those with perceived stigma were associated with lower quality of life. On the other hand performing regular exercise, performing daily activities and enough and regular pattern of sleep were related to better QOL.

It is evident that current management of epilepsy that focuses on only seizure control does not improve HRQOL of the patients receiving AEDs. In addition to controlling seizure and antiepileptic drugs side effects, the treatment of epilepsy should include clinical counseling and other interventions to address the physical, mental, psychological, social and emotional aspects for health wellbeing is likely to achieve better health outcomes for epileptic patients. Also recognition of co morbid psychiatric illness like depression and anxiety in people with epilepsy should be of great concern for health care providers.

a) *Consent for publication*

All authors are agreed to disseminate and publish the current research result

b) *Availability of data and materials*

All the data sets used and/or analyzed during this study are included in the article.

c) *Author's contribution*

This work was carried out in collaboration between all authors. Author DS designed the study, performed the statistical analysis, wrote the protocol, and wrote the first draft of the manuscript. Author EH managed the analyses of the study. Author DS managed the literature searches. Both authors read and approved the final manuscript.

ACKNOWLEDGMENTS

We would like to acknowledge Jimma University for financial support and also our extended gratitude goes to those who participated in this study.

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GLOBAL JOURNAL OF MEDICAL RESEARCH: K
INTERDISCIPLINARY

Volume 18 Issue 3 Version 1.0 Year 2018

Type: Double Blind Peer Reviewed International Research Journal

Publisher: Global Journals

Online ISSN: 2249-4618 & Print ISSN: 0975-5888

Comparative Studies on the Antioxidant Enzymes in Bone Marrow Precursor Cells and Mature Rat Polymorphonuclear Leukocytes

By Ms Swechha Mishra, Dr. Sonia Chadha, Sayali Mukherjee & Sangeeta Singh

Indian Institute of Information Technology

Abstract- Continuous blood cell production throughout the lifetime of an individual is ensured by the hematopoietic stem cells (HSCs), which are bone marrow cells that possess extensive self renewal capacity and ability to differentiate to all the blood cell lineages. The redox status of the bone marrow stroma is an important factor determining whether the HSCs would differentiate or remain quiescent. Lower levels of ROS (reactive oxygen species) are required to maintain HSC quiescence, whereas higher ROS levels drive the HSCs out of quiescence and reduces their self renewal capacity. The ROS levels in the bone marrow should therefore be regulated to maintain the self renewal capacity of HSCs. Endogenous antioxidants play an important role in regulation of the ROS levels. The present study was therefore undertaken to examine the changes in the cellular detoxifying defences against superoxide and H₂O₂ i.e. superoxide dismutase (SOD), catalase and glutathione peroxidase (GPx), in the precursor cells from the rat bone marrow and in the rat blood polymorphonuclear leukocytes. An increase in the Catalase and GPx activities in the precursor cells over the differentiated cells was seen. However, the SOD levels in the differentiated cells were greater than in the precursor cells. The levels of Nitric Oxide (NO)- an antioxidant and a regulator of superoxide generation- in the precursor cells were also found to be greater than those in the differentiated cells. The results of the present study thus indicate an up regulation of the endogenous antioxidants in hematopoietic precursor cells, which might be related to the maintenance of their self- renewal capacity.

Keywords: bone marrow precursor cells, polymorphonuclear leukocytes, antioxidants, nitric oxide.

GJMR-K Classification: NLMC Code: WH 200



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Comparative Studies on the Antioxidant Enzymes in Bone Marrow Precursor Cells and Mature Rat Polymorphonuclear Leukocytes

Ms Swechha Mishra ^α, Dr. Sonia Chadha ^σ, Sayali Mukherjee ^ρ & Sangeeta Singh ^ω

Abstract- Continuous blood cell production throughout the lifetime of an individual is ensured by the hematopoietic stem cells (HSCs), which are bone marrow cells that possess extensive self renewal capacity and ability to differentiate to all the blood cell lineages. The redox status of the bone marrow stroma is an important factor determining whether the HSCs would differentiate or remain quiescent. Lower levels of ROS (reactive oxygen species) are required to maintain HSC quiescence, whereas higher ROS levels drive the HSCs out of quiescence and reduces their self renewal capacity. The ROS levels in the bone marrow should therefore be regulated to maintain the self renewal capacity of HSCs. Endogenous antioxidants play an important role in regulation of the ROS levels. The present study was therefore undertaken to examine the changes in the cellular detoxifying defences against superoxide and H₂O₂ i.e. superoxide dismutase (SOD), catalase and glutathione peroxidase (GPx), in the precursor cells from the rat bone marrow and in the rat blood polymorphonuclear leukocytes. An increase in the Catalase and GPx activities in the precursor cells over the differentiated cells was seen. However, the SOD levels in the differentiated cells were greater than in the precursor cells. The levels of Nitric Oxide (NO)- an antioxidant and a regulator of superoxide generation- in the precursor cells were also found to be greater than those in the differentiated cells. The results of the present study thus indicate an up regulation of the endogenous antioxidants in hematopoietic precursor cells, which might be related to the maintenance of their self-renewal capacity.

Keywords: bone marrow precursor cells, polymorphonuclear leukocytes, antioxidants, nitric oxide.

Abbreviations:

Ros Reactive Oxygen Species

Nos Nitrogen Oxygen Species

GR Glutathione reductase

SOD Superoxide Dismutase

I. INTRODUCTION

The metabolic activities have variant degree of differences on the basis of tissue or organ where they are expressed, which leads to differences in their energy requirement. ROS are implicated in expression of several diseases affecting tissues and systems. ROS are mainly Free radicals, considered to have atoms having lone pair of electrons, which is

formed via breaking of covalent bond [1]. Ros can be categorized in two broad groups Oxygen derived free radicals and Nitrogen derived free radicals. These reactive entities are produced outside as well as inside of cell and cell organelles, such as mitochondria [2]. Reactive nitrogen species (RNS) are a family of antimicrobial molecules derived from nitric oxide ($\cdot\text{NO}$) and superoxide (O_2^-) produced via the enzymatic activity of nitric oxide synthase (NOS) and NADPH oxidase respectively. Nitrosative stress is one of the mechanism where (ROS) and (RNS) works together to damage microbial cell. Therefore, these two species are often collectively referred to as ROS/RNS. Functions of various aminoacids can be modified by ROS that may leads to inappropriate actions of proteins like dimerization and interaction with Fe-S [3]. It may also causes impairment of cell function and development of morbit condition [4]. In spite of all the anomiles it causes studies have also showed that ROS are required in a certain amount to maintain proper functioning of signalling pathways and metabolism [5]. Change in redox state by these reactive species might be responsible for proper defferentiation of cell. Changes in the redox balance during differentiation appear to be due to an increase in the rate of O_2^- generation. The effective concentration of oxidants depends on cellular levels of antioxidants-molecules which counteract the oxidants the cells possess several antioxidant enzymes such as superoxide dismutase (which reduces O_2^- to H_2O_2), catalase, and glutathione peroxidase (which reduces H_2O_2 to H_2O). In current work we have indirectly investigated the role of ROS and RNS via doing comparative analysis of antioxidant enzymes in the precursor cells of bone marrow and differentiated cells of blood. Since ROS and RNS play a role in cellular proliferation and differentiation during hematopoiesis, our aim was to compare the level of antioxidant enzymes in the precursor cells of bone marrow and the differentiated cell of blood.

II. MATERIALS AND METHODS

a) *Experimental animal*

Closed-colony-bred male rats, 4-6 weeks of age and weighing 80-100 g were used. They were kept in plastic cages with paddy husk bedding in a temperature between 25-28° C.

