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- Assessment of Time Gap
- Average Daily Food Consumption
- Public Transport Operators
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Discovering Thoughts, Inventing Future

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Contents of the Issue

i. Copyright Notice
ii. Editorial Board Members
iii. Chief Author and Dean
iv. Contents of the Issue

1. Assessment of Time Gap between Repeated Re-Happening OIs among PLWHA who are Initiated ART between 2008 and 2013. *1-7*
2. Average Daily Food Consumption and Live Bodyweight of Captive Common Buzzards (Buteo Buteo). *9-12*
3. Behavioural Patterns in Captive Common Buzzards Buteobuteo. *13-17*
4. The Smile Line in a Sample of a Sudanese Population. *19-26*

v. Fellows and Auxiliary Memberships
vi. Process of Submission of Research Paper
vii. Preferred Author Guidelines
viii. Index

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Assessment of Time Gap between Repeated Re-Happening OIs among PLWHA who are Initiated ART between 2008 and 2013

By Habtamu Mellie Bizuayehu
University Debre Markos, Ethiopia

Abstract- Introduction: According to 2011 Ethiopian demographic health surveys the national and Amhara Region adult HIV prevalence was 1.5 % and 2.2% respectively. The major causes of morbidity and mortality of PLWHA (people living with HIV/AIDS) patients are OIs (opportunistic infections) that would occur in up to 40% of PLWHA. OIs are repeatedly happening in HIV (Human Immunodeficiency Virus) infected patients though there is no prior local evidence on time gap of repetition. Therefore the current study is aimed to determine time gap between repeated re-happening OIs and its associated factors among PLWHA who are initiated ART (Anti-Retroviral Treatment)

Method: Institution based retrospective cohort study was conducted among 364 systematically selected PLWHA commencing ART. Time-gap was estimated using Kaplan-meier survival and actuarial life table. Hazard rate was calculated using Cox proportional-hazard model.

Result: during follow up OIs were re-diagnosed in about three quarter (76.9%) of participants. In each week the probability of getting the re-happened OI was 1.1 per 100 persons. The median duration of staying free of OI re-happening was 66 weeks. In multivariate logistic regression, educational status, marital status, Prophylaxisis exposure, ART and Prophylaxisis drug adherence, hemoglobin and CD4 level were significantly associated with time gap of relapse.

Keywords: HIV/AIDS, survival, ART, PLWHA, ethiopia.

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Habtamu Mellie Bizuayehu

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I. Introduction

Globally about 34 million people were living with HIV in 2012 [1,2]. Still, there were about 2.2 million new infections[3]. Since the beginning of the epidemic nearly 30 million people have died of AIDS-related causes[1, 2, 4].

At end of 2010 about 22.9 million which is 67% of those living with HIV/AIDS globally are in Africa though only about 12% of the world's population lives in the region[2]. In terms of mortality, the region represents about 79% of AIDS mortality globally [5], the estimated mortality from AIDS related illnesses at end of 2010 are 1.2 million[2].

According to 2011 Ethiopian demographic health survey HIV prevalence in Ethiopia was 1.5 % and in the study area of Amhara region, it was 2.2%[6].

In Ethiopia the fee based and universal free access Antiretroviral (ARV) treatment was started in 2002/3 and 2004/5 respectively. The country uses decentralizing the ARV treatment service provision to the level of Health centers and private Health facilities for fast expansion of the service[7].

The major causes of morbidity and mortality of HIV/AIDS patients are OIs[8] that would occur in up to 40% of PLWHA with a CD4 count less than 250/mm3[9].

In North India, TB was the commonest OI (71%) followed by candidiasis (39.3%), PCP (7.4%), cryptococcal meningitis and cerebral toxoplasmosis (3.7% each) [10].

A national study in Ethiopia showed HIV patients' had OIs like Herpes Zoster scar (19.3%); pulmonary tuberculosis (5.2%) and pneumonia (5.2%) and some patients (2%) had more than one neurologic complications of HIV/AIDS[11]. In Northwest Ethiopia about 7.5% and8.3% of the HIV patients' had pulmonary tuberculosis and Cryptococcal meningitis respectively[12, 13]. Nearly a quarter (22.7%) of HIV patients' had chronic diarrhea in Southern Ethiopia[14].

Even though, OIs are prevalent in the study area there is no local evidence on time gap between repeated re-happening OIs after prior treatment among PLWHA who are initiated ART. Thus the current study would give OI free time and its associated factors that can be used to plan resources and to identify PLWHA who need especial care. The evidence is expected to be used by governmental and non-governmental organizations working on HIV/AIDS.

II. Methods and Materials

a) Study design, area and population

Institution based retrospective cohort study was conducted from January 1, 2008 up to December 31, 2013 in Debre Markos town governmental health institutions among 4412 PLWHA who are initiated ART. In the town there is one referral hospital and one health center that provide chronic HIV care. All 18 years old and above PLWHA who develop OI after 30 days of starting ART (the first 30 days after HAART were

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excluded due to most immune reconstitution inflammatory syndrome occurring in the period[15]) and taking standard treatment according to the Ethiopian Ministry of Health guideline were the study populations. HIV patients who take treatment for OI but not returned at least once to health institution for follow up; those who did not develop any OI since registered on HIV care after starting ART; and their follow up format incompletely documented when treatment for OI given or on consecutive follow ups were excluded from the study.

b) Sampling and data collection procedure

The sample size was calculated based on the assumption of 95% confidence interval and 2.5% of absolute precision and the proportion of pulmonary tuberculosis (6%) among PLWHA who are initiating ART[16]. The calculate sample size using Open Epi Version 2.3, May 2009 was 347 and after adding 5% contingency the final sample size was becoming 364.

After preparing the sampling frame among PLWHA commencing ART that fulfill the inclusion criteria, selection of study participants were done using simple random sampling technique via random number table method.

Data collection instrument was developed from both federal ministry of health chronic HIV care form and the patient's card in which the follow up health status data were registered. Then the needed data was collected by reviewing ART follow up form, laboratory request and patients' card. If laboratory examinations like CD4 count, Hemoglobin, weight are not found during entry and exit to the study, the measurements that are most nearest to time of entry and exit to study were taken as baseline and end line predictors respectively.

Participants whose future time re-happening of OI not confirmed due to loss follow-up/drop-out/transferred out/dead by any disease other than OI/cause of death not confirmed during study period or not develop OI at end of the study period were censored.

Health professionals working on ART clinics were collecting the data after taking appropriate training on objective of the study and about the data collection instrument in detail.

c) Operational Definitions

i. *Re-happening/relapse/re-diagnosis:* diagnosis of OI by health personnel working in ART clinic after completing the preceding OI treatment

ii. *Survival:* OI free duration or not re-happening of OI.

iii. *Censored:* None re-happening of OI in study participant during follow up on study; but future re-happening is not certain.

iv. *Drop out:* if PLWHA on HIV care lost to follow-up above 3 months as recorded by health personnel working on ART clinic.

v. *Lost to follow-up:* if PLWHA on HIV care not seen for >1 month as recorded by health personnel working on ART clinic.

vi. *Transferred-out:* if PLWHA on HIV care in one health institution shift to other health institution.

vii. *Good Adherence:* if PLWHA adherent > 95 % that is the percentage of missed dose is < 2 doses of 30 doses or <3 dose of 60 dose) as documented by health personnel working on ART clinic.

viii. *Fair Adherence:* if PLWHA adherent 85-94 % that is the percentage of missed dose is 3-5 doses of 30 doses or 3-9 dose of 60 dose) as documented by health personnel working on ART clinic.

ix. *Poor Adherence:* if PLHIV adherent <85% that is the percentage of missed dose is > 6 doses of 30 doses or >9 dose of 60 dose) as documented by health personnel working on ART clinic.

d) Statistical Analysis

A coded questionnaire was double entered in to Epi Info version 3.5.1 statistical package by a trained data clerk and exported to SPSS version 20 and STATA version11 statistical packages for analysis of statistical inferences. Before further analysis, data cleaning was done using frequencies, cross tabulations, sorting and listing to check missed values and outliers. Errors identified during the process were corrected by revising the original questionnaire.

To estimate the time of OI free duration, the actuarial life table and Kaplan Meier survival was used. Assumption of proportional-hazard was checked using Schoenfeld residual with p-value >0.1(α=10%) and the assumption was not violated. Base line and end line hemoglobin value was correlated (r=0.48, p=0.006) thus end line hemoglobin value was excluded from multivariate analysis due to affecting the final model by its redundancy nature which affects precision of estimate. The hazard rate at uni-variate and Multivariate level was calculated using Cox proportional-hazard model. Variables having p-value <0.05 at uni-variate analysis and not collinear was entered into final model of multivariate analysis to identify associated factors with outcome.

e) Ethical Consideration

Ethical approval and clearance was given by the School of Public Health Addis Ababa University ethical committee. Permission was also obtained from the concerned bodies of East Gojam zone and Debre Markos town Health Department and the responsible bodies of hospital and health centers. To protect confidentiality, health professionals working in ART

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clinics prepared the sampling frame and extracted the data from medical records. In addition no personal identifier was extracted on medical records.

III. Result

In the six year follow up period majority of the participants were females (64.6%), orthodox Christians (91.6%), living in urban (74.5%), married (46.4%), not educated (41.5%) and not employed (74.2%) in governmental or private sectors. Their median age was 32 years in which all most all of them were below 50 years old (table 1).

The base line and end line CD4 count values were 159 and 313 cells/ul respectively. The respective base line and end line mean values for hemoglobin were 11.9 (±2.5) and 12.4 (±1.9) g/dl and for body mass index it was 18.9 (±3) and 19.7 (±2.9) kg/m^2. At start of the study about 72% of the participants were diagnosed only one type of OI while the rest was diagnosed 2 or more OIs at one visit of health institution. Of the diagnosed OIs at start about half (51.1%) was having WHO stage III OI. All most all (98.4%) the participants have no other concomitant chronic diseases like hypertension, cardiac disease, and diabetes mellitus. Nearly all study subjects were having working functional status both at base line (71.7%) and at follow up (89%). All participants were on first line ART regimens in which about 40.4% and 56.9% were taking Tenofovirdisoproxilfumarate+ Lamivudine+Efavirenzregimen both at base line and at end line respectively and their drug adherence status was good both at base line (94.8%) and at follow up (93.7%). Most of the study subjects were taking Prophylaxis is both at base line (93.1%) and at follow up (92.3%) and their drug adherence status was good both at base line (95.7%) and at follow up (94.5%) (Table1).

a) Time gap of OI re-happening and associated factors

During follow up the cumulative incidence of OI re-happening was 76.9% (95% CI: 72.6-81.25) and the incidence rate was 1.1 (95% CI: 0.97-1.23) per 100 person weeks. The commonly re-happening OIs were recurrent upper respiratory tract infection (19.3%), bacterial pneumonia (12.1%), oral candidiasis (10.4%), chronic diarrhea (9.3%), herpes zoster (9.3%), pulmonary tuberculosis (6.1%), extra pulmonary tuberculosis (7.1%), PCP (3.9%), encephalopathy (3.9%), toxoplasmosis (3.2%), and other types (3.3%).

