Online ISSN : 2249-4618
Print ISSN : 0975-5888
DOI : 10.17406/GJMRA

Global Journal of Medical Research: K

Interdisciplinary

Endogenous Endophthalmitis

Frequently Moving and Permanent

Highlights

Disseminated Myeloid Sarcoma

Evaluation of the Mutagenic Potential

Discovering Thoughts, Inventing Future

VOLUME 17 ISSUE 3 VERSION 1.0

Global Journal of Medical Research: K
Interdisciplinary

Global Journal of Medical Research: K
Interdisciplinary

Volume 17 Issue 3 (Ver. 1.0)

Open Association of Research Society

Incorporation No.: 0423089
License No.: 42125/022010/1186
Registration No.: 430374
Import-Export Code: 1109007027
Employer Identification Number (EIN):
USA Tax ID: 98-0673427

Global Journals Inc.

*(A Delaware USA Incorporation with "Good Standing"; **Reg. Number: 0423089**)*

Sponsors: Open Association of Research Society
Open Scientific Standards

Publisher's Headquarters office

Global Journals® Headquarters
945th Concord Streets,
Framingham Massachusetts Pin: 01701,
United States of America
USA Toll Free: +001-888-839-7392
USA Toll Free Fax: +001-888-839-7392

Offset Typesetting

Global Journals Incorporated
2nd, Lansdowne, Lansdowne Rd., Croydon-Surrey,
Pin: CR9 2ER, United Kingdom

Packaging & Continental Dispatching

Global Journals Pvt. Ltd.
E-3130 Sudama Nagar, Near Gopur Square,
Indore, M.P., Pin: 452009, India

Find a correspondence nodal officer near you

To find nodal officer of your country, please email us at *local@globaljournals.org*

eContacts

Press Inquiries: *press@globaljournals.org*
Investor Inquiries: *investors@globaljournals.org*
Technical Support: *technology@globaljournals.org*
Media & Releases: *media@globaljournals.org*

Pricing (Including by Air Parcel Charges):

For Authors:
22 USD (B/W) & 50 USD (Color)
Yearly Subscription (Personal & Institutional):
200 USD (B/W) & 250 USD (Color)

Editorial Board

Global Journal of Medical Research

Davee Department of Neurology and Clinical Neurosciences
Northwestern University Feinberg School of Medicine
Web: neurology.northwestern.edu/faculty/deng.html

Associate Attending Radiologist
NewYork-Presbyterian Hospital
MRI, MRA, CT, and CTA
Neuroradiology and Diagnostic Radiology
M.D., State University of New York at Buffalo,
School of Medicine and Biomedical Sciences
Web: weillcornell.org/pinasanelli/

Dr. Roberto Sanchez

Associate Professor
Department of Structural and Chemical Biology
Mount Sinai School of Medicine
Ph.D., The Rockefeller University
Web: mountsinai.org/

Dr. Michael R. Rudnick

M.D., FACP
Associate Professor of Medicine
Chief, Renal Electrolyte and Hypertension Division (PMC)
Penn Medicine, University of Pennsylvania
Presbyterian Medical Center, Philadelphia
Nephrology and Internal Medicine
Certified by the American Board of Internal Medicine
Web: uphs.upenn.edu/

Dr. Feng Feng

Boston University
Microbiology
72 East Concord Street R702
Duke University
United States of America

Dr. Seung-Yup Ku

M.D., Ph.D., Seoul National University Medical College,
Seoul, Korea Department of Obstetrics and Gynecology
Seoul National University Hospital, Seoul, Korea

Sanguansak Rerksuppaphol

Department of Pediatrics Faculty of Medicine
Srinakharinwirot University
NakornNayok, Thailand

Antonio Simone Laganà

M.D. Unit of Gynecology and Obstetrics
Department of Human Pathology in Adulthood and
Childhood “G. Barresi” University of Messina, Italy

Contents of the Issue

Global Journal of Medical Research: K
Interdisciplinary
Volume 17 Issue 3 Version 1.0 Year 2017
Type: Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals Inc. (USA)
Online ISSN: 2249-4618 & Print ISSN: 0975-5888

Bacterial Endogenous Endophthalmitis

By Francis Kwasi Obeng, Vipan Kumar Vig, Preetam Singh, Rajbir Singh, Kanwardeep Singh & Nikhil Sahajpal

Abstract- *Background:* Bacterial endogenous endophthalmitis (BEE) is uncommon and severe. Few patients who have this disease are initially misdiagnosed. Its victims usually have an underlying disease which predisposes them to infection. Blood and vitreous cultures are the most frequently used media of establishing the diagnosis. Staphylococcus aureus, group B streptococci, Streptococcus pneumonia and Listeria monocytogenes are the commonly found Gram positive organisms. The most common Gram negative causative bacteria are Klebsiella spp., Escherichia coli, Pseudomonas aeruginosa, and Neisseria meningitidis. Gram negative organisms are responsible for the majority of cases reported from East Asian hospitals, but Gram positive organisms are more common in the developed world. Apart from being rare, BEE has very little literature and there has not been any publication on it in Northern India emphasizing on its management to the best of our knowledge.

Keywords: *endophthalmitis, metastatic, bacterial, ocular barriers, vitreous inflammation.*

GJMR-K Classification: *NLMC Code: QW 180*

Strictly as per the compliance and regulations of:

Bacterial Endogenous Endophthalmitis

Francis Kwasi Obeng [α], Vipan Kumar Vig [σ], Preetam Singh [ρ], Rajbir Singh [ω], Kanwardeep Singh [¥] & Nikhil Sahajpal [§]

Abstract- Background: Bacterial endogenous endophthalmitis (BEE) is uncommon and severe. Few patients who have this disease are initially misdiagnosed. Its victims usually have an underlying disease which predisposes them to infection. Blood and vitreous cultures are the most frequently used media of establishing the diagnosis. Staphylococcus aureus, group B streptococci, Streptococcus pneumonia and Listeria monocytogenes are the commonly found Gram positive organisms. The most common Gram negative causative bacteria are Klebsiella spp., Escherichia coli, Pseudomonas aeruginosa, and Neisseria meningitidis. Gram negative organisms are responsible for the majority of cases reported from East Asian hospitals, but Gram positive organisms are more common in the developed world. Apart from being rare, BEE has very little literature and there has not been any publication on it in Northern India emphasizing on its management to the best of our knowledge. To fill in this gap in research, we evaluated the use of systemic antibiotics with intravitreal antibiotics and steroids (SAIAS) and/or pars plana vitrectomy (PPV) in treating patients diagnosed with BEE.

Aim: To assess the complication rate and visual outcomes of BEE after the use of SAIAS and/or PPV in a cohort of Indian patients who visited our hospital in Northern India.

Material and Method: Records of all patients who were diagnosed with BEE and managed at our hospital from 2007 to 2015 were reviewed retrospectively for visual outcomes and complications. Patients' demographic data, predisposing medical conditions, ocular features, extraocular manifestation of infection, Gram staining, treatment, best corrected visual acuity (BCVA) before and after treatment, indications for any further surgical procedures and length of follow up were collected and analysed.

Results: 31 eyes of 29 patients (19 males and 10 females) were identified. Mean age at presentation was 41.8± 18 years (range 3 – 81 years) with a mean follow up 11.1± 22.7 months (range 1- 96 months). 54.84%, 32.26% and 12.90% of eyes had maintenance, improvement and worsening of BCVA respectively at the last review. 16 (51.61%) of 31 eyes had complications from BEE the most common of which was rhegmatogenous retinal detachment (RRD).

Conclusion: Timely use of SAIAS and/or PPV in treating patients with BEE is a preferred method. The visual outcomes and complication profile of our centre are better compared to other case series. Although patients have benefitted massively from our therapeutic regimen, they should be informed on diagnosis that BEE itself is fraught with complications with baseline reporting BCVA being the best visual prognostic factor.

Keywords: endophthalmitis, metastatic, bacterial, ocular barriers, vitreous inflammation.

Author α σ ρ ω ¥ §: Vitreo-Retinal Center, Sadar Bahadur Dr. Sohan Singh Eye Hospital, Amritsar, India. e-mail: fobeng37@yahoo.com

I. Introduction

A gist of protective structures whose breakdown leads to intraocular infection and inflammation helps in better understanding of BEE. There are two main blood ocular barriers (BOB): blood aqueous barrier (BAB) and blood retinal barrier (BRB). Whereas the former is made up of non-pigmented ciliary epithelium and endothelium of iris vessels, the latter is further categorized into an inner and outer parts. The inner portion comprises tight junctions between endothelial cells of retinal capillaries and the outer, tight junctions between hexagonally shaped retinal pigment epithelial cells. Being similar to blood brain barrier, the BRB is restrictive and regulates ion, protein and water flux into and out of the retina.[1]

Endophthalmitis refers to purulent inflammation of vitreous and aqueous due to infection as a result of breakdown of BOB paving way for microbial invasion into the eye.[2] Depending on its causative organism, it can be classified into bacterial, fungal, protozoal, parasitic and viral although the first two are the most common. The route of infection can make it endogenous, in which the causative agent is from within the body or exogenous, characterized by external invasion.

Rare though it is, BEE is potentially devastating resulting in guarded visual prognosis. Albeit patients generally present with underlying systemic infections such as liver abscess, sinusitis, endocarditis or any other infection in any part of the body, in 44% of cases no source of infection is found according to a study published by Binder *et al*.[3]Jackson et al also documented in their study that in 70% of cases the source of infection is known inferring that the etiology is not known in 30%.[4]Another study has emphasized that the great majority of individuals with BEE have either diabetes mellitus, heart disease or malignancy as the main etiology.[5]Due to its hematogenous spread from a focus of infection, a systemic work up for detection of the source of infection is critical in its management. It is important that prompt diagnosis is made and appropriate treatment started to preserve vision and avoid mortality. A high index of suspicion, accuracy and clinical judgment with collaborative input from the ophthalmologist, physician specialist and microbiologist are therefore paramount to the successful management of BEE.

II. Materials and Methods

A 9-year retrospective study from 2007 to 2015 was conducted in our hospital with a minimum follow-up of 1 month. We have three experienced vitreoretinal surgeons, a physician specialist who helps in the management of systemic diseases with ocular complications and a microbiologist. Institutional ethical approval was required for this research and in a wider dimension, the tenets of Declaration of Helsinski applied in an attempt to respect human rights of the participants. Patients' demographic data, predisposing medical conditions, ocular features, extraocular manifestation of infection, Gram staining, treatment, BCVA before and after treatment, indications for any further surgical procedures and length of follow up were collected and analysed. Out of the 40 patients whose medical records were reviewed, 11 were excluded from the study because they were either followed up for less than 1month, lost to follow up, had had intraocular surgery within 1 year of presentation or involved in recent trauma to the eye. The vitreoretinal surgeons made all major decisions in consultation with the physician specialist and microbiologist.