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b) *Animal sacrifice and sample collection*i. *Isolation of PMNs from Blood*

Isolation of PMNs was carried out by the method of Boyum, 1976[6], Rat blood was collected under ether anaesthesia by cardiac puncture in sodium citrate (0.129 M, pH 6.5, 9:1 v/v). Blood was centrifuged at 1500 rpm for 20 min at 20°C and the buffy coat was carefully layered onto HiSep gradient and centrifuged at 2,000 rpm for 20 min at 20°C. The leukocyte rich layer was transferred to a fresh tube and centrifuged at 2,000g for 20 min at 20°C. Pellet was washed and suspended in 2 ml PBS {Composition (mM): NaCl 138; KCl 2.7; Na₂HPO₄ 8.1; KH₂PO₄ 1.5; pH 7.4}. PMNs were counted in Neubaur's chamber and the viability of the cells was determined by the trypan blue dye exclusion test.

ii. *Isolation of Precursor Cells from Rat Bone Marrow (BMCs)*

Both the femurs were surgically removed. Ends of the femur bones were snipped open with fine scissors. A 23-gauge needle fitted on a 5 ml sterile plastic disposable syringe (Dispovan, Hindustan Syringes & Medical Devices, Faridabad, India) containing 2 ml of Dulbecco's Modified Eagles Medium (DMEM, GIBCO, USA) was inserted inside the femur from one end and its content was forcefully ejected into the femoral cavity. As a result, the marrow plug was flushed from the femoral shaft. The sample was collected in graduated plastic centrifuge tubes. The procedure was repeated two times to ensure collection of all the cells from the femur. Precursors from bone marrow were isolated according to method described by [7]. Following sedimentation of debris (5–10 min), the clear supernatant containing leukocytes was removed and the cells were recovered by centrifugation (2000rpm for 10 min at room temperature). The pellet was washed and then resuspended in PBS. Cell counting was done using the Neubaur's chamber and the viability of the cells was determined using the trypan blue dye exclusion test.

iii. *Isolation of Platelets*

The platelets were obtained by centrifuging whole blood at 1,500 rpm for 20 min at 20°C. The platelet rich plasma so obtained was used as the source of platelets. Cell counting was done using the Neubaur's chamber and the viability of the cells was determined using the trypan blue dye exclusion test.

iv. *Nitrite Estimation*

Nitrite content in the rat platelets, neutrophils and precursors (BMCs) was measured by using the Griess reagent. Hypotonic lysis of the cells was carried out for 5 mins on ice followed by centrifugation at 2,000rpm for 20 min at 4°C. The supernatant thus obtained was used for nitrite estimations using the Griess reagent (1% sulphanilamide, 0.1% N-1 naphthylethylene diamine and

2.5% orthophosphoric acid. Briefly, the samples were treated with Griess reagent and incubated for 30 min at 37°C. Concentration of nitrite was estimated by measuring the absorbance at 548 nm using sodium nitrite as standard [8].

v. *Myeloperoxidase Activity*

MPO activity was evaluated following the method of Pember *et al*, 1983[9]. Neutrophils/ BMCs were freeze-thawed consecutively for three times and then they were hypotonically lysed for 5 mins. Cetyltrimethyl ammonium bromide (0.3%) was incubated with the cell lysate at 37°C for 10 min followed by centrifugation at 3,000rpm for 20 min at 20°C. Supernatant was taken for evaluation of enzymatic activity. Enzyme kinetics was run for 3 min at 15 s intervals using TMB (tetra methyl benzidine 0.5%) and H₂O₂ (0.2μM) at 37°C in the presence of 1.0 M citrate buffer pH 6.0). One unit of enzyme activity is defined as the amount of enzyme which causes an increase in absorbance of TMB by 0.4 in 2 mins.

c) *Antioxidant enzyme Assays*i. *Superoxide Dismutase (SOD)*

The activity of superoxide dismutase (SOD) was assayed by the method of Kakkar, *et al*, 1984 [10]. Briefly the assay mixture consisted of sodium pyrophosphate buffer (0.052 M, pH 8.3), phenazine methosulphate (6.5μM), NBT (30μM), NADH (52μM) and lysed neutrophil, BMC or platelet supernatant. SOD activity was estimated as the inhibition of chromogen formation due to NADH mediated PMS dependent reduction of NBT and is expressed in terms of U/ml/10⁶ cells. One unit of enzyme is defined as the amount of enzyme, which causes 50% inhibition of chromogen formation under the experimental conditions.

ii. *Catalase*

Catalase enzyme activity was estimated by the method of Aebi *et al*, 1974 [11]. Briefly 100μl of the lysed neutrophil, BMC or platelet supernatant was added to 2.9 ml of buffered substrate (50mM phosphate buffer, pH 7.0 containing 10 mM H₂O₂). The decrease in absorbance was monitored at 37°C for 3mins at intervals of 15 secs. The activity was calculated using the coefficient for H₂O₂ at 240 nm (0.041 M⁻¹cm⁻¹) and is reported as μM of H₂O₂ utilized per minute per 10⁶ cells.

iii. *Glutathione Reductase (GR)*

The activity of glutathione reductase in the neutrophil, BMC, or platelet lysate was carried out by the method of Sheokand *et al*, 2008 [12]. Incubation mixture for GR enzyme assay consisted of 0.1 M phosphate buffer (pH 7.5), 5 mM oxidized glutathione (GSSG), 0.2 mM NADPH and 100 μL enzyme extract in a final volume of 1.5 mL. Addition of GSSG, initiated the enzyme reaction. The decrease in absorbance at 340 nm due to oxidation of NADPH was monitored. The enzyme activity was calculated by using the extinction coefficient value

of $6.2 \text{ mM}^{-1} \text{ cm}^{-1}$ for NADPH. One unit of enzyme activity was equivalent to one nmol of NADPH oxidised during the reaction.

III. RESULTS

a) Catalase

In bone marrow cells amount of enzyme activity is $0.933 \text{ Unit}/10^6$ cells and in neutrophils it is $0.365 \text{ Unit}/10^6$ cells and 0.232 Unit of enzyme/ 10^6 cells in platelets. The finding shows that the activity of catalase is much more in the precursor cells and it decreases in differentiated cells.

b) Nitrite (stable end product of nitric oxide synthase)

Enzyme activity in bone marrow cells is 0.509 , which is decreasing in neutrophil and platelets as 0.112 and $0.009 \mu\text{M}/10^6$ cells.

c) Myeloperoxidase

In case of bone marrow cells myeloperoxidase activity is $1.6894 \text{ units}/10^6$ cells and in neutrophil it is $1.0717 \text{ units}/10^6$ cells. Amount of enzyme activity is decreasing in mature cells.

d) Superoxide dismutase

Superoxide dismutase activity in bone marrow cells was $0.071 \text{ units}/10^6$ cells and in neutrophil it was $0.104 \text{ units}/10^6$ cell. But in platelet the level again decreased to $0.004 \text{ units}/10^6$ cells.

e) Glutathione reductase

Activity of enzyme in bone marrow cell is 0.066 and it is 0.0001 and 0.0003 in neutrophil and platelets respectively. Enzyme activity of glutathione reductase is decreasing in mature cells.

IV. DISCUSSION

This study has demonstrated a comparison of the antioxidant enzymes in precursor cells of bone marrow and the differentiated neutrophils and platelets. The level of the antioxidants like catalase, nitric oxide, and glutathione was greater in the precursor cells than in the differentiated cells. In contrast, superoxide dismutase level was much elevated in the differentiated neutrophils than in the precursor bone marrow cell population. The difference in the antioxidant profiling can be attributed to the varying ROS and RNS concentration in the bone marrow microenvironment where precursor cells reside. Hematopoietic stem cells in bone marrow are maintained in the quiescent stage in hypoxic condition in the osteoblast niche [13] whereas in the relatively more oxygenic vascular niche, due to the proximity to blood circulation, stem cells actively proliferate and differentiate [14,15,16]. Which might increase the intracellular ROS level [17] However, increased ROS may result in accumulation of DNA damage and unscheduled activation of senescence mechanisms in the stem cell compartment in the long term. Unregulated accumulation of ROS in