According to Kaplan Meier survival estimation, the median time of OI re-happening was 66 (95% CI: 57.87-74.13) weeks (figure 1). As the actuarial life table analysis showed the probability of free of OI re-happening with in the first five weeks was 97% and it was becoming <10% and <1% after 180 and 255 weeks respectively.

After adjustment for potential confounders in multivariate cox proportional hazard model, the factors that delay re-happening of OIs were being educated than non-educated, taking Prophylaxis at follow up, having a hemoglobin level above 10 g/dl at base line, having a CD4 level above 100 compared <100 cells/ul both at base line and at end line. But being widowed compared to married and not adhering ART drug at base line were risks for short time re-happening of OIs (Table 1).

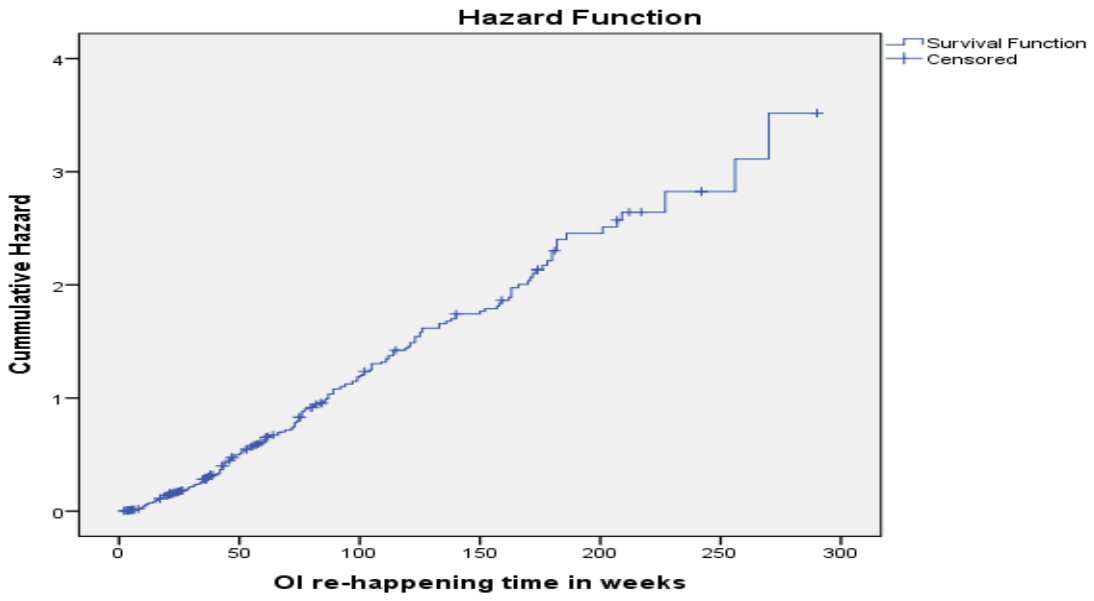

Figure 1 : Kaplan-Meier survival estimation of through time diagnosis of OI re-happening among ART PLWHA in Debre Markos town between 2007 and 2013

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Table 1 : The cumulative incidence ofre-happened OIs, Kaplan Meier survival estimation of median duration of not diagnosing re-happened OI and cox proportional hazard model of the association between factors and OI re-happening among ART PLWHA in Debre Markos town between 2007and 2013

Variables	Diagnosis of Re-happening OI		Median KMS	CHR (95% CI)	AHR (95% CI)
	No (%)	Yes (%)			
Marital status					
Married	45(53.6)	124 (44.3)	73	1	1
Single	13(15.5)	48(17.1)	79	1.15(0.82-1.60)	0.71(0.42-1.21)
Divorced	18(21.4)	76(27.1)	72	1.11(0.83-1.49)	0.81(0.52-1.27)
Widowed	8(9.5)	32(11.4)	35	2.12(1.43-3.14)	***4.65(2.13-10.16)***
Educational status					
Not educated	21(25)	130(46.4)	61	1	1
Grade 1-8	19(22.6)	82(29.3)	54	0.76(0.57-1.0)	***0.78(0.47-1.28)***
Grade 9-12	21(25)	53(18.9)	75	0.62(0.45-0.87)	***0.25(0.13-0.48)***
Above grade 12	23(27.4)	15(5.4)	170	0.38(0.22-0.64)	***0.14(0.05-0.43)***
Occupational status					
Un-employed	47(56)	223(79.6)	56	1	1
Employed	37(44)	57(20.4)	92	0.61(0.46-0.82)	0.85(0.51-1.41)
WHO staging[B.]					
I	3(3.6)	22(7.9)	72	1	1
II	30(35.7)	77(27.5)	85	0.49(0.31-0.79)	0.80(0.35-1.80)
III	42(50)	144(51.4)	61	0.53(0.33-0.83)	0.52(0.23-1.16)
IV	9(10.7)	37(13.2)	47	0.61(0.36-1.04)	0.32(0.098-1.01)
Prophylaxis exposure [B.]	4(4.8)	21(7.5)	33	1	1
No	80(95.2)	259(92.5)	72	0.48(0.31-0.75)	***0.24(0.08-0.69)***
Yes					
Prophylaxis exposure [F.]	5(6)	23(8.2)	21	1	1
No	79(94)	257(91.8)	69	0.61(0.40-0.94)	0.41(0.16-1.03)
Yes					
Prophylaxis adherence [B.]	84(100)	247(94.3)	72	1	1
Good	0(0)	6(2.3)	67	1.0(0.45-2.26)	0.21(0.05-1.0)
Fair	0(0)	9(3.4)	35	3.37(1.71-6.64)	3.62(0.32-41)
Poor					
Prophylaxis adherence F[·]	82(97.6)	244(93.5)	72	1	1
Good	2(2.4)	6(2.3)	45	2.30(1.01-5.23)	3.44(0.91-12.97)
Fair	0(0)	11(4.2)	35	3.42(1.85-6.32)	4.48(0.98-20.50)
Poor					
ART adherence [B.]					
Good	80(95.2)	265(94.6)	71	1	1
Fair	4(4.8)	7(2.5)	42	1.71(0.81-3.64)	***15.35(3.12-75.55)***
Poor	0(0)	8(2.9)	24	4.18(2.05-8.53)	4.21(0.39-45.83)
ART adherence [F.]					
Good	83(98.8)	258(92.1)	72	1	1
Fair	1(1.2)	9(3.2)	41	2.32(1.19-4.53)	0.97(0.34-2.65)
Poor	0(0)	13(4.6)	24	3.69(2.1-6.50)	1.04(0.16-6.80)
CD4 count (cells/μl)[B.]					
<=100	9(10.7)	23(8.2)	66	1	1
101-199	19(22.6)	49(17.5)	75	0.60(0.36-0.99)	***0.29(0.12-0.71)***
200-350	25(29.8)	98(35)	61	0.76(0.48-1.20)	0.60(0.26-1.38)
351-499	18(21.4)	70(25)	50	0.69(0.43-1.12)	1.30(0.52-3.24)
>=500	13(15.5)	40(14.3)	123	0.33(0.19-0.56)	0.87(0.34-2.26)
CD4 count (cells/μl)[F.]					
<=100	4(10.3)	14(7.4)	45	1	1
101-199	6(15.4)	26(13.8)	75	0.57(0.29-1.09)	1.19(0.45-3.15)
200-350	12(30.8)	68(36.2)	83	0.50(0.28-0.90)	0.87(0.36-2.10)

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351-499 >=500	11(28.2) 6(15.4)	51(27.1) 29(15.4)	101 121	0.30(0.16-0.57) 0.24(0.12-0.46)	*0.31(0.12-0.78)* *0.24(0.10-0.60)*
Hemoglobin value (g/dl)[B.] <10 >=10	17(31.5) 37(68.5)	96(39) 150(61)	44 74	1 0.60(0.46-0.78)	1 *0.58(0.39-0.88)*
Extra pulmonary tuberculosis [B.] No Yes	77(91.7) 7(8.3)	267(95.4) 13(4.6)	66 72	1 0.43(0.26-0.73)	1 3.26(0.94-11.28)
Oral candidiasis [B.] No Yes	74(88.1) 10(11.9)	249(88.9) 31(11.1)	69 66	1 1.83(1.24-2.72)	1 1.08(0.57-2.03)
Pneumonia [B.] No Yes	78(92.9) 6(7.1)	237(84.6) 43(15.4)	72 45	1 1.44(1.04-2.0)	1 2.73(1.38-5.42)

Key,
B.=base line value
F.=follow up value
CI=confidence interval
KMS=Kaplan Meier survival in weeks
CHR=crude hazard rate
AHR=Adjusted hazard rate

IV. Discussion

In current study, the cumulative incidence of OI re-happening was 76.9% and the commonly re-happening OIs were recurrent upper respiratory tract infection (19.3%), bacterial pneumonia (12.1%), oral candidiasis (10.4%), chronic diarrhea (9.3%), and herpes zoster (9.3%). And this finding was nearly in agreement with prior studies[9, 10, 12-14, 16] though some figures are slightly vary among prior findings each other and with the current study due to difference in study design (prior ones are cross sectionals), and study area which is conducted in various socio-economic characteristics.

With regarding sex various studies having contradicting outcome as risk for OI. In a cohort study, female sex increases the risk of toxoplasmic encephalitis[17]. A cohort study in United states showed female gender, were associated with significantly higher odds of OIs like herpes simplex virus-2 infection[18]. In contrary, a study in Thailand and showed male gender was significantly associated with higher incidence of OIs after ART[19]. In current study sex is not significantly associated and the possible reasons might be vary in study population, study design and differences in socio-cultural contexts of the source population.