Blood and vitreous samples for culture were taken from all patients with provisional diagnosis of BEE. Being rare contaminants of blood and vitreous cultures, Gram negative bacteria were very significant if isolated in either of the two fluids. On the other hand, Gram positive infection was significant if it was isolated in more than one culture plate. Our incubation period was up to 7 days at a temperature of 37*C.

All specimens were taken under sterile conditions in operating theatre after the last non-infected case of the day. 0.2 ml of vitreous was taken by entering the eye through a sclera point 3.5 mm away from the limbus. Depending on microscopy report which we got in few minutes, we chose the appropriate antibiotic and injected it intravitreally. If the causative organism was not identified by the laboratory, we routinely used 2 mg in 0.1 ml of vancomycin against Gram positive and 2 mg in 0.1 ml of ceftazidime against Gram negative bacteria. All patients also received intravitreal injection of 0.1 ml of dexamethasone to combat against the associated inflammation. If the presenting visual acuity was perception of light, we primarily performed 3 port PPV, a procedure which was also utilized as second line treatment for patients who did not respond to the initial SAIAS. Patients who had associated retinal detachment had belt buckling (BB) in addition to the PPV.

Positive blood cultures coupled with antibiotics capable of crossing the BOB helped us make systemic antibiotic choice. Patients in whom blood cultures were negative were put on systemic ciprofloxacin tablets (cifran) 500, 750 mg or less twice daily depending on their body weight for 14 days.

The Snellen BCVA was converted into logarithm of minimum angle of resolution (log MAR) units for statistical analysis. Patients whose visual acuities were hand motion and light perception were assigned the equivalence of 1.7 log MAR units. The x^2 test was used to determine relationships between categorical variables and the paired t test, normally distributed variables. All tests were considered to be statistically significant if the p value was 0.05 or less.

Table 1: BCVA after Treatment

SRL	Quality	Number of Eyes	Percentage
1	Maintenance	17	54.84
2	Improvement	10	32.26
3	Worsening	4	12.90
	Total	31	100.00

Table 2: Underlying Diseases Causing BEE

SRL	Disease	Number of Patients	Percentage
1	Type 2 Diabetes Mellitus	11	37.93
2	Urinary Tract Infection	5	17.24
3	Pneumonia/Bronchopneumonia	4	13.79
4	Ischaemic Heart Disease	3	10.35
5	Hepatitis C	2	6.90
6	Infected Skin Wound	2	6.90
7	Tuberculosis	1	3.45
8	No Focus of Infection	1	3.45
	Total	29	100

Table 3: Complications of BEE and Management

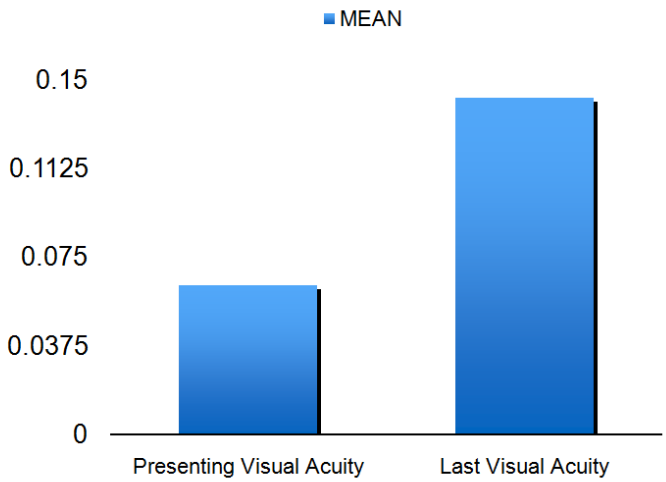
SRL	Complication	Number	Precentage	Management
1	Rhegmatogenous Retinal Detachment	8	50.00	BB+PPV+FLUID AIR EXCHANGE+ ENDOLASER+SILICONE OIL
2	Complicated Cataract	3	18.75	BB+LENSECTOMY+PPV
3	Phthisis	2	12.50	REFERRAL TO ORBIT AND OCULOPLASTIC SPECIALIST
4	Multifocal Choroiditis	2	12.50	SYSTEMIC STEROIDS+TREATMENT OF UNDERLYING DISEASE
5	Macular Scar	1	6.25	OBSERVATION
	Total	16	100	

III. Results

During the study, 29 patients (31 eyes) were diagnosed with BEE. There were 19 (65.52%) males and 10 (34.48%) females with a mean age of 42 years (SD 18; range 3-81). There was right eye (n=15; 51.73%) preponderance over left (n=12; 41.38%) but in all the condition was bilateral in 2 (6.89%) patients. The most common presenting and last follow up visual acuities were light perception and counting fingers at 1 metre respectively. The mean difference between the final postoperative BCVA at last visit and presenting visual acuity was 1.1±0.9 log MAR units which was significant statistically. (p= 0.04)This is shown in the graph pad below with its corresponding table.All data are expressed as Mean ± SD. The graph pad software version 5.0 was used to analyze data. The numerical data was compared using t test.

Presenting Visual Acuity	Last Visual Acuity	P VALUE
0.06 ± 0.17	0.14 ± 0.30	0.04 *

All values expressed as Mean ± SD.



As at the last visit after all therapeutic interventions, 17 (54.84%), 10 (32.26%) and 4 (12.90%) eyes had maintenance, improvement and worsening of their visual acuities respectively as shown in table 1. Fifteen eyes had hypopyon and ocular hypertension at presentation. Other clinical features in our case series included ocular pain, blurred vision, swollen eyelids, injected and chemosed conjunctiva, anterior chamber inflammation as well as poor red reflex and fundal view due to intraocular inflammation. The examination of patients with ocular medial opacification was complemented with B-scan ultrasonography. Initially misdiagnosed as having acute anterior uveitis, 4 (13.79%) patients had a 3-day delay in appropriate diagnosis and effective treatment of the disease. 28 (96.55%) patients had an underlying medical condition which made them vulnerable to infection and in 12 (41.38%), the underlying disease was previously undiagnosed. As shown in table 2, organized from most to least common predisposing systemic diseases detected in our study were type 2 diabetes, urinary tract infection, pneumonia/bronchopneumonia, ischaemic heart disease, hepatitis C, infected wound and tuberculosis.

All patients had positive vitreous or blood cultures. Vitreous culture was positive in 50% of cases

and blood, 60%. In all, Gram positive organisms were found in 21 (67.74%) eyes with the remaining 10 (32.26%) being Gram negative. Prognosis was guarded in the Gram negative group. The most common Gram positive and negative bacteria found were Staphylococcus aureus and Klebsiella respectively. All our patients did not only receive appropriate treatment of underlying diseases but also oral ciprofloxacin as well as intravitreal vancomycin, ceftazidime and dexamethasone. Out of the total number, however, 16 (51.61%) eyes had further treatment with PPV on not responding to the previous management. Table 3 shows the complications we had and their management. The visual outcome was generally poor with count fingers at 1 metre or worse in 25 (80.65%) eyes. Patients who presented with visual acuity of 6/36 or better retained useful vision. Eyes which underwent vitrectomy had markedly reduced chances for evisceration and enucleation.

IV. Discussion

Being rare, BEE has a prevalence rate of 2 to 8% of all endophthalmitis. [5]

The use of SAIAS and/or PPV is the best approach in the management of patients with BEE compared to other therapeutic regimen: intravitreal antibiotics with steroids alone or intravitreal treatment with systemic antibiotics or PPV alone. The aim of this study was to assess the complication rate and visual outcome of BEE after the use of SAIAS and/or PPV in a cohort of Indian patients who presented to our facility. In general our results show favorable outcomes compared to other studies. We did not register any mortalities from systemic complications of the underlying diseases. BCVA was maintained, improved and worsened in 54.84%, 32.26% and 12.90% of eyes respectively.

a) Patients' Details

The mean age of incidence of BEE, according to a study published by Wong *et al*, is 52 years.[6]In our study the mean age was 41.83years, a parameter which does not differ much from other case series. As reported in other publications, our research showed more males (65.52%) affected by BEE than females (34.48%).[4, 5, 6]The reason for this difference could be that men, unlike women, are more willing to travel when referred to specialized hospitals. A recent research result published by Zeng et al has established that men have thicker choroid than women.[7] They may therefore have bigger choriocapillaries which transport more bacteria to the vitreous than women albeit more studies are needed to corroborate it.

Our study as shown in table 2, like what has been published in other reviews, has demonstrated that the extraocular foci mostly affected are liver, lung, endocardium and urinary tract. [4] According to Binder M *et al*, a diagnosis of BEE merits systemic workup for the source of infection although in 44% of cases no source is found.[3]In the publication made by Jackson *et al*, it was also revealed that 40% of BEE patients may not have an underlying systemic disease and if they do, then type 2 diabetes, intravenous drug use, HIV infection and malignancies are the most commonly found causes but there are several other etiologies. [4] Our study also revealed type 2 diabetes as the most common cause as shown in table 2. Since it is a scientific fact that without focus of infection or immunodeficiency the diagnosis of BEE becomes ambiguous, we delivered almost free medical services to our patients majority of whom were poor with the aim to not only preventing them from using lack-of-funds as an excuse to refuse tests but also enhancing our diagnostic yield. As shown in table 2, only 1 (3.45%) participant did not have an underlying disease in our study. The patient in question missed an appointment. We, therefore, strongly believe that expensive medical bills may act as a hindrance in detecting systemic entities associated with BEE although further studies are needed to establish this fact.