hematopoietic stem cells leads to abnormal hematopoiesis (Yalcin *et al*, 2008) [18]. Thus, tight regulation of oxidative stress in hematopoietic stem cells is essential for normal control of homeostasis in hematopoietic tissues and this may be obtained by regulating the level of antioxidant enzymes. Catalase enzyme is compartmentalized into small granules in both bone marrow precursor cells and peripheral blood neutrophils [19]. Myeloid, erythroid, and megakaryocytic cells all contain substantial amounts of catalase [20][21]. The number and size of the diaminobenzidine (DAB)-reactive catalase-containing compartments decreased with differentiation of immature myeloid, erythroid, and megakaryocytic cells progressed, [19][22]. This supports our finding of reduced catalase activity in mature peripheral blood neutrophils and platelets than in precursor cells of bone marrow. Similar trend of reduction was found for the level of nitric oxide which was measured in the form of nitrite level in bone marrow cells and peripheral blood neutrophils and platelets. The level was several times elevated in the bone marrow precursor cells probably because in the bone marrow it may have a role in normal and malignant hematopoietic cell differentiation. Earlier studies have also reported that NO can modulate cellular differentiation [23]. The enzyme myeloperoxidase (MPO) is synthesized only in myeloid and monocytic cells, making it an important marker of the myeloid lineage. The elevated MPO level in bone marrow precursor cell from our present study is supported by the earlier finding that transcription of the MPO gene is turned on early during the myeloblast stage of myeloid differentiation and is turned off when myeloid precursors are induced to differentiate along any one of a number of pathways [24] Superoxide dismutase (SOD) is responsible for dismutation of superoxide radicals into molecular oxygen and hydrogen peroxide. Catalase, the subsequent enzyme in this pathway, converts hydrogen peroxide into water and molecular oxygen. High levels of SOD1 activity in neutrophils as reported from our study, without a concomitant increase in catalase, could cause escalation of the Fenton reaction producing hydroxyl radical from hydrogen peroxide [25][26] H_2O_2 produces hydroxyl radicals (OH^\cdot) were generated by a Fenton reaction, involving an ADP-Fe^{2+} (or ATP-Fe^{2+}) complex. It has been reported that a portion of the OH^\cdot free radicals derived from H_2O_2 , produced by the action of SOD, play a role in differentiation [27] This may account for the increased SOD level in differentiated cells revealed from our study. Our study also has shown a decline in the glutathione reductase activity in the peripheral blood neutrophils and platelets. Previous studies have reported that glutathione reductase activity decrease as erythroid cell differentiate [28] The higher level of the enzyme in bone marrow precursor cell indicates the greater importance of this enzyme in the precursor cell.

V. CONCLUSION

Cellular oxidants, called reactive oxygen species (ROS), are constantly produced in animal and human cells. Excessive ROS can induce oxidative damage in cell constituents and promote a number of degenerative diseases and aging. Cellular antioxidants protect against the damaging effects of ROS. However, in moderate concentrations, ROS are necessary for a number of protective reactions. ROS are essential mediators of antimicrobial phagocytosis, detoxification reactions carried out by the cytochrome P-450 complex, cellular differentiation and apoptosis which eliminates cancerous and other life-threatening cells this effect of ROS is dose dependent. Endogenous antioxidants do not completely remove ROS in animal and human cells. This raises the question of why, despite the existence of a powerful cellular system of antioxidants, the short-living ROS are not removed entirely and are permanently present in cells. The reasonable explanation for this phenomenon is that continuously produced ROS are needed to perform some important biological functions. Seemingly, the cells are tuned to remove excessive ROS and to leave the required level of oxidants. Thus, an interplay of oxidants and antioxidants decides the role of free radicals beneficial or deleterious. This depends on the basal concentration of free radicals and antioxidants in the cells. With this aim in mind, the present study was undertaken to find out the oxidant and the antioxidant status in precursor and differentiated cells. It was found that with the exception of SOD, basal level of all other antioxidants—catalase, NO and GR levels were higher in the precursor cells than in the differentiated cells, pointing towards the role of cellular antioxidants in maintaining the self-renewal characteristics of the bone marrow cells. Current study is undertaking the elaborative role of ROS in keeping the naive undifferentiated blood cell confined to that realm itself. On the contrary antioxidants are helping in differentiation of the blood cells.

Declaration of competing interest

The authors declare that they have no competing interests.

Contribution of authors

Swechha Mishra carried out all the experiment and also contributed in designing this whole experiment. Sonia Chadha, Sayali Mukherji, Sangeeta singh carried out formulation of the methods used in this experiment and also helped in drafting the manuscript via reviewing it.

ACKNOWLEDGEMENT

This research was supported by Amity University. We are thankful to the institute for believing in us and providing with all the best facilities to work.

We thank our colleagues Eshan khan, Yashika Aggarwal, Agnivesh sharma, Pranav Tripathi, from Amity University (bio-tech department) who provide insight and expertise that greatly assisted research, although may not agree with all the conclusion of this paper.

We thank Vaibhav Gupta for assistance with drafting and finalizing and also for the valuable comments that greatly improved the manuscript.

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GLOBAL JOURNAL OF MEDICAL RESEARCH: K
INTERDISCIPLINARY
Volume 18 Issue 3 Version 1.0 Year 2018
Type: Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals
Online ISSN: 2249-4618 & Print ISSN: 0975-5888

A Study to Assess the Accuracy of Medical Record Documentation of Priority I Patients in Emergency Department at a Tertiary Care Apex Hospital

By Dr. Innayath Kabir, Dr. Abhinav Wankar & Dr. Kanika Jain

Introduction- The Emergency Department is the first point of contact for all critical cases. It plays a pivotal role in the outcome of the care provided and is one of the vital links in the chain of healthcare in present day hospitals. Further, emergency medicine is the only specialty in the “House of Medicine” that has a federal/legal mandate to provide care to any patient requesting treatment.(1)Therefore, time is always considered as the most valuable resource by the emergency physicians in providing emergency aid.

Road traffic accidents (RTAs), acute myocardial infarctions (AMIs) and cerebrovascular accidents (CVAs) are the most commonly cited causes of morbidity and mortality in India(2). The quantum of patient load reporting to the emergency departments across India is way beyond their capacity, resulting in a crowded and highly tense environment where time is of prime value. A medical record is as a systematic documentation of a patient’s personal and social data, history of his or her ailment, clinical findings, investigations, diagnosis, treatment given, and an account of follow-up and outcome³. Clinical audit is to review clinical care against agreed medical profession standard in order to identify the shortcomings and opportunities for improvement.

GJMR-K Classification: NLMC Code: WB 290



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A Study to Assess the Accuracy of Medical Record Documentation of Priority I Patients in Emergency Department at a Tertiary Care Apex Hospital

Dr. Innayath Kabir^α, Dr. Abhinav Wankar^ο & Dr. Kanika Jain^ρ

I. INTRODUCTION

The Emergency Department is the first point of contact for all critical cases. It plays a pivotal role in the outcome of the care provided and is one of the vital links in the chain of healthcare in present day hospitals. Further, emergency medicine is the only specialty in the "House of Medicine" that has a federal/legal mandate to provide care to any patient requesting treatment.(1)Therefore, time is always considered as the most valuable resource by the emergency physicians in providing emergency aid.

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in the Medical Emergency of a tertiary care autonomous institute in North India with a view to enhance accuracy, compliance and plan for future improvement in documentation.

II. OBJECTIVES

The study was conducted with an objective to assess the compliance of healthcare personnel assigned to Priority I patient care area in Emergency department of a tertiary care institute with regard to documentation, to identify the deficiencies, if any, in documentation, and to recommend intervention for the identified deficiencies.