One of the factor that delay OI re-happening in current study was having a CD4 count above 100 compared <100 cells/ul both at base line and at end line and this finding was in conformity with other studies[17, 20-23]. The HIV cohort study in Switzerland showed the baseline CD4 count is one of the predictor for OI progression[20]. Another cohort study also showed higher CD4 cell count was associated with a reduction of risk of new OI progression[23].

The current finding shown as exposure for prophylaxis at follow up would delay repeated re-happening of OIs and this is in supported by other studies[21, 24-27]. Primary prophylaxis with Trimethoprim-sulfamethoxazole is preventing OIs[24]. Cotrimoxazole prophylaxis prevents diarrhea among PLWHA after ART initiation[26].

In current study not adhering ART drug at base line was the risk for short time re-happening of OIs and the result was supported by two studies[12, 28] in which non-adherence of ART was the risk of failure the drug which enhances OI spread.

V. Conclusion and Recommendation

OIs were re-diagnosed in majority of participants. In each week the probability of getting the re-happened OI was 1.1 per 100 persons. The median duration of staying free of OI re-happening was 66 weeks. Participants who were educated, taking Prophylaxisis, having a hemoglobin level above 10 g/dl, having a CD4 level above 100 compared <100 cells/ul would not visit heath institutions due to re-happened OI illness on short periods. Whereas those who were widows compared to married and not adhering ART drug would visit heath institutions due to re-happened OI illness on short periods.

Based on this study finding, the following recommendations can be forwarded

- ✓ During care of PLWHA, counseling and follow up on ART drug adherence and taking of prophylaxis should be further enhanced.
- ✓ Boosting the CD4 count and hemoglobin value by drug treatment or nutritional or by other means is a key to prevent short duration OI re-happening.

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- ✓ It is recommended for interested researchers can ascertain the current findings by doing observational studies with prospective design.

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Average Daily Food Consumption and Live Bodyweight of Captive Common Buzzards (Buteo Buteo)

By Okoli C. Pand & Aiyedun J O.
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Abstract- Twenty five common buzzards randomly picked at the reception of the Hellenic wild life hospital and Rehabilitation centre Aegina, Greece were weighed and put in separate well ventilated paper boxes in a large room(30m x 15m x5m). At entry, the birds weight ranged from 499g-796g.They were weighed 4 times during the study at fairly regular intervals. The birds were fed on chicken with bones every morning. A control was set up in a 26th paper box in which the same quantity of meat was placed but without any buzzard. The control was to find out the quantity of moisture lost to the atmosphere through evaporation.The moisture lost daily was recorded and the average computed and corrected for in calculating the average quantity of food consumed by the buzzards.A unit increase in the average quantity of food consumed per day and the initial weight resulted to a corresponding increase of 1.495 and 1.265 respectively in the final weights of the buzzards. The approximate daily food consumed by a buzzard of average weight of 691g was 115.1g which translates to 16.7% of its live body weight. The initial weight is significant in predicting the final weight with the criterion P value < 0.05.The range of weight gain for the studied buzzards was (2.7%-32.9%) with an average of 19.4%. The approximate daily quantity of food consumed by a common buzzard of average weight of 691g was 115.1g which translates to 16.7% of its live body weight.

Keywords: daily food, live weight, captive, common buzzards.

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AVERAGEDAILYFOODCONSUMPTIONANDLIVEBODYWEIGHTOFCAPTIVECOMMONBUZZARDSBUTEOBUTEO

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I. Introduction

Common buzzards apart from being a threatened species are vulnerable to human persecution and abuse particularly in Italy and the Balkans where illegal shooting and poisoning are a common scourge. Worse still is in Africa and other developing nations where they are hunted and eaten as "bush meat" because of insufficiency in protein of animal origin.The common buzzard is the most accipitrid bird of prey in central Europe (Mebs, 1964. Timbergen (1963) emphasized the need to study animals in their natural surroundings, especially where their bahaviour evolved. Captivity is stressful but it is inevitable in giving care to the birds to get over their conditions before returning them to the wild. According to Merck veterinary manual, 6th edition,animals require some stimulation to overcome stress or boredom in a barren environment but the import of adequate feeding for captive common buzzards can not be overemphasized.

The species is therefore often brought into wildlife rehabilitation centers following gunshots, poisoning, electrocution, early loss of parents, harsh and extreme weather conditions, food scarcity, natural disasters and inability to migrate during winter. Free living buzzards feed essentially on small rodents, small mammals, birds, reptiles, amphibians, large insects and worms. They hunt over open country and their preys include field voles, local rabbits, moles, leverets, shrews, wood mice, squirrels, rats, newly fledged subjects, and offals from slaughter houses can be important as part of their diet.

Common buzzards brought into wildlife rehabilitation facilities are stabilized and treated for whatever ailment or condition they have, rehabilitated and taken back to the wild to live their independent and free life. Those considered unable to survive in the wild are permanently in the rehab facility for captive breeding, teaching, research and tourism. A major challenge for rehabbers is how to feed captive common buzzards, the right quality and quantity of food similar to what they take in the wild. Bird et al (1976) attempted to give the nutrient composition of basic food types for raptors.

It is important to determine the quantity of food adequate for various species of raptors for knowledge and logistic purposes. Patrick T. Redig(1993)stated that there is an inverse correlation between the size of a bird and the amount of food they eat per day. Cooper (1985) stated that raptors such as saw-whet owls and kestrels will eat about 30 percent of their body weight per day, red-tailed Hawks will maintain themselves on 15 to 20 percent per day, and eagles require about 8 to l0 percent of their body weight per day. These are general guidelines. According to Patrick Redig, the actual quantity of food consumed by any species of raptors should be gauged by the body weight as determined by daily weighting of the patients.The prohibitive cost and logistic challenges of feeding commercially reared quails to birds of prey which was put at $1/day/kg by Patrick Redig makes the feeding of captive common buzzards on pre-slaughtered bony chicken inevitable. This is because it is cheaper and more readily available.

This investigation was carried out at the Hellenic wildlife Hospital and rehabilitation centre, Aegina, Greece with 25 common buzzards randomly picked.

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II. Materials and Method

After clinical examination, diagnosis and recording, 25 common buzzards were randomly picked for the investigation. The birds were weighed with electronic weighting scales and put individually in perforated paper boxes measuring 90cm x 75cm x 75cm. The paper boxes were all kept in one large room on top of raised wooden pallets. In the rehab facility, common buzzards were fed with preslaughtered frozen bony chicken. The chicken was brought ahead of time, chopped into smaller pieces and allowed to thaw slowly. Clean flat round bottom ceramic bowls 2cm deep with a diameter of 12cm were used in serving the chicken. The ceramic bowls were weighed and recorded. Thereafter a handful of the thawed chicken was taken and put in the bowl and their combined weight taken and recorded to determine the quantity of meat served. The weighed meat was then carefully lowered in to the boxes containing individual common buzzards labeled B1-B25.

Each bird was kept in one box throughout the study period and the boxes were destroyed at the end of the study as the birds were transferred in to bigger rooms. The birds were closely monitored for 24hours till the next morning when the buzzards were carefully picked up wrapped with clean dry cloth by one person, while the second person gathered the leftover meat for re-weighting. The underlay glossy paper was changed and the bird put back in the box.

The leftover meat were painstakingly gathered and put in the ceramic bowl and weighed. The weight of the ceramic bowl which has been predetermined was subtracted from the combined weight to determine the quantity of the meat left over. After the measurement and recording of the leftover meat for each bird, the birds were returned and another meat for the day weighed and served. The buzzards were studied in batches of 5 for a period ranging from 30 to 36 days each. The quantity of meat consumed by buzzards for each day was determined by subtracting the quantity of leftover meat from the quantity of meat served the bird the previous day. The birds were served once a day and the records were compiled and kept throughout the study period for an overall average daily consumption to be computed. In the course of the study, the weight of the birds were taken at fairly equal intervals about 4 times each and recorded. The average of the four weights W_1 toW_4 was used as the average weight of the studied common buzzards

In order to take cognizance of moisture lost by the served meat meals to the atmosphere through evaporation controls were set up each day of the study. The same quantity of meat served the buzzards each day was put in ceramic bowls of the same capacity and dimension and lowered into the 26th paper box in the same room without any buzzard. The meat in the control bowl was reweighed the next day and recorded. The difference in weight represented the amount of moisture lost to the atmosphere by the meat through evaporation.

III. Result

Table I : Interval weights (W_1-W_4) of the studied common buzzards (B_1-B_{25}) for food, their Average weight for the study period, their average daily food consumption and their average weight gain or lost, wt. gained in percent

Buzzard	W, (g)	W_2 (g)	W3 (g)	W_4(g)	Average Wt(g)	W_4-W_1 Wt. gained/lost (g)	Average qty of food per day (g)	% weight Gain/Loss
B_1	628.4	634.5	792	787.3	710.6	158.9	97.9	25.3
B_2	598	632	661.5	671	640.6	73	96	12.2
B_3	622	727.5	820	821.5	747.8	199.5	113.4	32.1 -
B_4	579	580.4	661.8	683.4	626.2	104.4	106.4	18
B_5	569.3	581	611.5	658	605	88.7	118.4	15.6
B_6	796	944.3	930.5	929	897.5	123	101.5	15.5
B_7	695	829.3	769.1	908	800.4	213	107.8	30.6
B_8	623.5	759	767.5	808	739,5	184.5	120.5	29.6
B_9	559	578.9	603.7	619.4	590.3	60.4	110.6	10.8
B_{10}	669	723	726.2	803.5	730.4	134.5	125	20.1
B_{11}	551	632.2	649	644.7	619.2	93.7	130.2	17
B_{12}	601.4	621.9	632	629.8	621.3	28.4	125.1	4.7
B_{13}	661.4	673.2	689	695.4	679.8	34	114.2	5.1
B_{14}	564	568.8	573	579.1	571.2	15.1	104.2	2.7
B_{15}	689	723.5	784	819	753.9	130	127.7	18.9

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B_{16}	633.5	684	700.5	716	683.6	82.1	111.7	13
B_{17}	603.5	711	743	802	714.9	198.5	122.3	32.9
B_{18}	591.3	639	692.5	713.4	659.1	122.1	111.7	20.6
B_{19}	683.9	751.2	798	803	759	119.1	118.3	17.4
B_{20}	753.5	802	884.5	911	837.8	157.5	110.1	20.9
B_{21}	629	678.1	713.4	747	691.9	118	113.1	18.8
B_{22}	557.4	603	674.5	725	640	167.6	119.9	30.1
B_{23}	499	534	578.4	622	558.4	123	127.5	24.6
B_{24}	565	644	673.3	690.1	643.2	125.1	121.6	22.1
B_{25}	654.2	731	790	833.5	752.2	179.3	123.3	27.4
Average	623.1	679.5	716.8	744.4	691	121.3	115.1	19.4