The only brachiocephalic artery in the cardiovascular system and the biggest branch of aortic arch is situated at the right making blood volume and bacterial load sent from it to the right carotid and eye more than the left.[8]Based on this fact, Greenwald *et al* suggested that BEE occurs more in right than left eye. [9]In an attempt to emphasize this scientific fact, Forster *et al* concluded in their study that the reason behind right eye predominance is that the only brachiocephalic artery which is right sided in the body directly takes blood and infective pathogens from aortic arch to the right eye through other arteries, an anatomical feature which the left eye does not possess. [10]Other researchers, however, upon finding left eye preponderance, have categorically stated that blood flow is equal to both eyes and the extra transit time to the left carotid is unlikely to have an important effect on bacterial survival.[4] Although with marginal difference, our study revealed right eye predominance (51.73%) substantiating previously found evidence in scientific armamentarium. Bilaterality is rare but when detected, the most commonly associated systemic disease and causative organisms are diabetes and klebsiella pneumoniae respectively.[11-16] Other characteristics of both eyes involvement include liver abscess and poor visual prognosis. [11-16]In our study we detected bilateral disease in 2 patients one of whom had diabetes and the other, tuberculosis. The final BCVA was worse in the patient with diabetes.

b) Clincal Features

The most common eye symptom in our patients was blurred vision (n=24; 82.76%) followed by eye pain (n=16; 55.17%). The signs we commonly detected were absence of red reflex (n=17; 58.62%), anterior chamber inflammation (n=13; 44.83%), vitritis (n=12; 41.38%)and

hypopyon (n=10; 34.48%). Many patients had systemic features like fever (n=13; 44.83%) and influenza-like symptoms (n=6; 20.69%) which accompanied or preceded the ocular symptomatology. These findings are similar to what has been detected in other case series.[4] Depending on the predominant focus of inflammation, there are five main types of BEE: anterior focal, anterior diffuse, posterior focal, posterior diffuse and panophthalmitis.[9] Anterior means aqueous and posterior refers to vitreous humor and retina. Focal and diffuse represent part of whole area and whole area respectively.

c) Diagnosis

i. *Errors In Diagnosis*

Albeit BEE has its own clinical symptoms and signs, many of them might be nonspecific making its diagnosis difficult. The diagnostic error is compounded by its very low incidence rate. According to Greenwald *et al*,[9] errors in diagnosis occurred in 11 out of 67 patients representing 16%. Jackson *et al*, however, are of the opinion that the error rate ranges from 22 to 63% emphasizing that physicians may not report all the diagnostic errors they make.[4] Our rate was 13.79% after having misdiagnosed 4 patients as having acute anterior uveitis. Index of suspicion should therefore be very high in order not to miss the diagnosis.

ii. *Differential Diagnoses*

Entities which can easily mimic BEE may be categorized into intraocular and eyelid. Intraocular entities include acute anterior noninfectious uveitis due to formation of keratic precipitates, acute angle closure glaucoma owing to trabecular meshwork clogging with inflammatory cells and fungal endophthalmitis from intravenous drug abuse. [4]Whereas there is enough scientific evidence explaining immunocompromised state of intravenous drug abusers making them prone to fungal endophthalmitis in general, such an evidence is not clearly established between them and BEE. This can bring about diagnostic dilemma.

In children under 2 years of age, the most common differential diagnosis is retinoblastoma due to pseudohypopyon and inflammatory cells appearing as leukocoria.[17, 18] Cataract and uveitis in a child is another mimicking entity to consider according to Auerbach et al.[19] Eyelid swelling may mimic orbital cellulitis.[4] The youngest patient in our study was 3 years.

d) Ancillary Tests

i. *Microscopy and culture*

a. Blood Culture

Blood culture, unlike vitreous, constitutes the most reliable medium for making the diagnosis as established in other case series with as high as 75% culture positivity. [5, 20, 21]In our study, 17 (58.62%) out of 29 patients had their blood cultures positive.

b. Intraocular Culture

Useful though they are, blood cultures cannot be relied upon entirely for the diagnosis of BEE. In the absence of positive blood cultures, it is advisable to get intraocular samples, be it vitreous or aqueous. Although some authorities advocate for aqueous samples when the inflammation is predominantly anterior, [9] clinical and experimental studies have concluded that vitreous samples are more reliable in exogenous endophthalmitis, a finding which has not been well established in BEE[22, 23, 24]. In our centre, we usually take vitreous and aqueous specimens in each patient suspicious of BEE. More than 65% of organisms grown were from the vitreous. This made us arrive at the conclusion that vitreous is more reliable than aqueous. Vitreous sample can be obtained through needle aspiration or cutter. Donahue *et al,* after investigating to find out which method of getting vitreous specimen yielded more culture positivity, ended their study concluding that use of a cutter is better than needle aspiration. [25] In our hospital the observation we have made is that whereas needle aspiration sometimes results in dry tap, use of a cutter always gives us a specimen. Another difference we have observed is that the needle may not aspirate enough sample but the cutter is very reliable in giving us the amount of sample we need. We, therefore, usually use the cutter in getting vitreous samples due to its advantages. Although we incubate pathogens up to 7 days, majority of our pathogens were detected within 24 hours.

ii. *Polymerase Chain Reaction*

Polymerase Chain Reaction (PCR) also plays an important role in the diagnosis of BEE. Its advantages include ability to detect unusual organisms,[26] augmentation of bacterial DNA for better detection of single organism,[27] and detection of organisms in culture-negative specimens after antibiotics have been initiated.[28] It is also faster than the traditional culturing of samples.[29]

Its main disadvantage in our hospital is cost. Other demerits substantiated by studies include cross contamination, false negative results, inability to detect capacity of an organism to replicate, difficulty in matching organism sensitivity to specific antibiotics and not being useful in infections caused by multiple organisms. [30, 31, 27] Due to these imperfections associated with it, PCR is used to complement the traditional microscopy and culture in our hospital.

e) Causative Organisms

It is a well known fact, according to Wong *et al,* that the most common cause of BEE in East Asia is Klebsiella which is a Gram negative bacterium. [6] Another publication from Okada *et al* has established that in the developed world it is Gram positive bacteria which predominantly cause BEE. [5] However, it is now accepted that the most common cause of BEE in both developed

and developing countries is Klebsiella Pneumoniae (KP).[4] Recent studies have revealed that apart from its capsule capable of protecting it against immunogenicity of the host, the organism in question has hypermucoviscosity and mag A gene which make it more virulent and metastatic in nature. [32, 33, 34.] There is a strong association among diabetes, KP, liver abscess and BEE.[32, 35] This means that a good number of patients with diabetes with compromised immune system are easily infected by KP with affinity to the liver and eye causing liver abscess and BEE. In our study, diabetes was the underlying disease mostly found as shown in table 2 and KP, the most commonly isolated Gram negative pathogen. Although we never had liver abscess as an underlying disease, 6.90% of our patients had hepatitis C, a discovery which still makes the liver a sine qua non being the nidus of settlement of KP to set the pace for the development of BEE. Further research is needed to help establish the association between hepatitis C and BEE.

Pseudomonas aeruginosa (PA) causes BEE in the old and young. In the former, the risks increase if there is immunodeficiency or urinary catheterization whereas in the latter, affected individuals are usually neonates or below age 25 years. [4]We neither had neonates nor catheterization in our research but the second most common underlying disease was PA urinary tract infection.

Other uncommon pathogens capable of causing BEE are N meningitides usually found in children and Bacillus cereus, in intravenous drug users. [9, 36, 37]

f) Pathogenesis

There are two major branches of the ophthalmic artery which help in ocular blood circulation: the posterior ciliary artery provides blood supply to the posterior uvea whereas central retinal artery does the retina.[38] BEE can only occur when the blood ocular barrier (BOB) is debilitated allowing entrance of offensive microorganisms usually from a focus of infection in the body to the eye through any of the 2 circulatory pathways.[2] We believe that 3 factors may play a role in the pathogenesis of BEE: disruption of BOB, compromised immune system of the host and virulence of the pathogen involved. Adequate integrity of BOB may not allow BEE to occur even when there is bacteremia.

Roth's spots are septic emboli on the retina which may occur in only 1% of patients with bacteremia.[39] We can therefore infer that it is not all patients with septicemia who progress to BEE depending on the tightness of their BOB. This fact was confirmed when out of 202 patients with septicemia none of them developed BEE with only 12 developing minute retinal hemorrhages and cotton wool spots thought to be Roth's spots.[40]We could not substantiate this fact because all patients referred to our centre already had an eye problem which finally turned out to be BEE.

The triad of diabetes, hepatic abscess and BEE with possible choroidal abscess needs to be highlighted. Diabetes is known to interfere with chemotaxis of polymorphonuclear leukocytes bringing about unopposed devastating effects of KP exo and endotoxins.[41] Serotype K1 of KP, which is the most common of all its serotypes, produces toxins which have affinity for the liver and vitreous after travelling through blood to reach and break down the BOB. [42]Owing to the fact that 70% of ocular blood circulation occurs at the choroid, [43]it should therefore not be a surprise that some patients with BEE develop choroidal and retinal abscesses. KP toxins can also cause irreversible photoreceptor damage within 24 hours to result in rapid decline in visual acuity. [44]

g) Treatment

i. *Systemic Antibiotics*

Although BOB is impermeable to antibiotics under non-inflammatory conditions, it becomes permeable to a few of them when there is ocular inflammation.[45, 46] Systemic fluoroquinolones, which are mostly utilized to treat infections caused by Gram positive and negative bacteria, have good ocular penetration against many bacteria and it improves with repeated doses.[45] Albeit all types of systemic fluoroquinolones may work well in BEE, the fourth generation class like moxifloxacin and levofloxacin are the best known antibiotics in crossing the BOB.[46,47] Since ciprofloxacin is not as good as the fourth generation group in terms of ocular penetration, it is recommended that it be supplemented with intravitreal antibiotics (IA) in the treatment of BEE.[47, 48]

Ceftazidime, a third generational cephalosporin, is the best choice against Gram negative organisms but has poor ocular penetration.[46] Aminoglycosides like gentamicin and amikacin have poor intraocular therapeutic levels against Gram negative bacteria.[48]

Intravenous vancomycin is usually used in treatment of infections caused by Gram positive bacteria but its ocular penetration is poor.[46]

Though other routes of treatment are available, systemic antibiotics should always be used in the management of BEE to help reduce or eliminate the bacterial load in the eye, systemically and treat the primary focus of infection.[45, 46, 47]. All the patients in our study received systemic oral ciprofloxacin supplemented with IA because they could not afford the fourth generation fluoroquinolones. If there were patients who could afford better oral antibiotics, we would still administer the IA to locally potentiate and augment ocular therapeutic effects.

ii. *Intravitreal Antibiotics*

According to Barza *et al* many systemic, subconjunctival and topical antibiotics have poor vitreous penetration. [49] After detailed research, Wong et al also realized IA did not improve visual acuity but reduced the rates of evisceration and enucleation as compared to those who did not receive it.[6] Other studies have accepted that the first line of treatment of BEE is systemic antibiotics such that if they fail, then IA can be used.[50]Although other authorities advocate for the use of IA, [4] Greenwald *et al* concluded in their research that IA are not required for most patients with BEE.[9] In our study, since we took vitreous sample for microscopy, culture and sensitivity from all our patients, we only thought it was logical to inject antibiotics into the vitreous cavity just after taking the specimen at least to depopulate the quantum of micro-organisms in all patients. None of our participants had evisceration nor enucleation, a success which we attribute to the IA.

a. *Choice of IA*

Vancomycin (1.0mg/0.1 mL) and ceftazidime (2.25mg/ 0.1 mL) are the best IA used against Gram positive and negative organisms respectively in BEE.[51] Whereas gentamicin causes macular infarction, amikacin can bring about retinal toxicity.[52, 53, 54] This means that aminoglycosides are not safe for intravitreal use. In our study we used vancomycin and ceftazidime intravitreally for all our patients.