III. METHODOLOGY

The study was a cross sectional medical record based study which was conducted in Medical Emergency of Tertiary care Hospital in North India over a period of 4 months (October, 2017 to March, 2018). The study population were patients received in area earmarked for Priority I cases between 1st June 2017 to 30th September 2017 at the medical emergency. Medical record of patients admitted in Paediatric casualty, trauma centre, eye casualty, surgical casualty and patients referred to other hospitals were excluded from the study. The patients admitted in Medical emergency during the study period were selected through UHID (Unique Health Identification Number) based simple random sampling. Keeping in view, the primary objective of the study and the lack of similar studies in an Emergency Department setting in Indian context minimum required, sample size was calculated based on the total number of patients admitted as Priority I in Medical Emergency for a period of one year from 1st September 2016 to 30th September 2017. The total number was approximately 700. Hence a representative sample of 10% of the total of 700 was calculated i.e.70 for the purpose of data collection. An audit tool was developed to assess the accuracy of medical record documentation of Priority I patients admitted in medical emergency from June 2017 to September 2017 (Annexure 1). The deficiencies were identified using appropriate statistical tools. The case records were

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further classified into three categories based on the percentage of compliance to criteria mentioned in the tool formulated: A (> 80%), B (60-80%), C (<60%). Interventions were given as recommended for the deficiencies identified. Percentage of compliance of different components of medical record was assessed using Microsoft Excel version 2010.

IV. OBSERVATION AND RESULTS

a) Category wise distribution of case sheets

A total of 74 case records of the patients admitted as Priority I at the Medical Emergency between 1st June 2017 to 30th September 2017 were subjected to audit. Following were the observations.

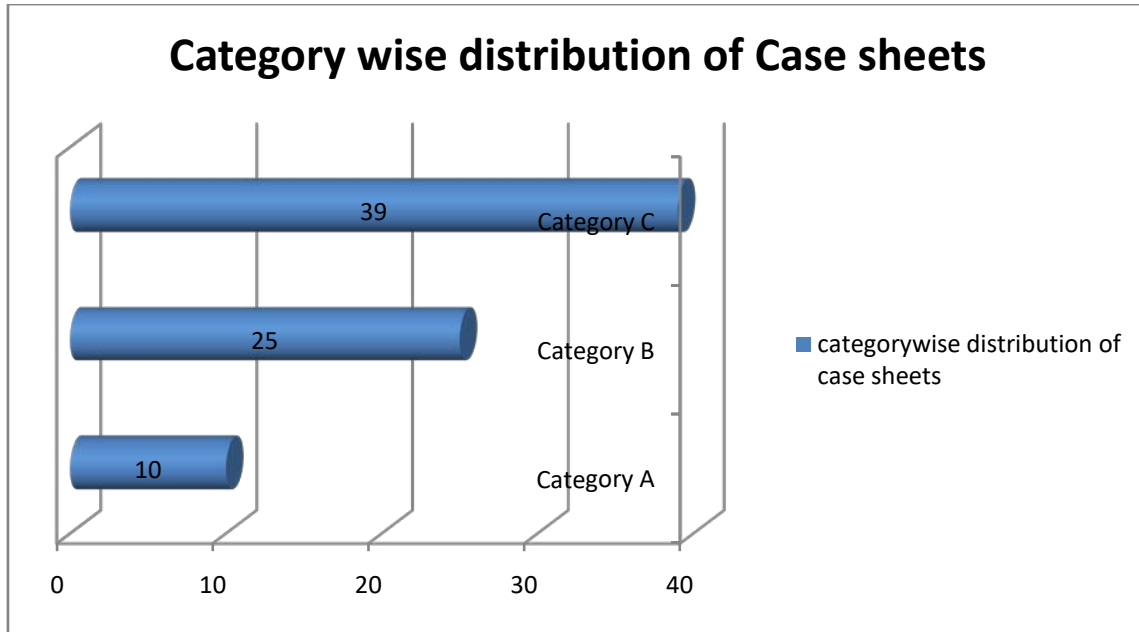


Figure 1: Out of 74 case records assessed, 10 case records (13.51%) of the records fell into Category A, 25 case records (33.78%) into B and 39 case records (52.70%) into C (Figure 1)

b) Component wise compliance of case sheets

Table 1

Sr. No.	Components	% of Compliance	Category
1.	Primary Assessment Area	59.77	C
2.	Emergency Room	62.10	B
3.	Referral	62.12	B
4.	Prescription details	92.05	A
5.	Blood Transfusion notes	48.70	C
6.	Nurses Records	60.88	B
7.	Discharge/Transfer records	38.40	C
8.	Death records	91.81	A

On further analysis of component wise compliance, maximum compliance was found in Death records and prescription, thereby earning Category A. In Postion B, a complinace of 62.10%, 62.12%, 60.88% were found in Emergency room, Referral Notes, Nurses Records. The least compliance of 38.40% was found in discharge/transfer records of the Patient. (Table 1)

c) Percentage of Compliance of different components in Primary Assessment

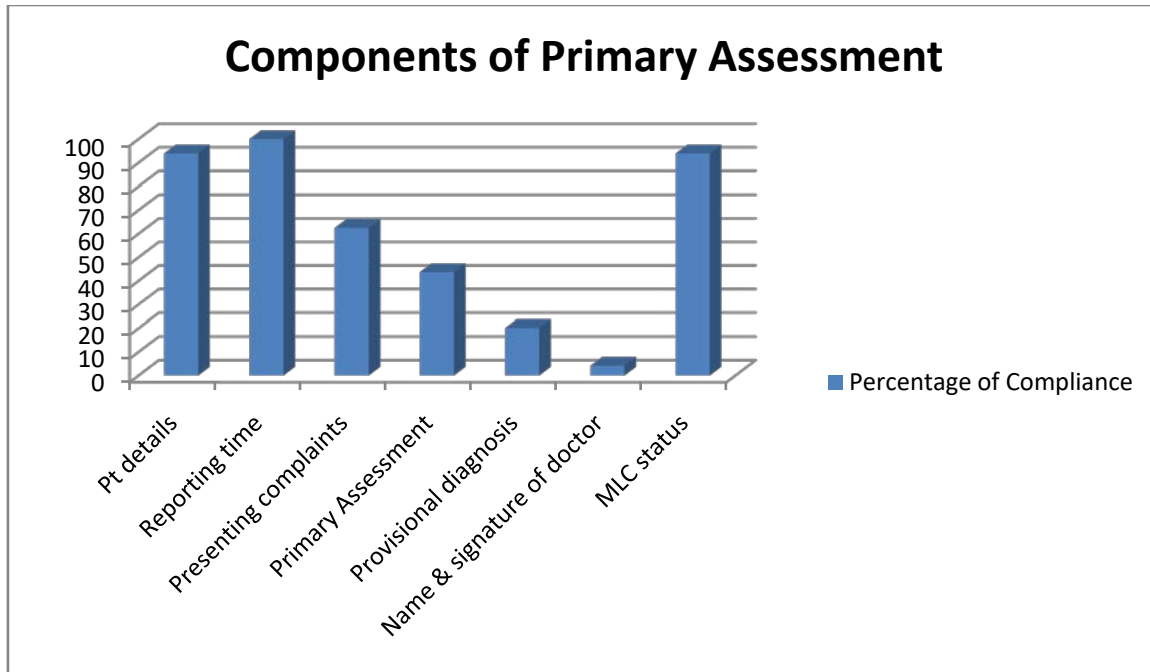


Figure 2: Percentage of Compliance of different components in Primary Assessment

Analysis of individual components/divisions of the audit tool was carried out. On analysis of Primary Assessment component, compliance with respect to medicolegal case records, patient details, triage record and reporting time were found to be above 80%. A

compliance of 62.5% was found in recording of presenting complaints due to which it was categorised as B. The remaining parameters fell into Category C with component name & signature of the doctor having the least compliance of nearly 4.17%. (Figure 2)

Table 2: Percentage of Compliance of different components in Emergency Room

Sr. No.	Components of Emergency Room	Percentage of compliance	Category
1.	Time of first assessment	54.05	C
2.	Consent Form	80.40	A
3.	Presenting Complaints	91.89	A
4.	Past History	81.08	A
5.	H/o Allergy	13.51	C
6.	General Examination	81.75	B
7.	Systemic examination	74.32	B
8.	Provisional Diagnosis	52.70	C
9.	Plan of care	75	A
10.	Name & signature	51.35	C
11.	Pt details on all pages	27.08	C