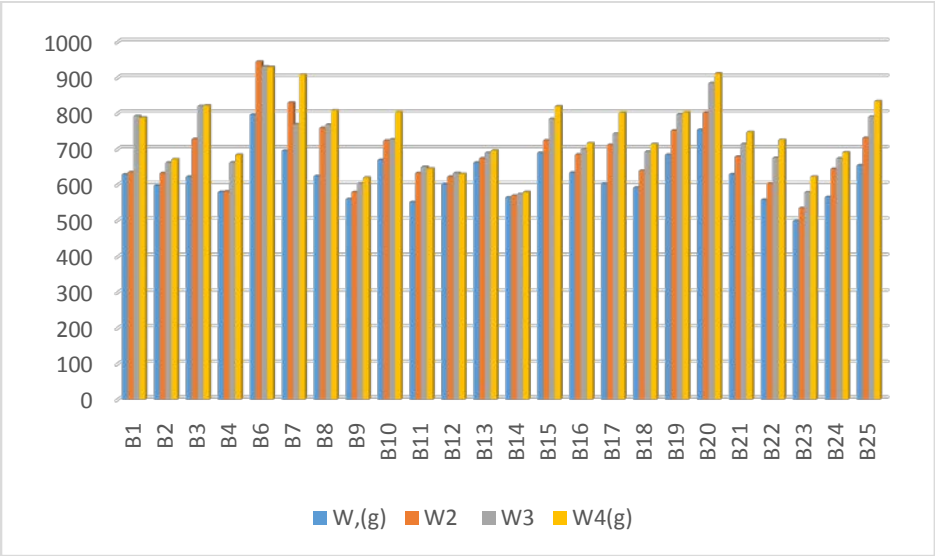

Figure I : Bar-chart of weights (g) (W1,W2,W3,&W4)

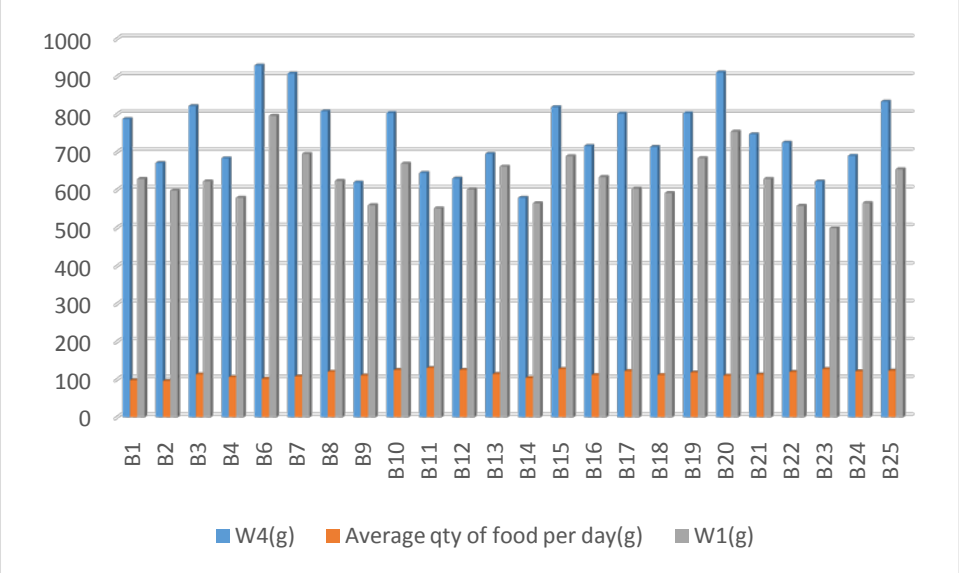

Figure II : Bar-chart of W1(g), Average qty of food per day and W4(g)

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Table II : Regression model coefficients table

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	-175.0198927	196.0679205	-0.89265	0.38216033	-582.765455	232.725669
Average food	1.149279016	1.207797123	0.95155	0.35214979	-1.3624726	3.66103063
initial weight	1.265447281	0.172053661	7.354957	3.0845E-07	0.907642105	1.62325246

IV. Discussion

This investigation sort to establish the average quantity of meat consumed per day by captive common buzzards in rehabilitation. Brown and Amadon (1968) put the approximate daily food intake of a red-tailed Hawk weighing 1150g at 10.7% of its body weight. Similarly they put the approximate daily intake of a 200g sparrow-Hawk at 26.5% of its body weight. From the Regression model, Final Wt. = -175.0199 + 1.1495Xav. food + 1.265Xinitial wt. This implies that a unit increase in the average quantity of food consumed per day resulted in a corresponding increase of 1.495 in the final weight of the studied captive common buzzards and a unit increase in their initial weight led to a corresponding increase of 1.265 in their final weight. The coefficient of initial weight is significant in predicting the final weight with the criterion P value < 0.05. According to Biyi Afonja(1982) , regression coefficient is a measure of the degree of dependence of one variable on another while correlation coefficient is a measure of the linear association between various values or quantities.

In the final analysis my result for the studied sample population put the approximate food consumed by a 691 g captive common buzzard at 115.1 g per day which is 16.7% of its 0live body weight. This result is in aggreement with Patrick Redigs assertion that there is an inverse correlation between the size of a bird and the the daily food intake of a 1150g red Hawk and a 200g Sparrow-Hawk at 10.7% and 26.5% of their body weights respectively.

It is important to note that there was a positive right shift in the weight of the studied common buzzards as the least weight gained by any of the birds was 2.7% with a maximum of 32.9% at the end of the investigation. This is a pointer to the effectiveness of the rehabilitation efforts at the wildlife rehab facility and it could also be one of the basis for the release of the birds back to the wild.

This research work is important as a logistic tool for wildlife rehabilitation facilities, zoo keepers, veterinarians and teachers of wildlife medicine and ecology. A knowledge of the daily quantity of food required by common buzzards in captivity, will help keepers and care givers in planning for their feeding which is paramount to their survival prior to release back to the wild or dedication for captive breeding.The findings can also be rationally adjusted and used for other raptor species in captivity.

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Behavioural Patterns in Captive Common Buzzards Buteobuteo

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Increase in buzzard population did not increase the mew rate significantly with the observer in sight. The observer coming to sight or otherwise produced a disproportionate increase and decrease in mew rate as the population increased. The study shows that mews by captive buzzards are means of communication and signals and their pitch and frequency were positively influenced by sight and movement.

Keywords: behavioural, patterns, captive, common buzzards.

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Increase in buzzard population did not increase the mew rate significantly with the observer in sight. The observer coming to sight or otherwise produced a disproportionate increase and decrease in mew rate as the population increased. The study shows that mews by captive buzzards are means of communication and signals and their pitch and frequency were positively influenced by sight and movement. The non-parametric methods (sign test) of comparing mew rates with observer waving hand and not waving hand shows that;

z-value=2.04 p=0.041

wilcoxon matched paired test

z-value=2.04 p=0.028

Both analysis show significant differences as waving of hand triggered off an exaggerated response as it indicates imminent danger attack or disturbance.

Buzzards mew in sympathy to themselves and the high-pitched mews may be their defense against apparent treats, invasion or response to movement. The pitches of the mews were higher with the observer in sight and the observer waving hand. The figures recorded with the observer out of sight,in sight and waving hand suggested that there must be a neuro-endocrinal or nervous/humoral interplay which accounts for the exaggerated responses in terms of pitch and frequency. The display of domination and subservience by captive buzzards may help rehabersand captive breeders as dominant birds have better survival trait and are believed to be better survivors of natural selection pressure.

Keywords: behavioural, patterns, captive, common buzzards.

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I. Introduction

Behavior in animals, including birds is an amalgam of inherited and acquired attributes. It is usually species specific and closely knotted to the survival instincts of the species in question.

Birds communicate by means of visual signals and vocalization (songs and calls) and communication involves a signals passing between two or more individuals. Vocalization and signals display in birds which may be described as sign language, are used often in conjunction with calls or songs to advertise a territory, repel a rival, attracts a mate and in some birds to reinforce the bond between pairs.

Wiley (1994) and Endler (1992) stated that signals may however portray conflicting messages. Vocal communication in birds is divided rather arbitrarily into calls and songs. Calls are simple notes and they are produced by both sexes at any time of the year while songs are acoustic and musical usually advertising ownership of a territory. Common buzzards vocalize by making a high pitched noise which is referred to as "Mew". This investigation was to find the purpose the mews serve buzzards in captivity, the factors that influence them the number of mews per minute in different circumstances. The second objective was to find out some behavioral adaptations developed by buzzards in captivity for survival or vices if any developed following the stress of captivity, regular handling and change of environment

II. Materials and Method

On the whole 142 common buzzards housed in a perforated paper box and four well ventilated rooms were studied closely at the Hellenic Wildlife Hospital and Rehabilitation centre, Aegina, Greece- The distribution of the birds were one in a paper box, 16, 30, 45 and 50 in 4 different other rooms. The rooms were equipped with suspended twigs and wood stumps on the floor for recreation and exercise. The floors were partly concreted with large quantity of leafy straw from the sea for easy cleaning. A strip of uncovered but concreted area was left in each room where the meat meals were served.

At the beginning of the study, ample time was spent by the observer for a close look at the birds without disturbing them. The study lasted 3 months with each set of birds observed closely and records kept.

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The record of the buzzards mew rates per minute were taken using electronic stop-watch, with (a) Observer out of sight, (b) Observer in sight and (c) Observer waving hand.

These series of investigation were conducted severally for 30days throughout the duration of the study. At the end of each day, the means of the data generated were computed and recorded for subsequent use and further analysis. The stop watch was held with the left hand while the counting of the mews started as soon as the knob was pressed with the left thumb. The counting stopped when the second arm went one full cycle from where it started, which was one minute.