iii. *Intravitreal steroids*

The purpose of using intravitreal steroids (IS) is to reduce intraocular tissue destruction as a result of host inflammatory response to bacterial toxins. [55] Many experiments have substantiated that intravitreal dexamethasone (0.4 mg/0.1mL) is capable of preserving retinal structure and function.[56, 57, 58] Meredith et al, on the contrary, had poor results when they treated BEE patients with IS.[59] In our hospital from the year 2000 up to 2006 out of the 10 cases of BEE diagnosed, 8 (80%) were treated with only IA but the other 2 (20%) had combination of IA with IS. 6 (75%) of those without IS had final BCVA of light perception. The remaining 2 (25%) of non-steriod group finally needed evisceration. On the other hand, the combination therapy group had final BCVA of 6/36 without any of them needing evisceration. After having had better visual and anatomical outcomes with the combination therapy, we have made it our policy to treat all cases of BEE with IS in addition to IA when microscopy rules out fungal infection. All our patients in this study had IS in addition to IA. In our candid opinion, our anatomical and visual outcomes could have been worse had we not used IS in addition to IA in this research.

a. *Reinjection*

Second IA and IS should be considered 48 hours after the first therapy if the response is not adequate but since a third injection makes the rate of retinal toxicity almost 100% irrespective of the antibiotic used, it is recommended that patients get vitrectomy performed if the second injection is not beneficial.[60, 61, 62] We had 3 patients who, on not responding well to the second IA and IS, were booked for PPV but were lost to follow up and therefore excluded from the study.

iv. *Vitrectomy*

PPV is performed with the aim to objectively removing the offensive micro-organisms together with their endo and exotoxins, vitreous membranes capable of leading to retinal detachment as well as vitreous inflammatory particles apart from helping to get abundant specimen for culture and appropriate dissemination of IA and IS. [60] A systematic review of 342 cases of BEE revealed that eyes treated with PPV and IA were 2 times more likely to have vision better than 6/60 and 3 times less likely to need evisceration or enucleation when compared with IA alone. [51]

The question of whether all patients with BEE should have immediate PPV remained unanswered prior to our research. In our center, however, out of the 51.61% of the patients we vitrectomised, the various indications were poor response to initial SAIAS, severe vitritis, retinal infiltration, worsening of vision and presenting visual acuity of light perception.

h) Prognosis

The prognosis of BEE has been poor since time immemorial. In a study published by Greenwald *et al*, 29% of patients required evisceration or enucleation, 26% were blind and 41% had visual acuity of counting fingers or better. [9] Shammas *et al* had similar results in their research.[63] Other publications have recorded mortality rate of 32% from the associated systemic diseases.[40] Our experience was better than what has been reported in other case series. The final BCVA we recorded were such that 70.96% of eyes had counting fingers at 1 metre or better, 9.69% had nil perception of light and 19.35%, light perception. None of our patients had evisceration, enucleation nor mortality till the last review. We ascribe this comparatively better outcomes to lower rates of KP etiology, our combination therapy and multidisciplinary collaborative efforts.

Poor prognosis can result from delay in diagnosis,[9] wrong choice of antibiotics,[64] diffuse infection of vitreous and retina or panophthalmitis,[9] infection with virulent organisms and Gram negative bacterial infection.[6]KP may cause choroidal and retinal abscess, bilateral BEE and poor visual prognosis.[11-16] The most common guarded prognostic factors in our centre for this study were poor presenting visual acuity and Gram negative infection with Klebsiella.

V. Conclusion

The poor prognosis of BEE which has not improved over several decades has underlying factors. It mimics several common ocular diseases such that it

easily leads to initial misdiagnosis setting the pace for rapid disease progression, delayed therapy and invariably unwanted outcomes. Physician specialists may hardly focus on the eye, a situation which is further compounded by the ophthalmologist overlooking the systemic implications and concentrating only on the eyes. There have not been large prospective trials whose purpose it is to determine the real advantages of systemic antibiotics, IA, IS and vitrectomy either in isolation or combination. The question of whether combination therapy involves double, triple or all the 4 remained unanswered before our study was initiated . KP etiology which is on the ascendency, has poor visual prognosis.

In our center, all patients are treated with systemic antibiotics, initial IA and IS while the physician specialist manages the systemic disease. If there is no improvement after 48 hours, we repeat intravitreal injections. PPV is performed 48 hours after the second intraocular injection if there is poor response. Should the patient meet the criteria for PPV on the first day, we perform it without going through this algorithm. A few aspects account for the limitations of our study: retrospective nature, one centre focus, 3 vitreoretinal specialists management of patients and small sample size.

We believe that our algorithm, fewer KP infective cases coupled with team work with the physician specialist and microbiologist, made us have appealing results compared to other case series owing to the fact that we did not record any eviscerations, enucleations nor mortalities apart from our visual outcomes being comparatively better.

Contribution

FKO commenced the project, implemented and completed the data collection, wrote the statistical analysis plan, analysed the data, drafted and revised the paper. NS contributed to the statistical analysis. VKV, PS, RS and KS contributed to the management of cases and revised the paper. VKV, PS, RS and KS are guarantors.

Competing interest-None.

References Références Referencias

1. European Ophthalmic Review, 2009,3(2):105-8 DOI: http://doi.org/10.17925/EOR.2009.03.02.105
2. Hassan, I.J, MacGowan, A.P, and Cook, S.D. Endophthalmitis at the Bristol Eye Hospital: an 11-year review of 47 patients. J Hosp Infect. 1992; 22: 271–278
3. Binder M et al. *Medicine.* 2003; 82(2): 97-105.
4. Jackson TL, Eykyn SJ, Graham EM, Stanford MR. Endogenous bacterial endophthalmitis: A 17-year prospective case series and review of 267 reported cases. *Surv Ophthalmol*. 2003; 48(4): 403-423. doi:10.1016/S0039-6257(03)00054-7.
5. Okada, A.A, Johnson, R.P, Liles, W.C et al. Endogenous bacterial endophthalmitis: report of a ten-year retrospective study. Ophthalmology. 1994; 101: 832–838.
6. Wong, J.S., Chan, T.K., Lee, H.M. et al. Endogenous bacterial endophthalmitis: an east Asian experience and a reappraisal of a severe ocular affliction. Ophthalmology. 2000; 107: 1483–1491.
7. Zeng J, Liu R, Zhang XY,. Relationship between gender and posterior pole choroidal thickness in normal eyes [in Chinese]. Zhonghua Yan KeZaZhi. 2012; 48(12): 1093–1096. Google Scholar.
8. https://en.wikipedia.org/wiki/Brachiocephalic_artery
9. Greenwald, M.J, Wohl, L.G, and Sell, C.H. Metastatic bacterial endophthalmitis: a contemporary reappraisal. Surv Ophthalmol. 1986; 31: 81–101.
10. Forster R.K. Endophthalmitis. In: Tasman W., Jaeger E. A., editors. Duane's Clinical Ophthalmology. Philadelphia: JB Lippincott, v.4, chapter 24, **1998.**
11. Margo CE, Mames RN, Guy JR (1994) Endogenous Klebsiella endophthalmitis. Report of two cases and review of the literature. Ophthalmology 101: 1298–1301. Google Scholar.
12. Irvine WD, Flynn HW, Miller D, et al. (1992) Endophthalmitis caused by gram-negative organisms. Arch Ophthalmol 110: 1450–1454. Open Url Cross Ref Pub Med Web of Science Google Scholar.
13. Lee CC, Chen CY, Chen FH, et al., (1998) Septic metastatic endophthalmitis from Klebsiella pneumoniae liver abscess: CT and MR imaging characteristics—report of three cases. Radiology 207: 411–416.Open Url Pub Med Google Scholar.
14. Yarng SS, Hsieh CL, Chen TL (1997) Vitrectomy for endogenous Klebsiella pneumoniae endopthalmitis with massive subretinal abscess. Ophthalmic Surg Lasers 28:147–150. Open Url Pub Med Google Scholar.
15. Chee SP, Ang CL (1995) Endogenous Klebsiella endophthalmitis—a case series. Ann Acad Med Singapore 24: 473–478. Open Url Pub Med Google Scholar.
16. Cheng DL, Liu YC, Yen MY, et al. (1991) Septic metastatic lesions of pyogenic liver abscess. Arch Intern Med 151:1557–1559. Open Url Cross Ref Pub Med Web of Science Google Scholar.
17. Harrison, S.A and Bateman, J.B. Endogenous endophthalmitis caused by Streptococcus mitis. Am J Ophthalmol. 1997; 123: 260–261.
18. Shields, J.A, Shields, C.L, Eagle, R.C.J et al. Endogenous endophthalmitis simulating retinoblastoma. The 1993 David and Mary Seslen Endowment Lecture. Retina. 1995; 15: 213–219.