Further, assessment of different parameters in the Emergency Room Component, it was found that an overall compliance of most of the parameters was above 80%. In contrast, to the Primary assessment, compliance with respect to recording of presenting complaints here was 91.89%. Least compliance in this component was observed in recording the history of allergy (13.5%) preceded by availability of patient details in all pages of the medical record (27.08%) (Table 2). Plan of care was found to be well documented (85.61%) in the referral notes. Name and signature of the doctor referring and attending were found to be least compliant

(47.26%) in the referral notes. Overall compliance of this component was 62.92%.



d) Percentage of Compliance of different components in Referral

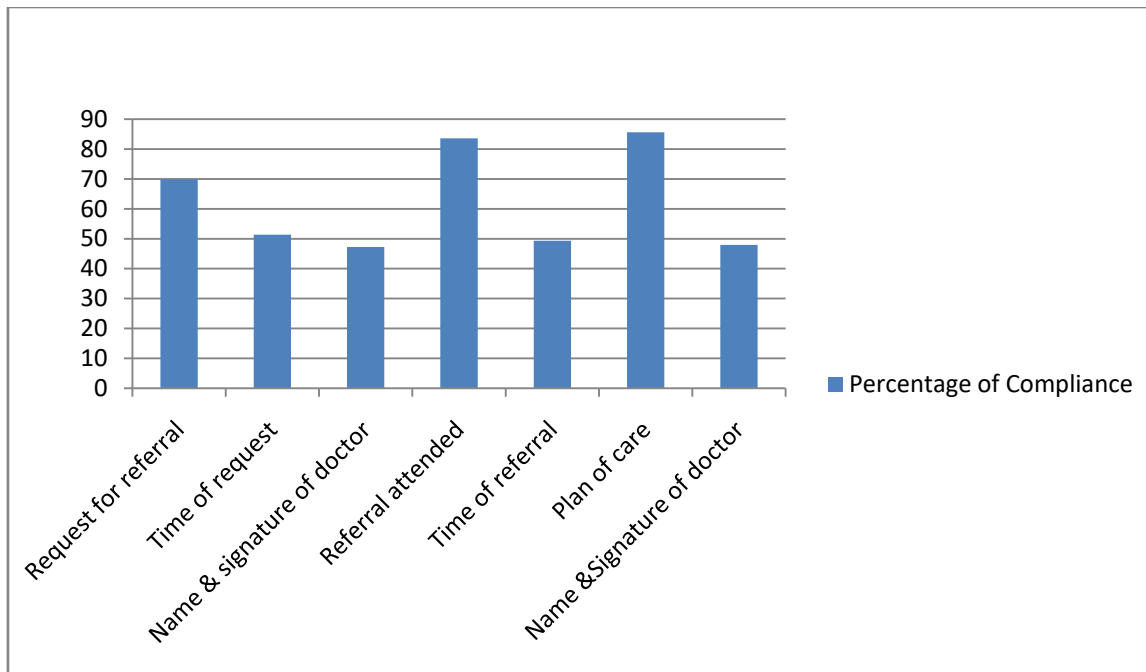


Figure 3: Percentage of Compliance of different components in Referral Notes

All the essential components in medication prescription like dose, route, strength, frequency, legibility of prescription was found to have a compliance of over 90% giving an overall compliance of 92.5% in this component. (Figure 3)

e) Percentage of Compliance of different components in Prescription details (Overall compliance-94.11%)

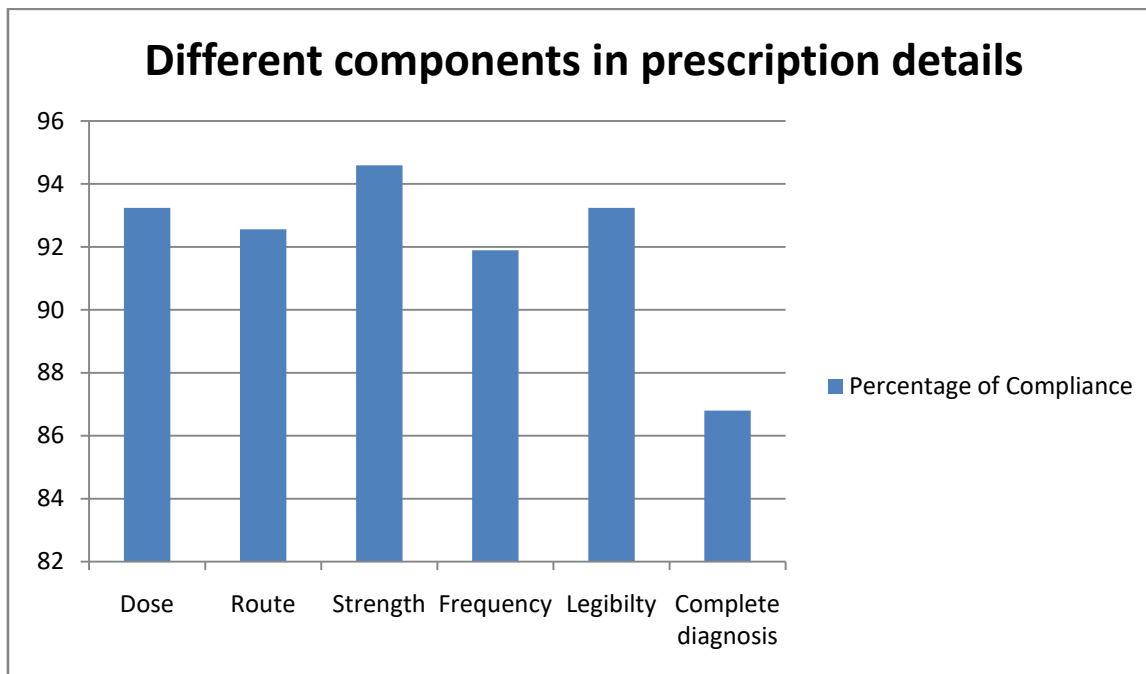


Figure 4: Percentage of Compliance of different components in Prescription details

Out of total components of Prescription details, all the components were in category A (>80%) with an overall compliance of 92.05%.

f) Percentage of Compliance of different components in Blood Transfusion Notes (Overall compliance-44.79%)

Table 3: Percentage of Compliance of different components in Blood Transfusion Notes

Sr. No.	Components of Blood Transfusion Notes	Percentage of compliance	Category
1.	Time of Order	29.16	C
2.	Name & signature	41.66	C
3.	Transfusion chart	91.67	A
4.	Transfusion start time	83.33	A
5.	Transfusion finish time	25	C
6.	Entry of blood unit details on case sheet	20.83	C

Despite being a mandate compliance of blood transfusion notes was found to be 44.79% with parameters like time of order for blood, transfusion finish time and entry of blood units details on case sheet was found to be below 30%.

g) Percentage of Compliance of different components in Nurses Records (Overall compliance-65.55%)