For the second series of counts of mews per minute, the observer quietly stepped in front of the open doors to the rooms covered wire mesh such that the birds will notice him. The observer ensured that he made no noise while the counting lasted. Thirdly, the observer appeared quietly in front of the rooms covered with wire mesh holding the stop watch on the left hand and waving the right hand 180 degrees or half cycle The stop watch knob was pressed as the waving of the hand was on and the counting stopped as soon as 1 minute was up. The counts were done severally for each set of buzzards in the various rooms each day of the study and the average recorded. The mews were counted at least an hour after serving their meals.

III. Results

Table I : Mew Rate of Captive Common Buzzards

Days	No of Buzzards in Room	No of Mews Per/Min. with Observer Out of Sight	No of Mews Per/Min. with Observer in Sight	No of Mews Per/Min. with Observer Waving Hand
1	30	10	29	
2	16	7	21	29
3	16	3	25	
4	30	10	53	
5	16	3	5	
6	45	12	48	
7	50	3	37	9
8	16	12	28	40
9	45	6	48	
10	50	7	38	
11	45	5	42	
12	16	1	10	16
13	50	6	42	
14	16	1	10	
15	50	14	66	
16	16	7	31	
17	45	23	51	68
18	45	26	48	
19	16	2	14	
20	50	13	48	
21	45	11	60	
22	16	3	24	36
23	50	11	49	
24	16	3	15	
25	45	8	40	
26	50	8	37	
27	30	7	28	43
28	30	8	23	

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29	30	8	23	
30	45	13	47	

Table II : Summary of Statistics of Mew Rate by Captive Common Buzzards

Summary						
Groups	*Count*	*Sum*	*Average*	*Variance*		
out of sight	30	248	S.266667	32.71564		
in sight	30	1049	34.96667	254.6622		
waving hand	7	241	34.42557	321.3885		

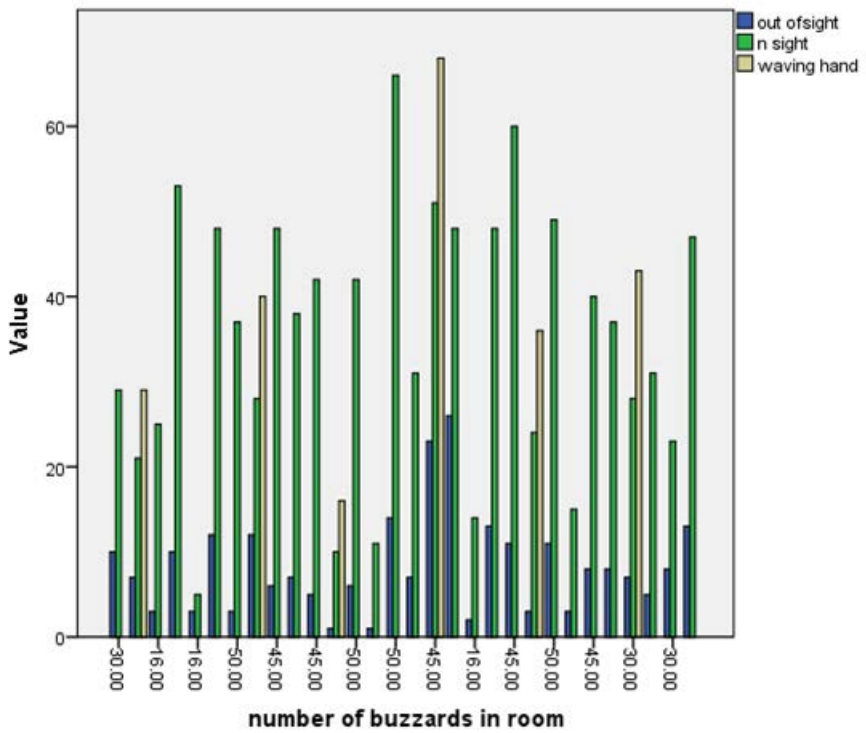

Figure I : Bar chart of mew rates by captive common buzzards

Mew Rate by Captive Buzzards
Observer out of sight with observer in sight
t-value =-8.82p =0.000 (significant difference)

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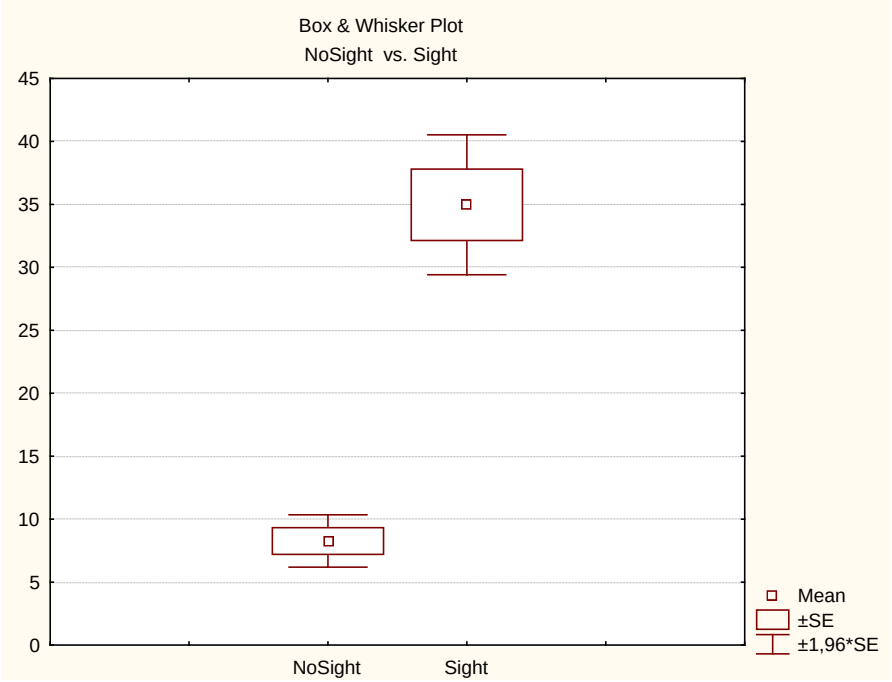

Figure II : Box and whisker plot comparing mews by buzzards per minute with the observer in and out of sight

Non Parametric Methods Comparing Mew Rates with Observer Waving Hand and without Waving Hand

Sign -test

z- value = 2.04 p =0.041

Wilcoxon Matched Paired Test

z-value = 220 p = 0.028

Both analyses show significant difference as waving of hand triggers off an exaggerated response as it portends imminent danger, attack or disturbance.

IV. Observation on Behavior and Discussion

The aspects of behavior which were studied very closely, although not exhaustively are vocalization displays and attitude to food. Some of these behaviors are species specific and inherited. They could also be influenced or altered by the environment or experience. Some birds played dead in the face of aggression from dominant buzzards for a long time. They lay down motionless pretending not to be breathing. This attempt to play dead as observed and recorded for some buzzards cannot be far from a design by the birds who exhibit them to survive by dodging attacks, resting for proper healing and recovery from diseases. It may also be a striking display of an evolving behavioural change following captivity and handling.

Brown and Amadon (1968) Endler, J.A., (1992), Forest, (1994) and Glutz (1971) variously highlighted trends amongst buzzards in the wild in regard to aggression, cannibalism, pair-formation, pair-contact, and territorial display. Tubbs (1974) recorded inter-sibling aggression, while Robert (1985) and Ingram (1959) talked about occurrences of cannibalism and some cases of death. It was also observed that inspite of the fact that large quantity of meat was served each time, some of the buzzards would not go close to the meat meals until the domineering ones are through and retire to the area covered with straw or perch on the tree twigs.

Glutz (1971) stated that in buzzard communities, subordinates adopt crouching posture, and if attacked may throw themselves on their back and present talons, eventually lying motionless with upper wing raised id submissive display if it cannot escape.

A number of the behaviours exhibited by the buzzards studied in captivity were in line with what the aforementioned workers reported for them in the wild. These include subordinate going prostrate and lying motionless on the floor in submission in the face of aggression. Since buzzards are reported to display their territories by moving round, and short flights, it is evident that earlier occupants or stronger inmates dominate new entrants and weak birds. Such must be what happened when three buzzards were seen lying motionless on the floor.

For the study on vocalization, analyses show that increase in buzzard population did not increase the mew rate significantly with the observer in sight. The observer coming to sight or otherwise produced a

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disproportionate increase and decrease in mew rate as the buzzard population increased. However, the study clearly shows that mews by buzzards in captivity in spite of being means of communication and signals have their pitch somehow dependent on sight and movement. There is abundant evidence that buzzards mew in sympathy to themselves and the high-pitched mews may be their defense against apparent threats, invasion or response to disturbance. The pitches of the mews were higher with the observer in sight and me observer waving hand.

The number of mews recorded with the observer out of sight, observer in sight with a waving of the hand suggests that there must be a neuro-endocrinal or nervous/humoral interplay or synergism which accounts for the exaggerated responses in terms of pitch and frequency. Additional stimuli seem to trigger off increased response or reaction from the birds as they attempt to ward off supposed intruders and alert others.

The observation of supremacy and territorial display by some of the studied buzzards In group and the corresponding exhibition of submission and subservience by supposedly weak and new entrants will enable keepers and breeders of common buzzards in captivity albeit temporally or permanently to closely monitor and separate these classes of birds to forestall the vice of cannibalism. This could additionally be helpful in the biased but informed selection of dominant birds for breeding as far as survival trait and instinct parameters arc concerned. Domineering birds are selected for breeding purposes because they are believed to be better survivors of natural selection pressure.

The student t-test comparing mew rate of common buzzards with observer in sight and observer out of sight shows that there was a significant different as t-value = -8.82 and p =0.000

The non-parametric methods (sign test) of comparing mew rates with observer waving hand and observer not waving hand shows that;

z-value=2.04 p=0.041

wilcoxon matched paired test

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Both analysis show significant differences as waving of hand triggered off an exaggerated response as it indicates imminent danger attack or disturbance

V. Acknowledgement

I wish to put on record on appreciation to the Greek government, Phillip Dragoumis, Margaret Okoli and the Hellenic wild life hospital and rehabilitation center Aegina, Greece.

The manuscript has two tables and two figures which titles are –

Table I : Mew Rates of captive common buzzards

Table II : Summary of statistics of mew Rates by captive common buzzards

Figure I : Bar chart of mew Rates by captive common buzzards

Figure II : Box and whisker plot comparing mews by buzzards per minute with the observer in and out of sight

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The Smile Line in a Sample of a Sudanese Population

By Dr. Sereen I. El Sarrag & Dr. Amal H. Abuaffan

University of Medical Sciences and Technology, Sudan

Abstract- Background: A smile is an important feature in determining an individual's attractiveness. It is a simple concept that is seldom considered and often adjusted rather involuntarily.