19. Auerbach, S.B, Leach, C.T, Bateman, B.J et al. Meningococcal endophthalmitis without concomitant septicemia or meningitis. Pediatr Infect Dis J. 1989; 8: 411–413
20. Chou, F.F and Kou, H.K. Endogenous endophthalmitis associated with pyogenic hepatic abscess. J Am Col Surg. 1996; 182: 33–36.
21. Liao, H.R, Lee, H.W, Leu, H.S et al. Endogenous Klebsiella pneumoniae endophthalmitis in diabetic patients. Can J Ophthalmol. 1992; 27: 143–147.
22. Rowsey, J.J, Newsom, D.L, Sexton, D.J et al. Endophthalmitis: current approaches. Ophthalmology. 1982; 89: 1055–1066.
23. Callegan, M.C, Booth, M.C, Jett, B.D et al. Pathogenesis of gram-positive bacterial endophthalmitis. Infect Immunity. 1999; 67: 3348–3356.
24. Koul, S, Philipson, A, and Arvidson, S. Role of aqueous and vitreous cultures in diagnosing infectious endophthalmitis in rabbits. Acta Ophthalmologica. 1990; 68: 466–469.
25. Donahue, S.P, Kowalski, R.P, Jewart, B.H et al. Vitreous cultures in suspected endophthalmitis—biopsy or vitrectomy?. Ophthalmology. 1993; 100: 452–455.
26. Rickman, L.S, Freeman, W.R, Green, W.R et al. Brief report: uveitis caused by Tropherymawhipplii (Whipple's bacillus). N Eng J Med. 1995; 332: 363–366.
27. Okhravi, N, Adamson, P, Matheson, M.M et al. PCR-RFLP-mediated detection and speciation of bacterial species causing endophthalmitis. Invest Ophthalmol Vis Sci. 2000; 41: 1438–1447.
28. Van Gelder, R.N. Applications of the polymerase chain reaction to diagnosis of ophthalmic disease. Surv Ophthalmol. 2001; 46: 248–258.
29. Lohmann, C.P, Gabel, V.P, Heep, M et al. Listeria monocytogenes-induced endogenous endophthalmitis in an otherwise healthy individual: rapid PCR-diagnosis as the basis for effective treatment. Eur J Ophthalmol. 1999; 9: 53–57.
30. Lohmann, C.P, Linde, H.J, and Reischl, U. Improved detection of microorganisms by polymerase chain reaction in delayed endophthalmitis after cataract surgery. Ophthalmology. 2000; 107: 1047–1051.
31. Knox, C.M, Cevallos, V, Margolis, T.P et al. Identification of bacterial pathogens in patients with endophthalmitis by 16S ribosomal DNA typing. Am J Ophthalmol. 1999; 128: 511–512.
32. Yang, C.S., Tsai, H.Y., Sung, C.S., Lin, K.H., Lee, F.L., and Hsu, W.M. Endogenous Klebsiella endophthalmitis associated with pyogenic liver abscess. Ophthalmology. 2007; 114: 876–880.
33. Keynan, Y. and Rubinstein, E. Endogenous endophthalmitis caused by hypermucoviscous Klebsiella pneumoniae: An emerging disease in Southeast Asia and beyond. Curr Infect Dis Rep. 2008; 10: 343–345.
34. Wiskur, B.J., Hunt, J.J., and Callegan, M.C. Hypermucoviscosity as a virulence factor in experimental Klebsiella pneumoniae endophthalmitis. Invest Ophthalmol Vis Sci. 2008; 49: 4931–4938.
35. McDonald, M.I, Corey, G.R, Gallis, H.A et al. Single and multiple pyogenic liver abscesses: natural history, diagnosis and treatment, with emphasis on percutaneous drainage. Medicine. 1984; 63: 291–302.
36. Cowan, C.L.J, Madden, W.M, Hatem, G.F et al. Endogenous Bacillus cereus panophthalmitis. Ann Ophthalmol. 1987; 19: 65–68.
37. Hemady, R, Zaltas, M, Paton, B et al. Bacillus-induced endophthalmitis: new series of 10 cases and review of the literature. Br J Ophthalmol. 1990; 74: 26–29.
38. https://en.wikipedia.org/wiki/Ophthalmic_artery
39. Neudorfer, M, Barnea, Y, Geyer, O et al. Retinal lesions in septicemia. Am J Ophthalmol. 1993; 116: 728–734
40. Bouza, E, Cobo-Soriano, R, Rodŕiguez-Créixems, M et al. A prospective search for ocular lesions in hospitalized patients with significant bacteremia. Clin Infect Dis. 2000; 30: 306–312.
41. Mowat, A.G. and Baum, J. Chemotaxis of polymorphonuclear leukocytes from patients with diabetes mellitus. N Engl J Med. 1971; 284: 621–627.
42. Fung, C.P., Chang, F.Y., Lee, S.C. et al. A global emerging disease of Klebsiella pneumoniae liver abscess: is serotype K1 an important factor for complicated endophthalmitis?. Gut. 2002; 50: 420–424.
43. Parver, L.M, Anker, T, and Carpenter, D.O. Choroidal blood flow as a heat dissipating mechanism in the macula. Am J Ophthalmol. 1980; 89: 641.
44. Meyers–Elliot, R.H and Dethlefs, B.A. Experimental Klebsiella induced endophthalmitis in the rabbit. Arch Ophthalmol. 1982; 100: 1959–1963.
45. Smith A et al. Drugs. 2001; 61(6): 747-761.
46. Ahmed S et al. J Ocul Pharmacol Ther. 2014; 30(10): 823-830.
47. García-Sáenz MC et al. J Cataract Refract Surg. 2001; 27(12): 1969-1974.
48. Davis JL. Am J Ophthalmol. 1996; 122(5): 724-726.
49. Barza, M, Kane, A, and Baum, J. Intraocular penetration of gentamicin after subconjunctival and retrobulbar injection. Am J Ophthalmol. 1978; 85: 541–547.
50. Brod, R.D and Flynn, H.W Jr. Endophthalmitis: current approaches to diagnosis and treatment. Curr Opin Infect Dis. 1993; 6: 628–637

51. Jackson TL et al. Surv Ophthalmol. 2014; 59(6): 627-635.
52. Campochiaro, P. A and Conway, B.P. Aminoglycoside toxicity—a survey of retinal specialists. Implications for ocular use. Arch Ophthalmol. 1991; 109: 946–950.
53. Campochiaro, P.A and Lim, J.I. Aminoglycoside toxicity in the treatment of endophthalmitis. The Aminoglycoside Toxicity Study Group. Arch Ophthalmol. 1994; 112: 48–53.
54. Jackson, T.L and Williamson, T.H. Amikacin retinal toxicity. Br J Ophthalmol. 1999; 83: 1199–1200
55. Schulman, J.A and Peyman, G.A. Intravitreal corticosteroids as an adjunct in the treatment of bacterial and fungal endophthalmitis: a review. Retina. 1992; 12: 336–340.
56. Maxwell, D.P, Brent, B.D, Diamond, J.G et al. Effect of intravitreal dexamethasone on ocular histopathology in a rabbit model of endophthalmitis. Ophthalmology. 1991; 98: 1370–1375.
57. Park, S.S, Samiy, N, Ruoff, K et al. Effect of intravitreal dexamethasone in treatment of pneumococcal endophthalmitis in rabbits. Arch Ophthalmol. 1995; 113: 1324–1329.
58. Smith, M.A, Sorenson, J.A, D'Aversa, G et al. Treatment of experimental methicillin-resistant Staphylococcus epidermidis endophthalmitis with intravitreal vancomycin and intravitreal dexamethasone. J Infect Dis. 1997; 175: 462–466.
59. Meredith, T.A, Aguilar, H.E, Drews, C et al. Intraocular dexamethasone produces a harmful effect on treatment of experimental Staphylococcus aureus endophthalmitis. Trans Am Ophthalmol Soc. 1996; 94: 241–252.
60. Endophthalmitis Vitrectomy Study Group. Results of the Endophthalmitis Vitrectomy Study. A randomized trial of immediate vitrectomy and of intravenous antibiotics for the treatment of postoperative bacterial endophthalmitis. Arch Ophthalmol 1995; 113: 1479–1496.
61. Endophthalmitis, a review of current evaluation and management. Lemley et al. Retina 27: 662-680, 2007.
62. 62 Das T, Sharma S; Hyderabad Endophthalmitis Research Group. Current management strategies of acute post-operative endophthalmitis. Semin Ophthalmol. 2003; 18(3): 109-115.
63. Shammas, H.F. Endogenous E. coli endophthalmitis. Surv Ophthalmol. 1977; 21: 429–435.
64. Wang, L.S, Lee, F.Y, Cheng, D.L et al. Klebsiella pneumoniae bacteremia: analysis of 100 episodes. J Formos Med Assoc. 1990; 89: 756–763.

Global Journal of Medical Research: K
Interdisciplinary
Volume 17 Issue 3 Version 1.0 Year 2017
Type: Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals Inc. (USA)
Online ISSN: 2249-4618 & Print ISSN: 0975-5888

Evaluation of the Mutagenic Potential of Orlistat in Root Merymatic Cells of *Allium cepa*

By G.R. de Sousa, R.P. Gomes, D.M.L. de Andrade, H.K.P. Porto, M.O. Santos, A. Genaro, L.C. Carneiro & A.V. de Moraes Filho

Universidade Federal de Goiás

Abstract- It has been manufactured constantly, more drugs against obesity, and a great part of these medicines can be bought without prescription, as is the case of Orlistat®. However, some drugs can cause genotoxic effects in the body, which are closely related to carcinogenesis and are therefore capable of cause DNA modifications and can cause great damage to cells. In order to provide information on safety for human health, thus contributing to public health, it is hoped to increase the knowledge about the genotoxic activity of the drug. Orlistat® to provide a broader picture of the possible side effects of this drug. For this, the Allium cepa test with different concentrations of Orlistat® was performed. It was found that the drug induced chromosomal aberrations in meristematic cells of onion root. Genotoxic assessment of medicinal products increases the complexity of assessing its side effects.

Keywords: *obesity, genotoxicity, weight loss.*

GJMR-K Classification: *NLMC Code: QU 550.5.M8*

Strictly as per the compliance and regulations of:

Evaluation of the Mutagenic Potential of Orlistat in Root Merymatic Cells of *Allium cepa*

G.R. de Sousa [α], R.P. Gomes [σ], D.M.L. de Andrade [ρ], H.K.P. Porto [ω], M.O. Santos [¥], A. Genaro [§], L.C. Carneiro [χ] & A.V. de Moraes Filho [ν]

Abstract- It has been manufactured constantly, more drugs against obesity, and a great part of these medicines can be bought without prescription, as is the case of Orlistat®. However, some drugs can cause genotoxic effects in the body, which are closely related to carcinogenesis and are therefore capable of cause DNA modifications and can cause great damage to cells. In order to provide information on safety for human health, thus contributing to public health, it is hoped to increase the knowledge about the genotoxic activity of the drug. Orlistat® to provide a broader picture of the possible side effects of this drug. For this, the *Allium cepa* test with different concentrations of Orlistat® was performed. It was found that the drug induced chromosomal aberrations in meristematic cells of onion root. Genotoxic assessment of medicinal products increases the complexity of assessing its side effects.

Keywords: obesity, genotoxicity, weight loss.

I. Introduction

Obesity is a disease characterized by dysregulated accumulation of fat in the body, which is associated with health risks due to its relationship with various metabolic complications. It is simultaneously a disease and one of the most important risk factors for other chronic non - communicable diseases, such as cardiovascular diseases and *Diabetes mellitus* (Pi-Sunyer et al., 1997; Halpern and Mancini, 1999; Halpern et al., 2000; Fortes et al., 2006).

For the treatment of this disease the daily insertion of pharmacological and / or non-pharmacological therapies such as physical exercises, change of eating habits, surgical procedures and medications, respectively, is recommended.

In an attempt to aid in the treatment of obesity, there are currently drugs with direct and / or indirect weight-loss properties such as those that inhibit appetite (catecholaminergic), which increase satiety (serotonergic), those that decrease fat absorption and those that increase burning of fat (Guyton e Hall, 1997; Pi-Sunyer, 1997; Halpern e Mancini, 1999; Radominski, 2010).

Among these drugs, Orlistat® is of recent use in the treatment of obesity, which has a mechanism of action different from the others because it inhibits the lipases of the gastrointestinal tract, which are responsible for the cleavage and subsequent absorption of fatty acids (Drent e Veen, 1993; Drent et al., 1995; Zhi et al., 1995; Zhi et al., 1996; James et al., 1997).