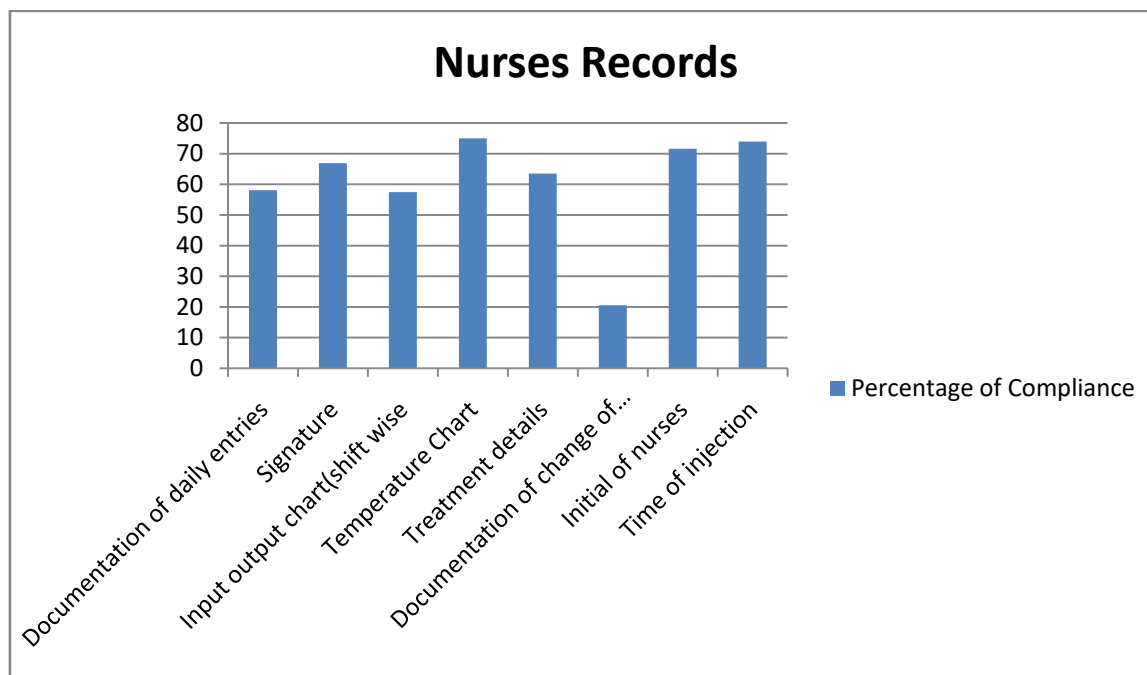


Figure 5: Percentage of Compliance of different components in Nurses Records

Nurses records are an important indicator to the type of nursing care provided to the patient. The same is all the more important admitted as Priority 1 .The nurses record were checked on 8 parameters, of which none of the results belong to category A. Only documentation of change of medication with a compliance of 20.54 fell into category C. The remaining 6 parameters were found to be compliance of 58.10 % to 75 % which belong to category B.

h) Percentage of Compliance of different components in Discharge/Transfer Notes (Overall Compliance-41.26)(Table 4)

Table 5: Percentage of Compliance of different components in Discharge /Transfer Notes

Sr. No.	Components of Discharge/Transfer Notes	Percentage of compliance	Category
1.	Details of patient	37.30	C
2.	D.O.A	48.09	C
3.	D.O.Discharge/transfer	35.71	C
4.	Documentation of Diagnosis	39.68	C
5.	Condition at the time	37.30	C
6.	Investigation details	30.95	C
7.	Treatment details	34.92	C
8.	Follow up advice	66.66	C
9.	Emergency contact(for discharged pt)	25	C

Discharge /Transfer Notes had the least overall compliance of 41.26% with all its 9 parameters

belonging to category C. The least compliant was emergency contact (25%).

i) *Percentage of Compliance of different components in Death Notes (Overall compliance-92.5%)*

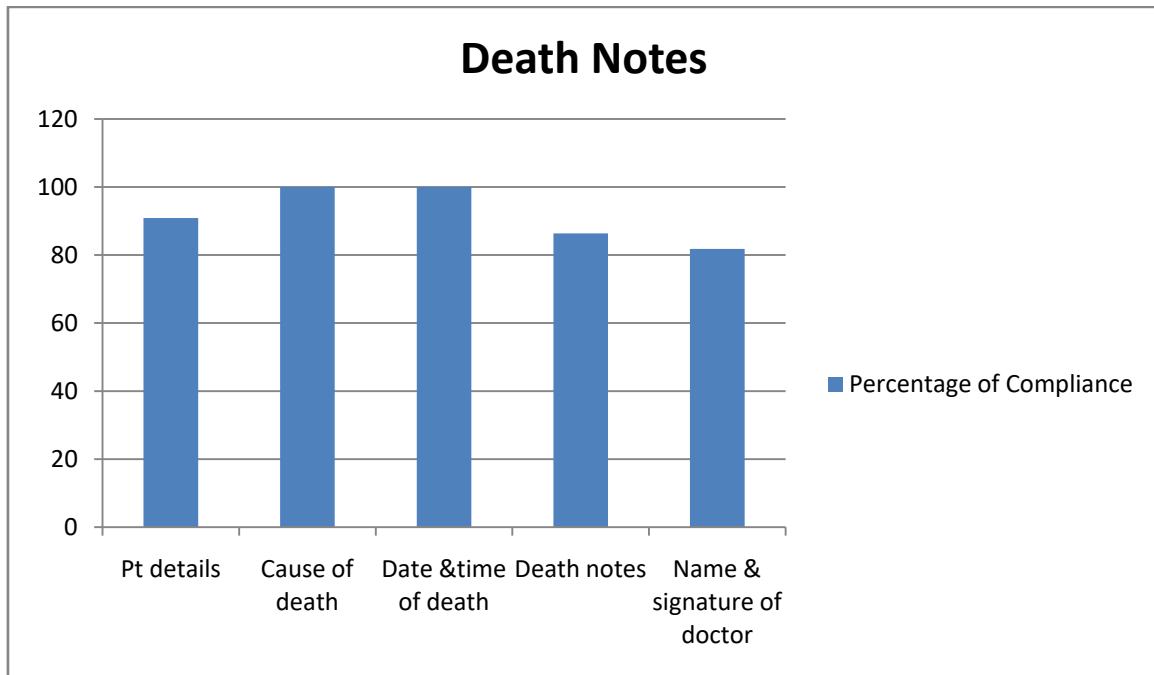


Figure 6: Percentage of Compliance of different components in Death Notes

All the components of Death Notes assessed were found to be 80% compliant and hence component belonged to category A with an overall compliance of 92.5%

V. DISCUSSION

Medical records are an integral part of clinical care provided in a hospital. They provide essential information regarding the type of care, outcome of care provided and forms basis of evidence for future improvement. They cover a wide range of material including handwritten notes, computerised records, correspondence between health professionals, laboratory reports, imaging reports, videos and printouts from monitoring equipment^{6,7}

This study is a record based retrospective study in which medical records of patients admitted in Priority 1 area of Medical emergency were assessed for their completeness using an audit tool. This study was similar to the study conducted at Charlotte Maxeke Johannesburg Academic Hospital⁸ which was a cross-sectional review of patient files to examine the completeness of emergency department (ED) records taken by doctors, both before and after the introduction of a new record form.⁸ The above mentioned study was an interventional study in comparison to which is descriptive in nature.

In present study it was noted that patient details were almost complete (93%) in record of primary

assessment, while the completeness only 27.08%. in the patient progress notes. The inference of the above findings could be due to the fact that the pt details are captured in a computerised format in primary assessment, while patient details were manually entered in the progress notes. This finding has also been corroborated by a study conducted by McInnes DK et al on general practitioner' use of computers for prescribing and electronic health records⁹.

The average score of record of history and examination in our study was 65.87% which was better than similar study conducted at Department of Medicine, Postgraduate Medical Institute, Lady Reading Hospital, Peshawar (49%) and study carried out at Charlotte Maxeke Johannesburg Academic Hospital⁸ (10%). This could be due to the fact that the study population in our study was limited to Priority 1 cases in comparison to the study population of the quoted studies which were patients admitted in Deptt of Medicine and patients admitted in the entire ED respectively.

With regard to documentation of diagnosis, compliance was 20.13% in primary assessment and 52.17 % in Emergency Room. This differed from study conducted at Department of Medicine, Postgraduate Medical Institute, Lady Reading Hospital¹⁰ (24%).

The documentation of plan of care was found to have a compliance of 75% complete which is similar to study conducted at Department of Medicine,

Postgraduate Medical Institute, Lady Reading Hospital (78%).¹⁰

The nurses' record documentation indicated a compliance of 60.88% in Documenting Input/output chart, 75% in Temperature chart documentation and 20.54% in documentation of change of medication on Nurses record. This issue was also raised by Mann and Williams (2003) who in their work found that a lack of standardization acted as a significant barrier to effective documentation and record-keeping within nursing. Findings from the focus groups suggest that if documentation was simplified to follow a standard format, nurses would be more likely to complete it. O'Conner et al (2007) also found this to be the case.^{11, 12}

The completeness of discharge /transfer notes was recorded as 38.4 % .The low compliance score is due to the non availability of structured format for transfer notes while the same for discharge summary is on a structured format. The completeness of records assessed in the current study was however higher than that carried out in Menelik II Referral Hospital, Addis Ababa, Ethiopia with a score of 16.2% and in a study conducted at Chitwan Medical College Teaching Hospital, Nepal the score was recorded as 26%.