Objectives: A cross sectional study to assess the smile line in a sample of Sudanese population and its correlation with age, gender, and incisor classification.

Material and methods: Clinical examination as well as a photograph was taken for 500 (230 males and 270 females) Sudanese adults with an age range of 15- >46 years in the Academy dental hospital to assess their smile line.

Results: Low smile line was the most frequently (41%) encountered smile line followed by average (29.4%), high (22%), and the least being the very high smile line (7.6%). A statistically significant difference was found between age, gender and incisor classification in relation to the smile line (p value ≤ 0.05).

Conclusion: Low smile line was the most frequent among Sudanese population and a strong correlation was found between the smile line and age, gender and incisor classification.

Keywords: smile line, incisor classification, sudanese population.

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The Smile Line in a Sample of a Sudanese Population

The Smile Line

Dr. Sereen I. El Sarrag [α] & Dr. Amal H. Abuaffan [σ]

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I. Introduction

A smile is an important feature in determining an individual's attractiveness. It is a simple concept that is seldom thought about and adjusted rather involuntarily, yet it has the power to improve one's mood, lift spirits and generally make a person appear more beautiful. Conversely, an esthetically displeasing smile with the occlusion of teeth being far from ideal may have a negative impact on social life making a person feel insecure, timid and less confident.

Esthetic concerns regarding the smile are usually the patient's main reason for seeking orthodontic treatment.[1]Sabri stated that "the smile line depends on six factors; upper lip length, lip elevation, vertical maxillary height, crown height, vertical dental height, and incisor inclination". And defined the smile line (lip line) as the amount of vertical tooth exposure in smiling, the height of the upper lip relative to the maxillary central incisors.[2]

The lips are the main factors controlling tooth and gingival display, therefore they must be taken into consideration for an aesthetically pleasing smile. The smile composition is framed by the lips; in this way, the arrangement of the teeth and the visible gingiva is dictated by the outline of the lips and the height of the smile line. [3]

In orthodontic treatment, aesthetics has traditionally been associated with profile enhancement. Although a patient's top priority is to improve their smile; orthodontists' mainly focus on the skeletal structure rather than soft tissues and thus the smile gets relatively little attention. Creating a pleasing smile should therefore be a fundamental aim in orthodontics. [4, 5]

Smiles are either **posed** or **spontaneous**. A posed smile is the voluntary expression made when a person is for example being introduced to someone, or when taking a passport photograph or orthodontic records and according to studies it is repeatable. A spontaneous smile on the other hand is involuntary natural, and affected by emotions. With all the muscles of facial expression involved, a spontaneous smile always has more lip elevation than a posed smile.[2] Studies usually refer to the posed smile because it is reproducible and can therefore be used as a reference position. [1]

As a general guideline, the smile line is optimal when the upper lip reaches the gingival margin, displaying the total cervicoincisal length of the maxillary central incisors, along with the inter-proximal gingivae. The beginning point of a smile is the lip line at rest, with an average maxillary incisor display of 1.91mm in men and nearly twice that amount (3.40mm) in women.[2]With aging, there is a steady decrease in exposure of the maxillary incisors at rest and, to a much lesser degree, in smiling. This gradual decline in maxillary tooth exposure at rest is accompanied by an increase in mandibular incisor display. [5]

A number of studies worldwide have assessed the smile line using different evaluation methods among different ethnic groups. Photographs are the most popular methods for assessment. [1, 6-13, 15, 16, 18, 19] Very few researchers use visual and videographic methods for smile line evaluation. [14, 17]

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The smile of an individual affects their self-esteem, confidence, as well as their social and work life. Recently Sudanese people have become more conscious about their appearance and aesthetics and this has resulted in an increase in number of individuals seeking orthodontic treatment in order to have an aesthetically pleasing smile. However achievement of these aesthetic goals presents many challenges, including occasional differing opinions between patients and clinicians as to what constitutes an aesthetic smile. Therefore, the present study aimed to assess the smile line in a sample of Sudanese population, which may act as a baseline for future researches and aid orthodontists in treatment planning as there is no such study available in Sudan.

II. Materials and Methods

A descriptive, cross sectional study was carried out in the Academy Charity Teaching Hospital (ACTH), University of Medical Sciences and Technology, Faculty of Dentistry, Khartoum, Sudan. All students, staff members and patients (attending the hospital) satisfying the inclusion criteria from the period of November 2013 to March 2014 were included in the study.

Permission and approval was obtained from the University of Medical Sciences and Technology to conduct this study. The aim of the study was explained to each participant and it was ensured that the photographs taken will only be used for research purposes and the personal data will remain confidential throughout the study. Those that agreed to participate in the study signed a consent form and later were called for a clinical examination and photograph.

The data sheet was filled for each individual that fulfilled the inclusion criteria: Sudanese nationality, age group ≥15 years, no previous or current orthodontic treatment, presence of all anterior permanent teeth, no facial abnormalities and no syndromes.

The main researcher using a mask, gloves, and an examination set, carried out the clinical examination while the individual sat in the dental chair. The incisor classification was assessed according to the British classification as follows [20]:

Class I: The lower incisal edges occlude with or lie immediately below the cingulum of the upper incisors.

Class II division I: The lower incisal edge occludes behind the cingulum of the upper central incisors and the upper incisors are proclined.

Class II division II: The lower incisal edge occludes behind the cingulum of the upper central incisors, and the upper incisors are retroclined.

Class III: The lower incisal edge occludes in front of the cingulum of the upper incisors.

A photograph was then taken of each subject by the main investigator using a (Sony Cyber-shot DSC-WX100, Sony lens, 18.2 mega pixels, 10X optical zoom) camera with a wide mouth opener to yield a smile with the front teeth with the teeth in habitual contact. Later each photograph was assessed under four different categories with the following score definitions: [3]

a. Score 0= Low smile line: Estimated as less than 25% of the inter- proximal gingivae visible and no gingival margins visible.
b. Score 1= Average smile line: Estimated as 25-75% of the inter-proximal gingivae visible, gingival margins possibly visible at single teeth.
c. Score 2= High smile line: Estimated as more than 75% of the inter-proximal Gingivae visible, while gingival margins scarcely visible.
d. Score 3= Very high smile line: when a band of contiguous maxillary gingival of at least 2 mm is visible in all regions of interest.

After the data was collected, summarized, and coded it was entered into the Statistical Package for Social Sciences (SPSS) program (version 17) in the computer. The data was analyzed in the form of pie and bar charts. A chi square test was used to examine the correlation between smile line scores with age and gender, and incisor classification. For all statistical tests a P-value of less than 0.05 was considered as significant.

Method of the error

Fifteen participants were randomly selected for a repeated photograph and clinical examination. No difference was found between the 2 photographs as well as the incisor classification.

III. Results

The number of participants examined was 500 (230 males and 270 females) with an age range of 15->46. Most of the examined participants were in the age group of 15-25 years (figure 1).

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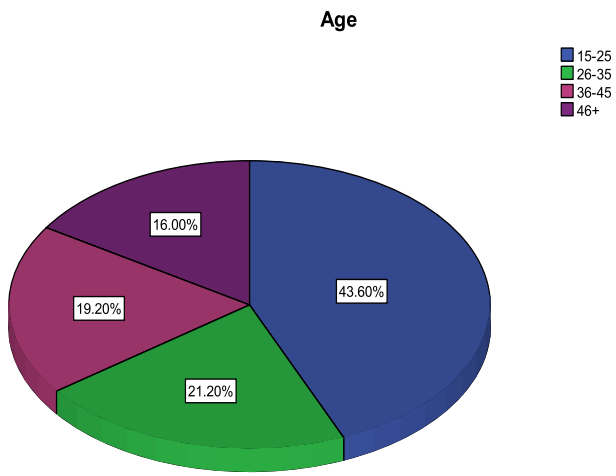

Figure 1 : Age distribution of the study sample

According to the incisor classification (figure 2), the most common class was Class I with (40.8%) followed by Class II (33.4%) and the least common was Class III (25.8%)

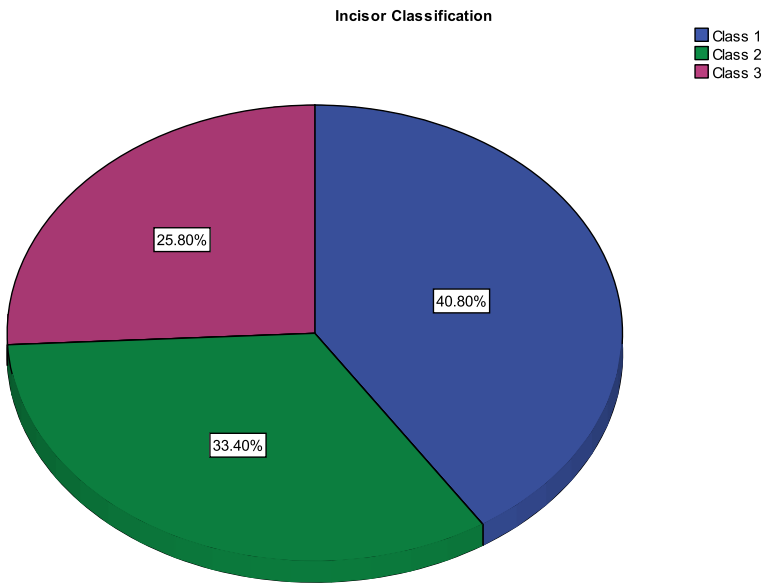

Figure 2 : Incisor classification of the study sample

The smile line score revealed that 41% of the sample had score of 0 while 29.4%, 22%, and 7.6% of the sample had a score of 1, 2, and 3 respectively (Figure 3,4,5,6).

Age * Smile * Gender Cross tabulation

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Figure 3 : Smile Line Score 0 Low smile line. less than 25% of the inter proximal gingivae visible and no gingival margins visible

Figure 4 : Smile Line Score 1. Average smile line 25-75% of the inter-proximal gingivae visible, gingival margins possibly visible at single teeth

Figure 5 : Smile Line Score 2. High smile line more than 75% of the inter-proximal Gingivae visible, while gingival margins scarcely visible

Figure 6 : Smile Line Score 3 Very high smile line: when a band of contiguous maxillary gingival of at least 2 mm is visible in all regions of interest

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It was noted that in table 1 the majority of the studied sample with incisor class I, II, and III had a smile line score of 0 (44.6%, 34.7% and 43.4% respectively) while very few had a score of 3. A strong association was found between gender smile line and incisor classification with a p value of ≤ 0.05.