Also known as tetrahydrolipostatin, it is a specific inhibitor of gastric and pancreatic lipases, which are important for aiding the digestion of fats in the diet (Drent et al., 1995). This drug is chemically synthesized from a hydrogenated derivative of the lipostatin produced by *Streptomyces toxytricini* (Drent e Veen , 1993; Zhi et al., 1994; Amatruda e Welle, 1995). With the following structure (Fig. 1):

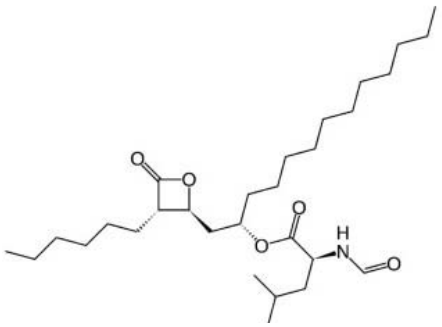


Fig. 1: Orlistat's chemical strutucture

The evaluation of the carcinogenic risk / benefit ratio should always be performed before prescribing a drug (Brambilla et al., 2011; Brambilla et al., 2012).

Therefore, this work aims to contribute to a risk-benefit projection of the use of this drug, demonstrating the possible genotoxic effects of this treatment. The objective of this study was to evaluate the mutagenic potential of Orlistat® in meristematic cells of *Allium cepa*; Quantify the mutagenic effects of Orlistat® in the test system used; contribute to the elucidation of information on probable adverse effects caused by the indiscriminate use of Orlistat®.

II. Methodology

Organic onion bulbs were purchased locally with reliable source. The dry external scales were removed without damaging the root area and the central

Author α: Bolsista do Programa Bolsa de Iniciação Científica. Acadêmica do curso de Biomedicina, Faculdade Alfredo Nasser.
Author σ: Pesquisadora Colaboradora, Mestranda do Programa de Pós-Graduação em Biologia da Relação Parasito-Hospedeiro da Universidade Federal de Goiás.
Author ρ ¥ §: Pesquisadora Colaboradora, Faculdade Alfredo Nasser.
Author ω: Pesquisadora Colaboradora, Doutoranda em Ciências da Saúde pela Universidade Federal de Goiás.
Author χ: Pesquisadora Colaboradora.
Author ν: Professor Orientador, Faculdade Alfredo Nasser.
e-mail: aroldodemoraes@gmail.com

parenchyma of the bud crown was also removed by circular incision to increase the uptake and uniformity of budding and root growth. These bulbs were washed in running water for about 20 minutes. Carefully, the roots of the bulbs were exposed with the samples in covered glass beakers to prevent light from entering, so that only the central parenchyma of the bud crown was in contact with the samples. For each sample analyzed, five onion bulbs were used and placed in contact with the samples for 24 hours. The negative control was performed in the same manner using distilled water and ethanol in the ratio 1: 1 (solvent) (Rank. and Nielsen, 1993; Kruger, 2009; Cuchiar et al., 2012).

The standard orlistat test concentrations for the experiments were 60 mg/L, 360 mg/L and 500 mg/L. These concentrations were selected on the basis of the doses considered subdose (where the dose described is lower than the dose at which the drug reaches therapeutic effect), therapeutic dose (from 60 to 120mg, 3 times a day) until overdose (where the dose described is higher than the dose at which the drug achieves therapeutic effect, and may reach toxicological effect (Zhi et al., 1995). The positive control was Paracetamol® at 800 mg / L concentration.

After growth, the roots immersed in the samples were measured and then fixed in Carnoy's solution (acetic acid and ethyl alcohol, in the concentration of 3: 1) for 12 hours. After fixation, the roots were washed in distilled water for five minutes and stained on slides. For this, the roots were stained with acetic orcein dye in the dilution of 2% orcein and 45% acetic acid. The root tips were cut and heated for one minute in counting with the dye. Then, the roots were placed on slides covered by coverslips and one drop of acetic orcein dye was added between slide and cover slip. Subsequently, the root was crushed by gentle pressure. The observation of the slides was performed under an optical microscope with a 100x objective, counting 5000 cells, observing the mitotic indexes and the chromosomal and mitotic changes (Ribeiro and Grotzner, 2012; Dias, 2014).

The calculation of the mitotic index (MI) and the index of chromosomal and mitotic aberrations (ICMA) occurred according to the following equations:

MI = number of cells in mitosis x 100 ÷ total number of cells observed
ICMA = number of altered cells x 100 ÷ total number of cells observed

For statistical analysis, the ANOVA test was used, with significance level $\alpha = 0.05$, using the statistical package GrafPad Prism 5.0.

III. Results

The characterization of the genotoxicity and cytotoxicity of Orlistat® was performed by root growth analysis of *Allium cepa*, in order to evaluate the inhibition of root growth, mitotic index (GMI) and mitotic and chromosomal abnormalities index (MCAI).

The results of the analysis of variance by the ANOVA test of root growth are described in Fig. 2. It was possible to verify that the root growth of a strain in the negative control did not present statistically significant difference of the means obtained in the roots treated with the three concentrations of the drug, so Orlistat® did not interfere with the growth of onion roots.

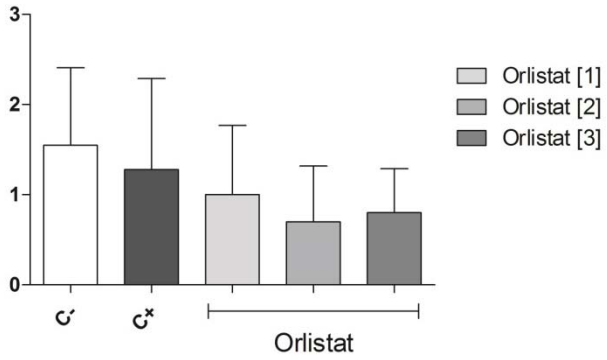


Fig. 2: Root growth of *Allium cepa*

In relation to MI, when comparing the negative control and the treatments, in the three concentrations the drug significantly reduced the MI in the two lowest concentrations, as can be observed in Fig. 3.

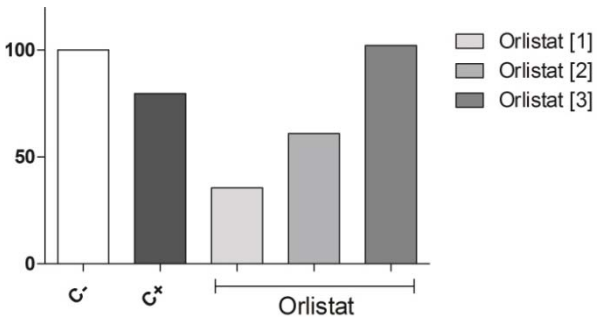


Fig. 3: Mitotic Index

Orlistat® significantly increased ICMA when compared to the negative control. This increase had a dose-response effect (Fig. 4).

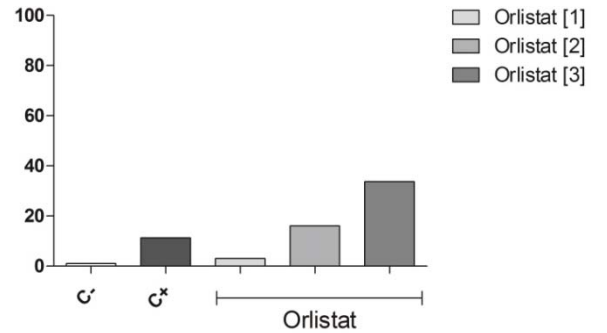


Fig. 4: Index of chromosomal and mitotic aberrations

IV. Discussion

In the study of Lopes and Vicentini (2002) with mouse bone marrow cells, Orlistat® showed no mutagenic effect at the concentrations tested (0.2, 0.4 and 0.6 mg/mL). Concentrations tested in the above work are considerably lower than those tested in this study.

Based on this survey of the mutagenic potential of the Orlistat® drug in *Allium cepa* meristematic root cells, the number of mutations was high, as was a study with *Drosophila melanogaster*, in which Orlistat® was tested at the standard cross- Enzymatic basements) and improved cross-fertilization (with metabolic activation). At the standard crossing, the drug did not show genotoxic effects, but at the improved cross-breeding it was genotoxic, demonstrating that Orlistat® has an indirect genotoxic effect on *D. melanogaster*, suggesting that cytochrome P450 enzymes interfere with the genotoxicity of the compound. On the other hand, when co-administered with doxorubicin, Orlistat® modulated the action of this agent (Orsolin et al., 2012). Moreover,in carcinogenicity tests in *Drosophila melanogaster*, Orlistat® did not induce tumors, nor did it modulate the action of Mitomycin C in relation to tumor formation (Orsolin et al., 2012; Menendez et al., 2005), Orlistat® showed antitumor effect in breast cancer cells. However, in another study Orlistat® showed genotoxicity in human lymphocytes in the presence of caffeine by *in vitro* comet assays, was induced DNA damage prior to the repair mechanism (Chakrabart et al., 2016).

Therefore, as genotoxicity may be related to carcinogenesis, it is necessary to monitor chronic medications to make a profile with regard to the possible side effects produced by them and thus serve as support to ensure health safety oxcf people who use these medicines. Therefore, further research should be carried out in order to broaden our understanding of the genotoxicity of Orlistat®.