The study revealed that the completeness of death records was found to be 91.81% and this can be attributed to electronic death record in comparison to the study conducted at Chitwan Medical College Teaching Hospital, Nepal where admission and discharge record had quite a satisfactory performance rate observed (81.7%).

VI. CONCLUSION

Documentation gives an insight into the care being provided to the patients and could be instrumental in predicting the outcomes of care in any healthcare organisation. Despite the importance of documentation being highlighted at various legal and medical forums time and again, it's importance is yet to be completely understood by the health care providers which is evident by the fact that medical records are not compliant even in tertiary care settings. As aptly quoted by Dr. James Gould "Electronic Health Records are the wave of the future", it is felt that with digitisation and a structured format, compliance could be improved up to a large extent. Digitisation yet remains a distant dream in a resource constrained setting where there is a constant demand supply mismatch similar to the one where the study was conducted. It is felt that having a structured format for medical records in general and of the Emergency Department in particular will go a long way in ensuring adequacy of care provided and completion of medical records in a timely manner.

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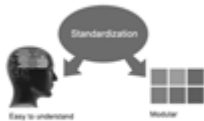
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Unless specified in the notification, the Editorial Board's decision on publication of the paper is final and cannot be appealed before making the major change in the manuscript.

Acknowledgments

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Authors can submit papers and articles in an acceptable file format: MS Word (doc, docx), LaTeX (.tex, .zip or .rar including all of your files), Adobe PDF (.pdf), rich text format (.rtf), simple text document (.txt), Open Document Text (.odt), and Apple Pages (.pages). Our professional layout editors will format the entire paper according to our official guidelines. This is one of the highlights of publishing with Global Journals—authors should not be concerned about the formatting of their paper. Global Journals accepts articles and manuscripts in every major language, be it Spanish, Chinese, Japanese, Portuguese, Russian, French, German, Dutch, Italian, Greek, or any other national language, but the title, subtitle, and abstract should be in English. This will facilitate indexing and the pre-peer review process.

The following is the official style and template developed for publication of a research paper. Authors are not required to follow this style during the submission of the paper. It is just for reference purposes.



Manuscript Style Instruction (Optional)

- Microsoft Word Document Setting Instructions.
- Font type of all text should be Swis721 Lt BT.
- Page size: 8.27" x 11", left margin: 0.65, right margin: 0.65, bottom margin: 0.75.
- Paper title should be in one column of font size 24.
- Author name in font size of 11 in one column.
- Abstract: font size 9 with the word "Abstract" in bold italics.
- Main text: font size 10 with two justified columns.
- Two columns with equal column width of 3.38 and spacing of 0.2.
- First character must be three lines drop-capped.
- The paragraph before spacing of 1 pt and after of 0 pt.
- Line spacing of 1 pt.
- Large images must be in one column.
- The names of first main headings (Heading 1) must be in Roman font, capital letters, and font size of 10.
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Structure and Format of Manuscript

The recommended size of an original research paper is under 15,000 words and review papers under 7,000 words. Research articles should be less than 10,000 words. Research papers are usually longer than review papers. Review papers are reports of significant research (typically less than 7,000 words, including tables, figures, and references)

A research paper must include:

- a) A title which should be relevant to the theme of the paper.
- b) A summary, known as an abstract (less than 150 words), containing the major results and conclusions.
- c) Up to 10 keywords that precisely identify the paper's subject, purpose, and focus.
- d) An introduction, giving fundamental background objectives.
- 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.
- f) Results which should be presented concisely by well-designed tables and figures.
- g) Suitable statistical data should also be given.
- h) All data must have been gathered with attention to numerical detail in the planning stage.

Design has been recognized to be essential to experiments for a considerable time, and the editor has decided that any paper that appears not to have adequate numerical treatments of the data will be returned unrefereed.

- i) Discussion should cover implications and consequences and not just recapitulate the results; conclusions should also be summarized.
- j) There should be brief acknowledgments.
- k) There ought to be references in the conventional format. Global Journals recommends APA format.

Authors should carefully consider the preparation of papers to ensure that they communicate effectively. Papers are much more likely to be accepted if they are carefully designed and laid out, contain few or no errors, are summarizing, and follow instructions. They will also be published with much fewer delays than those that require much technical and editorial correction.

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The full postal address of any related author(s) must be specified.

Abstract

The abstract is the foundation of the research paper. It should be clear and concise and must contain the objective of the paper and inferences drawn. It is advised to not include big mathematical equations or complicated jargon.

Many researchers searching for information online will use search engines such as Google, Yahoo or others. By optimizing your paper for search engines, you will amplify the chance of someone finding it. In turn, this will make it more likely to be viewed and cited in further works. Global Journals has compiled these guidelines to facilitate you to maximize the web-friendliness of the most public part of your paper.

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A major lynchpin of research work for the writing of research papers is the keyword search, which one will employ to find both library and internet resources. Up to eleven keywords or very brief phrases have to be given to help data retrieval, mining, and indexing.

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

Choice of the main keywords is the first tool of writing a research paper. Research paper writing is an art. Keyword search should be as strategic as possible.

One should start brainstorming lists of potential keywords before even beginning 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 a research paper?" Then consider synonyms for the important words.

It may take the discovery of only one important paper to steer in the right keyword direction because, in most databases, the keywords under which a research paper is abstracted are listed with the paper.

Numerical Methods

Numerical methods used should be transparent and, where appropriate, supported by references.

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Authors must list all the abbreviations used in the paper at the end of the paper or in a separate table before using them.

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Authors are advised to submit any mathematical equation using either MathJax, KaTeX, or LaTeX, or in a very high-quality image.

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Tables: Tables should be cautiously designed, uncrowned, and include only essential data. Each must have an Arabic number, e.g., Table 4, a self-explanatory caption, and be on a separate sheet. Authors must submit tables in an editable format and not as images. References to these tables (if any) must be mentioned accurately.



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Figures are supposed to be submitted as separate files. Always include a citation in the text for each figure using Arabic numbers, e.g., Fig. 4. Artwork must be submitted online in vector electronic form or by emailing it.

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2. Think like evaluators: If you are in confusion or getting demotivated because your paper may not be accepted by the evaluators, then think, and try to evaluate your paper like an evaluator. Try to understand what an evaluator wants in your research paper, and you will automatically have your answer. Make blueprints of paper: The outline is the plan or framework that will help you to arrange your thoughts. It will make your paper logical. But remember that all points of your outline must be related to the topic you have chosen.

3. Ask your guides: If you are having any difficulty with your research, then do not hesitate to share your difficulty with your guide (if you have one). They will surely help you out and resolve your doubts. If you can't clarify what exactly you require for your work, then ask your supervisor to help you with an alternative. He or she might also provide you with a list of essential readings.

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7. Revise what you wrote: When you write anything, always read it, summarize it, and then finalize it.

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Verbs have to be in agreement with their subjects. In a research paper, do not start sentences with conjunctions or finish them with prepositions. When writing formally, it is advisable to never split an infinitive because someone will (wrongly) complain. Avoid clichés like a disease. Always shun irritating alliteration. Use language which is simple and straightforward. Put together a neat summary.

14. 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 for your topic. You may also maintain your arguments with records.

15. Never start at the last minute: Always allow enough time for research work. Leaving everything to the last minute will degrade your paper and spoil your work.

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

17. Never copy others' work: Never copy others' work and give it your name because if the evaluator has seen it anywhere, you will be in trouble. Take proper rest and food: No matter how many hours you spend on your research activity, if you are not taking care of your health, then all your efforts will have been in vain. For quality research, take proper rest and food.