Table 1 : Shows the correlation between gender, incisor classification, and smile line score (%)

Incisor Classification			Smile Line Score				Total	P Value
			Score 0	Score 1	Score 2	Score 3		
Class 1	Gender	Male	55 (27.0%)	34 (16.7%)	7 (3.4%)	3 (1.5%)	99 (48.5%)	.000*
		Female	36 (17.6%)	24 (11.8%)	36 (17.6%)	9 (4.4%)	105 (51.5%)	.000*
	Total		91 (44.6%)	58 (28.4%)	43 (21.1%)	12 (5.9%)	204 (100%)	
Class 2	Gender	Male	31 (18.6%)	23 (13.8%)	9 (5.4%)	1 (0.6%)	64 (38.3%)	.000*
		Female	27 (16.2%)	13 (7.8%)	45 (26.9%)	18 (10.8%)	103 (61.7%)	.000*
	Total		58 (34.7%)	36 (21.6%)	54 (32.3%)	19 (11.4%)	167 (100%)	
Class 3	Gender	Male	33 (25.6%)	30 (23.3%)	3 (2.3%)	1 (0.8%)	67 (51.9%)	.020*
		Female	23 (17.8%)	23 (17.8%)	10 (7.8%)	6 (4.7%)	62 (48.1%)	.020*
	Total		56 (43.4%)	53 (41.1%)	13 (10.1%)	7 (5.4%)	129 (100%)	

**P value <0.05 is significant*

In table 2, the majority of the studied sample fall within score 0 among all age groups, however very few numbers fall within score 3 smile line. All of the participants falling in the age group of >46 years had a 0 smile line score except 2 (1.1%).

Table 2 : Shows the correlation between age groups, incisor classification, and smile line score in the studied sample (%)

Incisor Classification			Smile Line Score				Total	P Value
			Score 0	Score 1	Score 2	Score 3		
Class 1	Age	15-25	38 18.6%	23 11.3%	28 13.7%	8 (3.9%)	97 (47.5%)	.000*
		26-35	8 3.9%	17 8.3%	4 2.0%	2 (1.0%)	31 (15.2%)	.000*
		36-45	11 5.4%	18 8.8%	10 4.9%	2 1.0%	41 (20.1%)	.000*
		46+	34 16.7%	0 0.0%	1 0.5%	0 0.0%	35 (17.2%)	.000*
	Total		91 44.6%	58 28.4%	43 21.1%	12 5.9%	204(100%)	
Class 2	Age	15-25	21 12.6%	12 7.2%	25 (15%)	6 (3.6%)	64 (38.3%)	.000*
		26-35	12 7.2%	13 7.8%	16 (9.6%)	9 (5.4%)	50 (29.6%)	.000*
		36-45	3 1.8%	11 6.6%	12 (7.2%)	4 (2.4%)	30 (18.0%)	.000*
		46+	22 13.2%	0 0.0%	1 (0.6%)	0 (0.0%)	23 (13.8%)	.000
	Total		58 34.7%	36 21.6%	54 (32.3%)	19 (11.4%)	167 (100%)	
Class 3	Age	15-25	24 18.6%	26 20.2%	4 (3.1%)	3 (2.3%)	57 (44.2%)	.000*
		26-35	4 3.1%	16 12.4%	3 (2.3%)	2 (1.6%)	25(19.4%)	.000*
		36-45	6 4.7%	11 8.5%	6 (4.7%)	2 (1.6%)	25 (19.4%)	.000*
		46+	22 17.1%	0 0.0%	0 (0.0%)	0 (0.0%)	22 (17.1%)	.000*
	Total		56 43.4%	53 41.1%	13 (10.1%)	7 (5.4%)	129 (100%)	

**P value ≤0.05 is significant*

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In table 3 it was noticed that females exhibited a higher smile line score 2 and 3 (33.7% and 12.2% respectively) than males among the different age groups, however more males were found to have a smile line score of 0 and 1(51.7% and 37.8% respectively). A strong association was also found between smile lines, age groups, among males and females (p value ≤0.05).

Table 3 : Correlation between smile lines, age groups among genders (%)

Gender			Smile Line Score								Total		P value
			Score 0		Score 1		Score 2		Score 3				
Male	Age	15-25	48	20.9%	37	16.1%	14	6.1%	4	1.7%	103	44.8%	.000*
		26-35	16	7.0%	27	11.7%	3	1.3%	0	0.0%	46	20.0%	.000*
		36-45	11	4.8%	23	10%	2	0.9%	1	0.4%	37	16.1%	.000*
		46+	44	19.1%	0	0.0%	0	0.0%	0	0.0%	44	19.1%	.000*
	Total		119	51.7%	87	37.8%	19	8.3%	5	2.2%	230	100%	
Female	Age	15-25	35	13.0%	24	8.9%	43	15.9%	13	4.8%	115	42.6%	.000*
		26-35	8	3.0%	19	7.0%	20	7.4%	13	4.8%	60	22.2%	.000*
		36-45	9	3.3%	17	6.3%	26	9.6%	7	2.6%	59	21.9%	.000*
		46+	34	12.6%	0	0.0%	2	0.7%	0	0.0%	36	13.3%	.000*
	Total		86	31.9%	60	22.2%	91	33.7%	33	12.2%	270	100%	

**P Value ≤ 0.05 is significant*

No association was found between age, gender, and incisor classification except with the age group of 36-45 years where the p value was 0.042 in males and 0.034 in females (<0.05) (table 4).

Table 4 : The correlation between age gender and incisor classification (%)

Age			Incisor Classification						Total		P Value Significance
			Class 1		Class 2		Class 3				
15-25	Gender	Male	42	19.3%	29	13.3%	32	14.7%	103	47.2%	.285
		Female	55	25.2%	35	16.1%	25	11.5%	115	52.8%	.285
	Total		97	44.5%	64	29.4%	57	26.1%	218	100%	
26-35	Gender	Male	16	15.1%	19	17.9%	11	10.4%	46	43.4%	.485
		Female	15	14.2%	31	29.2%	14	13.2%	60	55.6%	.485
	Total		31	29.2%	50	47.2%	25	23.6%	106	100%	
36-45	Gender	Male	19	19.8%	6	6.3%	12	12.5%	37	38.5%	.042
		Female	22	22.9%	24	25.0%	13	13.5%	59	61.5%	.034
	Total		41	42.7%	30	31.3%	25	26.0%	96	100%	
46+	Gender	Male	22	27.5%	10	12.5%	12	15%	44	55.0%	.348
		Female	13	16.3%	13	16.3%	10	12.5%	36	45.0%	.348
	Total		35	43.8%	23	28.8%	22	27.5%	80	100%	

**P Value ≤ 0.05 is significant*

IV. Discussion

This is a clinical based study aimed to evaluate the smile line among a sample of the Sudanese population with regards to age, gender, and incisor classification. A photograph of the participants' posed smiles was taken as the posed smile is reproducible.

The results showed (percentage of gender, age and incisors classification) that the majority of the studied sample had a low smile line. The majority of the studied sample fell in the age group of 15-25 since it was it was carried out in the university hospital and only a few of the patients fell in the older age group of >46.

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In the present study, 41% of the sample was found to have a low smile line which was similar to a study conducted by MN Hochman et al [10] who reported 78% of their population had a low gingival display whereas J Zhang et al [8] among Chinese population reported a lower percentage of a low smile line (16.25%) but exhibited a higher percentage of the average smile line (68.75%).

This difference in percentages can be attributed to the sample size, age groups, scoring method, environmental factors as well as ethnic background of the examined population.

When comparing genders, the present study showed that the smile line among the younger females age group exhibited more or less similar results as those obtained among other study populations in previous literature such as those reported by Jensen et al [1] among the Switzerland sample, H. Miron [7] in Israeli population as well as Tjian et al [19] among Californian Caucasian where younger females had a higher smile line than males.

This high smile line among young females may be partially attributed to their ethnic background as well as the cranial facial structure with bimaxillary protrusion displayed in the Sudanese population.

Regarding age groups the present study showed that the majority (97.5%) of the older age group (above 46 years) had low smile lines. Similar results were obtained by Jensen et al where 50-70% of the older age group (above 35 years) had a low smile line. [1]

This difference in results can be explained by the difference in the sample size together with the age range distribution and ethnic background of the studied samples. In contrast to the previous literature mentioned above, the present study evaluated the smile line in relation to the British incisor classification and it was evident that the results revealed a high statistical significance, in which approximately half of the class II individuals showed a higher smile line compared to class I and III in which only 25 % and 15 % respectively exhibited high smile line. This is in agreement with the results obtained by Sabri in which class II individuals exhibit a higher smile line. [2]

Nevertheless, some limitations should be discussed. The studied sample was only collected from the Academy Dental Hospital, as well as the fact that the majority of the sample consisted of university students and so only a few patients fell in the older age groups, thus the results may have not shown a clear association due to the limited diversity of the group.

In the future, it is recommended that a larger sample size is studied with a more diverse age range, a more equal distribution of gender, and a broadened range of the areas studied in Sudan in order to have an overview of the type of smile line in the general population of Sudanese adults. The results can then act as a guideline for orthodontists and orthodontic surgeons for treatment planning of an esthetically pleasing smile post treatment.

V. Conclusion

- The most common smile line in the Sudanese sample was the low smile line 41%. Females showed a higher percentage of high smile lines when compared to males. A low smile line was observed in all of the older age group over 46 years except two individuals.
- Incisors class I relation reported in 40.8%, of the sample while less individuals had class III (25.8%)
- Approximately half of the Incisor Class II individuals had a high smile line score.
- A difference exists in the smile line of the present studied sample with those of Caucasian, and Asians based on age and gender.

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Manuscript submission is a systematic procedure and little preparation is required beyond having all parts of your manuscript in a given format and a computer with an Internet connection and a Web browser. Full help and instructions are provided on-screen. As an author, you will be prompted for login and manuscript details as Field of Paper and then to upload your manuscript file(s) according to the instructions.

To avoid postal delays, all transaction is preferred by e-mail. A finished manuscript submission is confirmed by e-mail immediately and your paper enters the editorial process with no postal delays. When a conclusion is made about the publication of your paper by our Editorial Board, revisions can be submitted online with the same procedure, with an occasion to view and respond to all comments.