References Références Referencias

1. Amatruda, J.M. and Welle, S. 1995. Obesity. In: *Endocrinology and metabolismo*. Felig,; Baxter, J.D.; Frohman, L.. 3. ed . New York : Mc GrawHill.
2. Brambilla, G.; Mattioli, F.; Robbiano, L.; Martelli, A., 2011. Studies on genotoxicity and carcinogenicity of antibacterial, antiviral, antimalarial and antifungal drugs. *Mutagenesis*, 1–27.
3. Brambilla, G.; Mattioli, F.; Robbiano, L.; Martelli, A., 2012. Update of carcinogenicity studies in animals and humans of 535 marketed pharmaceuticals. *Mutation Research*. 750: 1-51.
4. Chakrabart, M.; Ghosh, I.; Jana, A.; Ghosh, M.; Mukherjee, A., 2016. Genotoxicity of antiobesity drug orlista and effect of caffeine intervention: an *in vitro* study. *Drug and Chemical Toxicology*, p. 1-5.
5. Cuchiara, C.C.; Borges, C.S.; Bobrowski, V.L., 2012. Sistema teste de *Allium cepa* como bioindicador da citogenotoxicidade de cursos d'água. *Tecnologia Ciência Agropecuária*. 6: 33-38.
6. Dias, M.G., 2014. Efeito genotóxico e antiproliferativo de Mikania cordifolia (LF) Willd. (*Asteraceae*) sobre o ciclo celular de *Allium cepa* L. *Revista brasileira plantas medicinais*, 16: 202-208.
7. Drent, M.L. and Veen, E.A., 1993. Lipase inhibition: a novel concept in the treatment of obesity. *International Journal of Obesity and Related Metabolic Disorders*. 17: 241-244.
8. Drent, M.L. et al., 1995 Orlistat (RO 18-0647), a lipase inhibitor , in the treatment of human obesity : a multiple dose study . *International Journal of Obesity*. 19: 221-226.
9. Fortes, R.C.; Guimarães, N.G.; Haack, A.; Torres, A.A.L.; Carvalho, K.M.B., 2006. Orlistat e sibutramina: bons coadjuvantes para perda e manutenção de peso? *Rev. Bras. Nutr. Clin*. 21: 244-251.
10. Guyton, A.C. and Hall, J.E., 1997. *Tratado de fisiologia médica*. 9 ed. Rio de Janeiro: Guanabara Koogan.
11. Halpern, A. and Mancini, M.C., 1999. Obesidade. *Jovem médico*. 1: 58-65.
12. Halpern, A.; Monegaglia, A.P.; Oliva, A.B.G. Beyruti, M.; Halpern, Z.S.C.; Mncini, M.C., 2000. Experiência clínica com o uso conjunto de Sibutramina e Orlistat em pacientes obesos. *Arq Bras Endocrinol Metab*, 44: 103-105.
13. James, W.P.T. et al., 1997 A one -year trial to asses the value of orlistat in the management of obesity. *International Journal of Obesity*. 21: 24-30.
14. Kruger, R.A., 2009. *Análise da toxicidade e da genotoxicidade de agrotóxicos utilizados na agricultura utilizando bioensaios com Allium cepa*. Novo Hamburgo [Dissertação de Mestrado em Qualidade Ambiental – Feevale].
15. Lopes, E.F. and Vicentini, V.E.P., 2002. Avaliação da mutagenicidade do Xenical (Orlistat) utilizando-se células da medula óssea de ratos Wistar, em tratamento agudo, via gavagem. In: *XI Encontro de Iniciação Científica da Universidade Estadual de Maringá*.
16. Menendez, J.A.; Vellon, L.; Lupu, R., 2005. Antitumoral actions of the anti-obesity drug orlistat (Xenical) in breast cancer cells: blockade of cell cycle progression, promotion of apoptotic cell death and PEA3-mediated transcriptional repression of Her2/neu(erb B-2) oncogene. *Ann. Oncol.* 16: 1253-1267.
17. Orsolin, P.C.; Silva-Oliveira, R.G.; Nepomuceno, J.C., 2012. Assessment of the mutagenic, recombinagenic and carcinogenic potential of orlistat in somatic cells of *Drosophila melanogaster*. *Food and Chemical Toxicology*. 50: 2598-2604.

18. Pi-Sunyer, F.X., 1997. Obesity. In: *Cecil tratado de medicina interna,* Bennett, J.C. and Plum, F. 20 ed. Rio de Janeiro: Guanabara Koogan, 1997.
19. Popkin, B.M., 2007. *Global context of obesity*. Handbook of Obesity Prevention. 227-238.
20. Radominski, R.B., 2010. Atualização das diretrizes para o tratamento farmacológico da obesidade e do sobrepeso. *ABESO*.
21. Rank, J. and Nielsen, M.H., 1993. A modified Allium test as a tool in the screening of genotoxicity of complex mixtures. *Hereditas*, 118: 49-53.
22. Ribeiro, C.A.O.; Reis Filho, H.S.; Grotzner, S.R., 2012. Técnicas e Métodos para Utilização Prática de Microscopia. *São Paulo: GEN - Grupo Editorial Nacional, Editora Santos* 1: 440.
23. Zhi, J. et al., 1994. Retrospective population based analysis of the dose response (fecal fat excretion) relationship of orlistat in normal and obese volunteers. Clinical Pharmacology & Therapeutics. 56: 82-85.
24. Zhi, J. et al., 1995. Review of limited systemic absorption of orlistat , a lipase inhibitor in a healthy human volunteers .*J. Clin . Pharmacol*. 35:1103-1108.

Figures

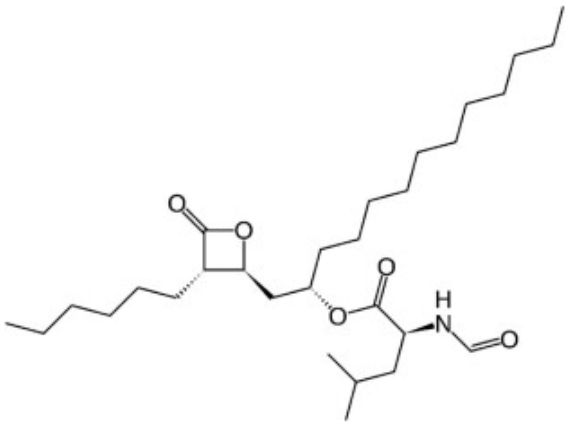


Fig. 1: Chemical structure of Orlistat®. Fonte: Orsolin et al, 2012

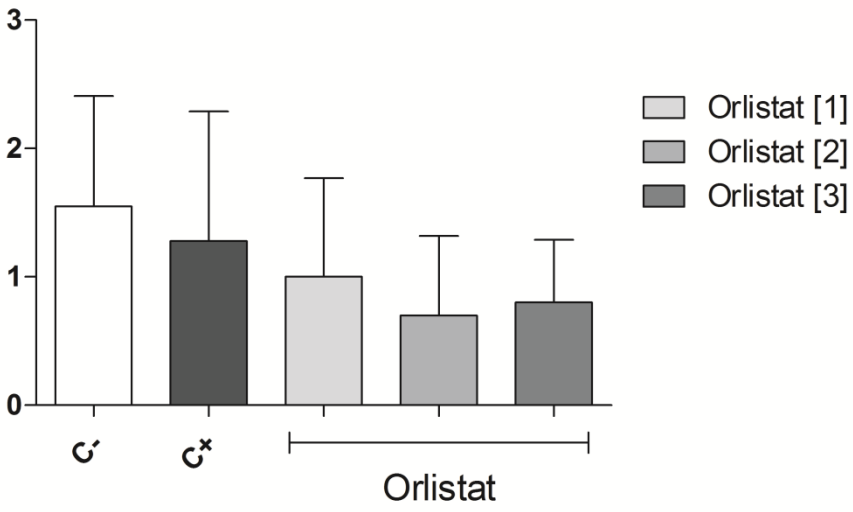


Fig. 2: Root growth index

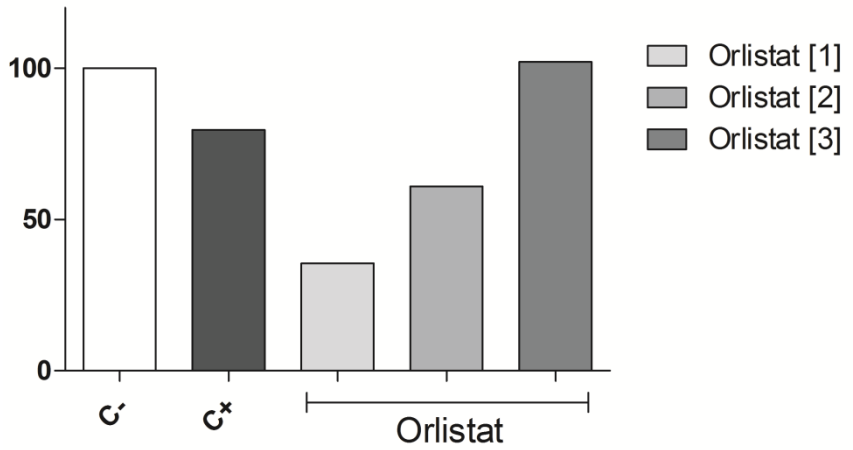


Fig. 3: Mitotic Index

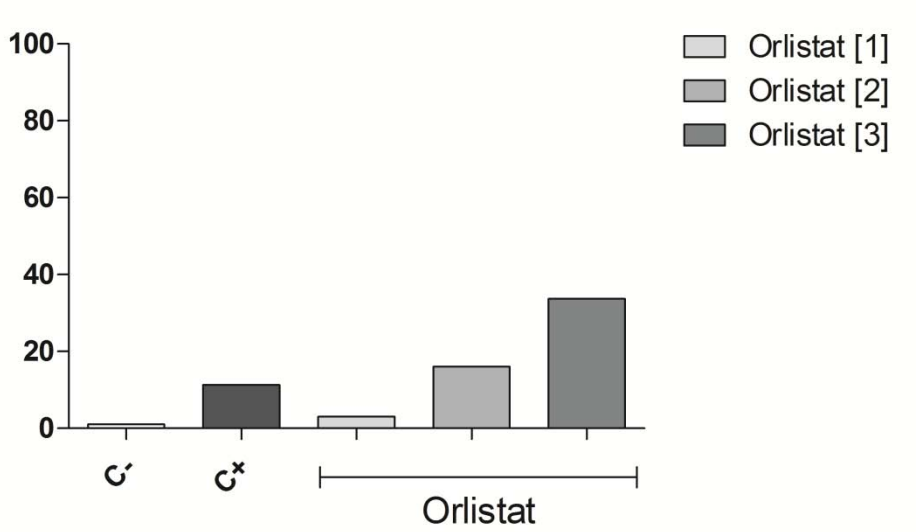


Fig. 4: Chromosomal aberration index

Global Journal of Medical Research (K) Volume XVII Issue III Version I Year 2017
16

This page is intentionally left blank

Global Journal of Medical Research: K
Interdisciplinary
Volume 17 Issue 3 Version 1.0 Year 2017
Type: Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals Inc. (USA)
Online ISSN: 2249-4618 & Print ISSN: 0975-5888

Knowledge of Fearfulness about HIV/AIDS between Frequently Moving and Permanent Resident Population of Three Metropolitan Cities in Bangladesh

By Dr. Prosannajid Sarkar, Shah Md. Ruhul Amin, Kazi Asaduzzaman, Md. Khairul Islam & Md. Hafizur Rahman

Begum Rokeya University

Abstract- HIV/AIDS and its potentially fatal impact on human beings have undoubtedly become an extremely topical issue now-a-days. To have accomplished the task, this study has used mainly primary data and information collected from 1596 respondents among Dhaka, Rajshahi and Chittagong cities with the help of an interview schedule through conducting a well-designed survey have also been used in this study. It is notable that the sample size for the survey is categorized into two groups- frequently moving and permanent resident consisting of 798, 798 respondents respectively. The study reveals that though 99 percent frequently moving and permanent resident respondents heard the name of HIV/AIDS by various sources of media but 31 percent frequently moving and 28 percent permanent resident respondents don't know the fearfulness of HIV/AIDS. Findings also reveal that comparatively permanent resident respondents (92.4%) more educated than frequently moving respondents (about 78%).