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

19. Refresh your mind after intervals: Try to give your mind a rest by listening to soft music or sleeping in intervals. This will also improve your memory. Acquire colleagues: Always try to acquire colleagues. No matter how sharp you are, if you acquire colleagues, they can give you ideas which will be helpful to your research.



20. Think technically: Always think technically. If anything happens, search for its reasons, benefits, and demerits. Think and then print: When you go to print your paper, check that tables are not split, headings are not detached from their descriptions, and page sequence is maintained.

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22. Report concluded results: Use concluded results. From raw data, filter the results, and then conclude your studies based on measurements and observations taken. An appropriate number of decimal places should be used. Parenthetical remarks are prohibited here. Proofread carefully at the final stage. At the end, give an outline to your arguments. Spot perspectives of further study of the subject. Justify your conclusion at the bottom sufficiently, which will probably include examples.

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INFORMAL GUIDELINES OF RESEARCH PAPER WRITING

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 criteria peer reviewers will use for grading the final paper.

Final points:

One purpose of organizing a research paper is to let people interpret your efforts selectively. The journal requires the following sections, submitted in the order listed, with each section starting on a new page:

The introduction: This will be compiled from reference matter and reflect the design processes or outline of basis that directed you to make a study. As you carry out the process of study, the method and process section will be constructed like that. The results segment will show related statistics in nearly sequential order and direct reviewers to similar intellectual paths throughout the data that you gathered to carry out your study.

The discussion section:

This will provide understanding of the data and projections as to the implications of the results. The use of good quality references throughout the paper will give the effort trustworthiness by representing an alertness to 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 progression.

General style:

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- Submitting a manuscript with pages out of sequence.
- In every section of your document, use standard writing style, including articles ("a" and "the").
- Keep paying attention to the topic of the paper.
- Use paragraphs to split each significant point (excluding the abstract).
- Align the primary line of each section.
- Present your points in sound order.
- Use present tense to report well-accepted matters.
- Use past tense to describe specific results.
- Do not use familiar wording; don't address the reviewer directly. Don't use slang or superlatives.
- Avoid use of extra pictures—include only those figures essential to presenting results.

Title page:

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

Abstract: This summary should be two hundred words or less. It should clearly and briefly explain the key findings reported in the manuscript and must have precise statistics. It should not have acronyms or abbreviations. It should be logical in itself. Do not cite 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 approaches to the problem, relevant results, and significant conclusions or new questions.

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Reason for writing the article—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 for this; results of any numerical analysis should be reported. Significant conclusions or questions that emerge from the research.

Approach:

- Single section and succinct.
- An outline of the job done is always written in past tense.
- Concentrate on shortening results—limit background information to a verdict or two.
- Exact spelling, clarity of sentences and phrases, and appropriate reporting of quantities (proper units, important statistics) are just as significant in an abstract as they are anywhere else.

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The following approach can create a valuable beginning:

- Explain the value (significance) of the study.
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- Present a justification. State your particular theory(-ies) or aim(s), and describe the logic that led you to choose them.
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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 for every section. If you make the four points listed above, you will need at least four paragraphs. Present surrounding information only when it is necessary to support a situation. The reviewer does not desire to read everything you know about a topic. Shape the theory specifically—do not take a broad view.

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When a technique is used that has been well-described in another section, mention the specific item describing the way, but draw the basic principle while stating the situation. The purpose is to show all particular resources and broad procedures so that another person may use some or all of the methods in one more study or referee the scientific value of your work. It is not to be a step-by-step report of the whole thing you did, nor is a methods section a set of orders.

Materials:

Materials may be reported in part of a section or else they may be recognized along with your measures.

Methods:

- Report the method and not the 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—detail how procedures were completed, not how they were performed on a particular day.
- If well-known procedures were used, account for the procedure by name, possibly with a reference, and that's all.

Approach:

It is embarrassing to use vigorous voice when documenting methods without using first person, which would focus the reviewer's interest on the researcher rather than the job. As a result, when writing up the methods, most authors use third person passive voice.

Use standard style in this and 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 as 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. Use statistics and tables, if suitable, to present consequences most efficiently.

You must clearly differentiate material which would usually be incorporated in a study editorial from any unprocessed data or additional appendix matter that would not be available. In fact, such matters should not be submitted at all except if requested by the instructor.

Content:

- Sum up your conclusions in text and demonstrate them, if suitable, with figures and tables.
- In the manuscript, explain each of your consequences, and point the reader to remarks that are most appropriate.
- Present a background, such as by describing the question that was addressed by creation of an exacting study.
- Explain results of control experiments and give remarks that are not accessible in a prescribed figure or table, if appropriate.
- Examine your data, then prepare the analyzed (transformed) data in the form of a figure (graph), table, or manuscript.

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- Do not discuss or infer your outcome, report surrounding information, or try to explain anything.
- Do not include raw data or intermediate calculations in a research manuscript.
- Do not present similar data more than once.
- A manuscript should complement any figures or tables, not duplicate information.
- Never confuse figures with tables—there is a difference.

Approach:

As always, use past tense when you submit your results, and put the whole thing in a reasonable order.

Put figures and tables, appropriately numbered, in order at the end of the report.

If you desire, you may place your figures and tables properly within the text of your results section.

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Infer your data in the conversation in suitable depth. This means that when you clarify an observable fact, you must explain mechanisms that may account for the observation. If your results vary from your prospect, make clear why that may have happened. If your results agree, then explain the theory that the proof supported. It is never suitable to just state that the data approved the prospect, and let it drop at that. Make a decision as to whether each premise is supported or discarded or if you cannot make a conclusion with assurance. Do not just dismiss a study or part of a study as "uncertain."



Research papers are not acknowledged if the work is imperfect. Draw what conclusions you can based upon the results that you have, and take care of the study as a finished work.

- You may propose future guidelines, such as how an experiment might be personalized to accomplish a new idea.
- Give details of all of your remarks as much as possible, focusing on mechanisms.
- Make a decision as to whether the tentative design sufficiently addressed the theory and whether or not it was correctly restricted. Try to present substitute explanations if they are sensible alternatives.
- One piece of research will not counter an overall question, so maintain the large picture in mind. Where do you go next? The best studies unlock new avenues of study. What questions remain?
- Recommendations for detailed papers will offer supplementary suggestions.

Approach:

When you refer to information, differentiate data generated by your own studies from other available information. Present work done by specific persons (including you) in past tense.

Describe generally acknowledged facts and main beliefs in present tense.

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Topics	Grades		
	A-B	C-D	E-F
<i>Abstract</i>	Clear and concise with appropriate content, Correct format. 200 words or below	Unclear summary and no specific data, Incorrect form Above 200 words	No specific data with ambiguous information Above 250 words
<i>Introduction</i>	Containing all background details with clear goal and appropriate details, flow specification, no grammar and spelling mistake, well organized sentence and paragraph, reference cited	Unclear and confusing data, appropriate format, grammar and spelling errors with unorganized matter	Out of place depth and content, hazy format
<i>Methods and Procedures</i>	Clear and to the point with well arranged paragraph, precision and accuracy of facts and figures, well organized subheads	Difficult to comprehend with embarrassed text, too much explanation but completed	Incorrect and unorganized structure with hazy meaning
<i>Result</i>	Well organized, Clear and specific, Correct units with precision, correct data, well structuring of paragraph, no grammar and spelling mistake	Complete and embarrassed text, difficult to comprehend	Irregular format with wrong facts and figures
<i>Discussion</i>	Well organized, meaningful specification, sound conclusion, logical and concise explanation, highly structured paragraph reference cited	Wordy, unclear conclusion, spurious	Conclusion is not cited, unorganized, difficult to comprehend
<i>References</i>	Complete and correct format, well organized	Beside the point, Incomplete	Wrong format and structuring



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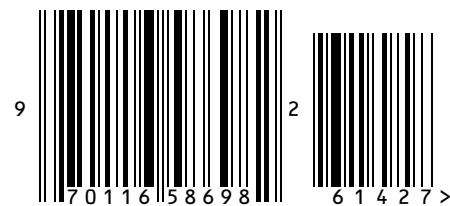
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