Complete support for both authors and co-author is provided.

4. MANUSCRIPT'S CATEGORY

Based on potential and nature, the manuscript can be categorized under the following heads:

Original research paper: Such papers are reports of high-level significant original research work.

Review papers: These are concise, significant but helpful and decisive topics for young researchers.

Research articles: These are handled with small investigation and applications

Research letters: The letters are small and concise comments on previously published matters.

5.STRUCTURE AND FORMAT OF MANUSCRIPT

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

Papers: These are reports of significant research (typically less than 7000 words equivalent, including tables, figures, references), and comprise:

(a)Title should be relevant and commensurate with the theme of the paper.

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

(c) Up to ten keywords, that precisely identifies the paper's subject, purpose, and focus.

(d) An Introduction, giving necessary background excluding subheadings; objectives must be clearly declared.

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

(f) Results should be presented concisely, by well-designed tables and/or figures; the same data may not be used in both; suitable statistical data should be given. All data must be obtained with attention to numerical detail in the planning stage. As reproduced design has been recognized to be important to experiments for a considerable time, the Editor has decided that any paper that appears not to have adequate numerical treatments of the data will be returned un-refereed;

(g) Discussion should cover the implications and consequences, not just recapitulating the results; conclusions should be summarizing.

(h) Brief Acknowledgements.

(i) References in the proper form.

Authors should very cautiously consider the preparation of papers to ensure that they communicate efficiently. Papers are much more likely to be accepted, if they are cautiously designed and laid out, contain few or no errors, are summarizing, and be conventional to the approach and instructions. They will in addition, be published with much less delays than those that require much technical and editorial correction.

The Editorial Board reserves the right to make literary corrections and to make suggestions to improve briefness.

It is vital, that authors take care in submitting a manuscript that is written in simple language and adheres to published guidelines.

Format

Language: The language of publication is UK English. Authors, for whom English is a second language, must have their manuscript efficiently edited by an English-speaking person before submission to make sure that, the English is of high excellence. It is preferable, that manuscripts should be professionally edited.

Standard Usage, Abbreviations, and Units: Spelling and hyphenation should be conventional to The Concise Oxford English Dictionary. Statistics and measurements should at all times be given in figures, e.g. 16 min, except for when the number begins a sentence. When the number does not refer to a unit of measurement it should be spelt in full unless, it is 160 or greater.

Abbreviations supposed to be used carefully. The abbreviated name or expression is supposed to be cited in full at first usage, followed by the conventional abbreviation in parentheses.

Metric SI units are supposed to generally be used excluding where they conflict with current practice or are confusing. For illustration, 1.4 l rather than 1.4 × 10-3 m3, or 4 mm somewhat than 4 × 10-3 m. Chemical formula and solutions must identify the form used, e.g. anhydrous or hydrated, and the concentration must be in clearly defined units. Common species names should be followed by underlines at the first mention. For following use the generic name should be constricted to a single letter, if it is clear.

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Abstract, used in Original Papers and Reviews:

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Many researchers searching for information online will use search engines such as Google, Yahoo or similar. By optimizing your paper for search engines, you will amplify the chance of someone finding it. This in turn will make it more likely to be viewed and/or cited in a further work. Global Journals Inc. (US) have compiled these guidelines to facilitate you to maximize the web-friendliness of the most public part of your paper.

Key Words

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

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

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

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

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

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

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

Acknowledgements: Please make these as concise as possible.

References

References follow the Harvard scheme of referencing. References in the text should cite the authors' names followed by the time of their publication, unless there are three or more authors when simply the first author's name is quoted followed by et al. unpublished work has to only be cited where necessary, and only in the text. Copies of references in press in other journals have to be supplied with submitted typescripts. It is necessary that all citations and references be carefully checked before submission, as mistakes or omissions will cause delays.

References to information on the World Wide Web can be given, but only if the information is available without charge to readers on an official site. Wikipedia and Similar websites are not allowed where anyone can change the information. Authors will be asked to make available electronic copies of the cited information for inclusion on the Global Journals Inc. (US) homepage at the judgment of the Editorial Board.

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For scanned images, the scanning resolution (at final image size) ought to be as follows to ensure good reproduction: line art: >650 dpi; halftones (including gel photographs) : >350 dpi; figures containing both halftone and line images: >650 dpi.

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TECHNIQUES FOR WRITING A GOOD QUALITY RESEARCH PAPER:

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

2. Evaluators are human: First thing to remember that evaluators are also human being. They are not only meant for rejecting a paper. They are here to evaluate your paper. So, present your Best.

3. Think Like Evaluators: If you are in a confusion or getting demotivated that your paper will be accepted by evaluators or not, then think and try to evaluate your paper like an Evaluator. Try to understand that what an evaluator wants in your research paper and automatically you will have your answer.

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

12. Make all efforts: Make all efforts to mention what you are going to write in your paper. That means always have a good start. Try to mention everything in introduction, that what is the need of a particular research paper. Polish your work by good skill of writing and always give an evaluator, what he wants.

13. Have backups: When you are going to do any important thing like making research paper, you should always have backup copies of it either in your computer or in paper. This will help you to not to lose any of your important.

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

17. Never use online paper: If you are getting any paper on Internet, then never use it as your research paper because it might be possible that evaluator has already seen it or maybe it is outdated version.

18. Pick a good study spot: To do your research studies always try to pick a spot, which is quiet. Every spot is not for studies. Spot that suits you choose it and proceed further.

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20. Use good quality grammar: Always use a good quality grammar and use words that will throw positive impact on evaluator. Use of good quality grammar does not mean to use tough words, that for each word the evaluator has to go through dictionary. Do not start sentence with a conjunction. Do not fragment sentences. Eliminate one-word sentences. Ignore passive voice. Do not ever use a big word when a diminutive one would suffice. Verbs have to be in agreement with their subjects. Prepositions are not expressions to finish sentences with. It is incorrect to ever divide an infinitive. Avoid clichés like the disease. Also, always shun irritating alliteration. Use language that is simple and straight forward. put together a neat summary.

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

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

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

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

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

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

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

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

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

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

31. Adding unnecessary information: Do not add unnecessary information, like, I have used MS Excel to draw graph. Do not add irrelevant and inappropriate material. These all will create superfluous. Foreign terminology and phrases are not apropos. One should NEVER take a broad view. Analogy in script is like feathers on a snake. Not at all use a large word when a very small one would be sufficient. Use words properly, regardless of how others use them. Remove quotations. Puns are for kids, not grunt readers. Amplification is a billion times of inferior quality than sarcasm.

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

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

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Key points to remember:

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

Final Points:

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

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

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

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To make a paper clear

· Adhere to recommended page limits

Mistakes to evade

- Insertion a title at the foot of a page with the subsequent text on the next page
- Separating a table/chart or figure - impound each figure/table to a single page
- Submitting a manuscript with pages out of sequence

In every sections of your document

· Use standard writing style including articles ("a", "the," etc.)

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

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

· Align the primary line of each section

· Present your points in sound order

· Use present tense to report well accepted

· Use past tense to describe specific results

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

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

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

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

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

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

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- Fundamental goal
- To the point depiction of the research
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- Significant conclusions or questions that track from the research(es)

Approach:

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- Center on shortening results - bound background information to a verdict or two, if completely necessary
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The **Introduction** should "introduce" the manuscript. The reviewer should be presented with sufficient background information to be capable to comprehend and calculate the purpose of your study without having to submit to other works. The basis for the study should be offered. Give most important references but shun difficult to make a comprehensive appraisal of the topic. In the introduction, describe the problem visibly. If the problem is not acknowledged in a logical, reasonable way, the reviewer will have no attention in your result. Speak in common terms about techniques used to explain the problem, if needed, but do not present any particulars about the protocols here. Following approach can create a valuable beginning:

- Explain the value (significance) of the study
- Shield the model - why did you employ this particular system or method? What is its compensation? You strength remark on its appropriateness from a abstract point of vision as well as point out sensible reasons for using it.
- Present a justification. Status your particular theory (es) or aim(s), and describe the logic that led you to choose them.
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Approach:

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Materials:

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

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

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

What to keep away from

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

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

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

Content

- Sum up your conclusion in text and demonstrate them, if suitable, with figures and tables.
- In manuscript, explain each of your consequences, point the reader to remarks that are most appropriate.
- Present a background, such as by describing the question that was addressed by creation an exacting study.
- Explain results of control experiments and comprise 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 in manuscript form.

What to stay away from

- Do not discuss or infer your outcome, report surroundings information, or try to explain anything.
- Not at all, take in raw data or intermediate calculations in a research manuscript.
- Do not present the similar data more than once.
- Manuscript should complement any figures or tables, not duplicate the identical information.
- Never confuse figures with tables - there is a difference.

Approach

- As forever, use past tense when you submit to 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 part.

Figures and tables

- If you put figures and tables at the end of the details, make certain that they are visibly distinguished from any attach appendix materials, such as raw facts
- Despite of position, each figure must be numbered one after the other and complete with subtitle
- In spite of position, each table must be titled, numbered one after the other and complete with heading
- All figure and table must be adequately complete that it could situate on its own, divide from text

Discussion:

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References	Complete and correct format, well organized	Beside the point, Incomplete	Wrong format and structuring

Index

A

Akhionbare · 13
Amenaghawon · 13
Ayanbadejo · 13

B

Bernardi · 13
Bimaxillary · 31

C

Cariogenic · 12
Chaovavanich · 6
Cingolani · 6
Cotrimoxazole · 5, 7
Cumberbatch · 12

D

Dagnachew · 6
Dragoumis · 18, 23

E

Ehizele · 13
Ekanayake · 13
Enquselassie · 6
Esthetically · 25, 31

F

Fumarate · 3

H

Hayashizaki · 13
Honkala · 13

K

Kirtiloglu · 13

M

Mausebussards · 18
Mediterr · 13

O

Ojehanon · 13
Okeigbemen · 13
Oosterveld · 31
Oproxil · 3
Orthodontic · 25, 26

P

Periodontitis. · 12
Preslaughtered · 16
Prophylaxisis · 1, 3, 5

R

Retroclined · 26
Reweighed · 16
Rimondini · 13

S

Schoenfeld · 2
Sulfamethoxazole · 7

T

Tansuphas · 6
Timbergen · 15
Trimethoprim · 5, 7

V

Veeresha · 13
Velázquez · 13

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