Keywords: HIV/AIDS, fearfulness, frequently moving and permanent resident population.

GJMR-K Classification: NLMC Code: WY 153.5

Strictly as per the compliance and regulations of:

Knowledge of Fearfulness about HIV/AIDS between Frequently Moving and Permanent Resident Population of Three Metropolitan Cities in Bangladesh

Dr. Prosannajid Sarkar [α], Shah Md. Ruhul Amin [σ], Kazi Asaduzzaman [ρ], Md. Khairul Islam [ω] & Md. Hafizur Rahman [¥]

Abstract- HIV/AIDS and its potentially fatal impact on human beings have undoubtedly become an extremely topical issue now-a-days. To have accomplished the task, this study has used mainly primary data and information collected from 1596 respondents among Dhaka, Rajshahi and Chittagong cities with the help of an interview schedule through conducting a well-designed survey have also been used in this study. It is notable that the sample size for the survey is categorized into two groups- frequently moving and permanent resident consisting of 798, 798 respondents respectively. The study reveals that though 99 percent frequently moving and permanent resident respondents heard the name of HIV/AIDS by various sources of media but 31 percent frequently moving and 28 percent permanent resident respondents don't know the fearfulness of HIV/AIDS. Findings also reveal that comparatively permanent resident respondents (92.4%) more educated than frequently moving respondents (about 78%). Electronic media is the most dominate source of hearing about HIV/AIDS for both frequently moving (about 51%) and permanent resident (39%) respondents. In this study it also found that uncontrolled and unsafe sexual relation is the main causes to HIV/AIDS answer by the respondents. Also, they knew only safety highest ways to avoid HIV/AIDS are multiple ways. Further, all the variables (respondent's age, marital status, educational level and occupation) of contingency analysis are significantly associate with HIV/AIDS in both permanent resident and frequently moving. In multivariate logistic analysis we found that in case of frequently moving respondents variables like respondent's age, marital status, educational level and occupation exerts the significant effect on the knowledge about the fearfulness of HIV/AIDS whereas in permanent residents all variables exerts the significant (except in age group) effect on the knowledge about the fearfulness of HIV/AIDS.

Keywords: HIV/AIDS, fearfulness, frequently moving and permanent resident population.

Author α: Senior Researcher, Dr. Wazed International Research and Training Institute Begum Rokeya University, Rangpur.
e-mail: drpsarkarbrur@yahoo.com
Author σ: Executive Officer, Dutch Bangla Bank Limited Bangladesh.
e-mail: sobin_cu@yahoo.com
Author ρ ω: Begum Rokeya University, Rangpur Rangpur-5400, Bangladesh. e-mails: asaduzzaman.brur@gmail.com, khairulnet @gmail.com
Author ¥: Assistant Director (Passport), Department of Immigration and Passport DIP, Agargaon, Dhaka. e-mail: hafbge02@yahoo.com

I. Introduction

Bangladesh is the seventh most populous country in the world and administratively, Bangladesh is divided into six Metropolitan Cities with a population of about 161.3 million (UNFPA, State of world population, 2008 and Notun Bisso, 2009). Rapid urbanization and industrialization have increased the scope of mobility within the country and job opportunity outside the country as well. During the past two decades, the urban population has grown from 6 million in 1974 to 21million in 1994, and it is expected to grow to over 50 million by 2014. About two million migrant workers live in Middle East and South East Asian Countries (World AIDS Day, 2001). Despite many major achievements in health, a small number of populations in our region continue to slightly die from these murderer AIDS diseases. Meanwhile, Acquired Immune Deficiency Syndrome (AIDS) is caused by the Human Immunodeficiency Virus (HIV). It weakens the immune system and makes the body susceptible to and unable to recover from other opportunistic diseases. Consequently it is one of the main causes of death of human being and world wide wreaking devastation on millions of people's communities. HIV/AIDS is the late clinical stage of infection with the HIV. The virus is generally transmitted through sexual contact, infected women to their unborn children, or through contaminated needles (infections) or blood (Rahman, Mondol & Abedin, 2005). It poses a serious challenge to human kind and at present AIDS/HIV has increasingly become a major public-health concern in many developing countries as well as in Bangladesh. So far the disease has no any reliable antibiotic medicine till today, but a cure for HIV/AIDS infection remains an elusive goal despite the significant impact of current treatments. This is because of the virus' ability to adapt to and resist those treatments, and bypass the immune system's natural defenses (Suhadolnik, Robert J. et al, 2007). It is a threat to social and economic development, to people in the most productive period of

their lives, to family life, to mothers and their children, to entire culture and population.

HIV still continues to be a very common complication worldwide. During the twenty-first century, it was the fourth cause of mortality, with more than 5% of deaths all over the world (Murray C.J.L., et al., 2001). In a study, up to 40 million people are estimated to live with HIV in the world. In addition, 25 million deaths have been reported (UNAIDS/WHO, 2006). The level of knowledge of the population is thus an important measure for understanding the magnitude of the challenges by Government and Non-government organizations Bangladesh is passing through a period of demographic transition. The most distinctive demographic change is the shift of population from rural to urban areas, especially in Metropolitan cities (Sultana, R, 2005). The impact of HIV/AIDS in Bangladesh reaches every concern of society. HIV/AIDS also has become national concern in Bangladesh and the government has already developed a national strategy and an operational plan to address the country's needs. Worldwide experience of HIV/AIDS disease has suggested that public knowledge on AIDS is the most fundamental weapon against the AIDS pandemic as long as a vaccine or cure has not been developed (UNAIDS China, 2002). The level of knowledge of the population is thus an important measure for understanding the magnitude of the challenges by Government and Non-government organizations (United Nations, 2002). To meet the targets and goals of AIDS prevention and control, there is a strong need to assess the current levels of specific knowledge about AIDS transmission and prevention by various residence and other key socio-demographic factors. In this context, the study is conduct on knowledge of HIV/AIDS between the frequently moving (a section of the population who is frequently moving in where and there place) and permanent resident (a section of the population permanently resident in a place) population.

II. Objectives of the Study

The present study focus on-

- To identify socio-demographic factors related to knowledge about HIV/AIDS
- To investigate the factor related to knowledge about HIV/AIDS transmission and prevention
- To determine and compare the levels of knowledge about HIV/AIDS between frequently moving and permanent resident groups of selective people
- To examine the knowledge of fearfulness about HIV/AIDS

III. Data Sources and Methodology

The study is based on the data from a quota sampling of which 50 are of frequently moving and 50 are of permanent residents for every 100 respondents from three Metropolitan City Corporations namely Dhaka, Rajshahi and Chittagong. The information is collected on the basis of structured frequently moving (a section of the population frequently moved in every place) and permanent resident (a section of the population permanently resident in a place) population. All the respondents were interviewed during 1st October to 20th December, 2008.

At first, we estimated percentage distribution of both frequently moving and permanent resident respondents who have or not ever heard the name of HIV/AIDS and their fearfulness. Secondly, to test any association between different phenomena that could be useful in the cross tabulation analysis by Pearson's chi-square (χ^2) statistic is considered. Finally, binary logistic regression was used to estimate the number of determinant fearfulness about HIV/AIDS.

IV. Results and Discussions

a) Socio-economic characteristics of frequently moving and permanent resident respondents

Socio-economic and demographic characteristics of the study population are essential for interpretation of collected data and examination of any cause-effect relationship among different variables. It also helps in comparing findings with similar characteristics in other independent study findings. It is provide the descriptive summary of some selected socio-economic and demographic characteristics of the study population from Table 1 we observed that about 39 percent of the respondents in frequently moving category are in age 30-39 years whereas about 44 percent of the respondents in permanent resident category are in age group 18-29 years. Education is one of the most important indicators of increasing awareness. Table 1 show that 28 percent frequently moving respondents and about 31 percent permanent resident respondents have education secondary & higher. The professional characteristics are the subject matter analysis which influences the socio-economic performance and identification of issue of HIV/AIDS in Bangladesh. Table 1 presents in frequently moving category respondents (33.70%) are engaged in rickshaw & auto rickshaw whereas permanent resident category respondents (25.60%) are engaged in other category work. We also observed that according to frequently moving (about 86%) and permanent resident (about 74%) respondents, married respondents contain a significantly higher percentage.

Table 1: Selected socio-economic characteristics of frequently moving and permanent resident respondents

Characteristics	Population	
	Frequently Moving (N=798)	Permanent Resident (N=798)
Age Group		
18-29	202 (25.30)	348 (43.60)
30-39	307 (38.50)	332 (41.60)
40-49	139 (17.40)	99 (12.40)
50+	150 (18.80)	19 (2.40)
Education		
No education	178 (22.30)	61 (7.60)
Primary Incomplete	193 (24.20)	180 (22.60)
Primary Complete	108 (13.50)	123 (15.40)
Secondary & Higher	224 (28.10)	246 (30.80)
Graduate & Above	113 (11.90)	188 (23.60)
Occupation		
Rickshaw & Auto Rickshaw	269 (33.70)	174 (21.80)
Service Man	130 (16.30)	176 (22.10)
Business Man	135 (16.90)	179 (22.40)
Driver	82 (10.30)	65 (8.10)
Sex worker	-	-
Others (day labor, farmer, beggar)	182 (22.80)	204(25.60)
Marital Status		
Single	97 (12.20)	196 (24.60)
Married	683 (85.60)	588 (73.70)
Widow & Widower	18 (2.30)	14 (1.80)

Notes: Figure in parenthesis indicate that the percentage distribution, single define never married and (-) not available

Sources of Information about HIV/AIDS: The role of sources information about HIV/AIDS is alarm the public awareness. The public should be reassured that HIV/AIDS is not a dangerous disease as long as the appropriate prevention measures taken. Table 2 shows that 99 percent frequently moving and permanent resident respondents heard the name of HIV/AIDS by various sources of media but 31 percent frequently moving and 28 percent permanent resident respondents don't know the fearfulness of HIV/AIDS. Electronic media is the most dominate source of hearing about HIV/AIDS for both frequently moving (about 51%) and permanent resident (39%) respondents. Most of the respondents are known HIV/AIDS as transmitted diseases and it is transmitted by multiple routes for both frequently moving (about 57%) and permanent resident (about 32%) respondents. Awareness of prevention on HIV/AIDS of frequently moving and permanent resident population regarding knowledge based about HIV/AIDS prevention. When respondents were asked how way to avoid AIDS virus, it seems that they want to rely on personal opinion about way to reducing HIV/AIDS. Table 2 pointed that about 30 percent frequently moving respondents and 22 percent permanent resident respondents mention highest way to reduce HIV/AIDS is multiple way.

Table 2: Sources of Information about HIV/AIDS

HIV/AIDS Related Information	Population	
	Frequently Moving (N=798)	Permanent Resident (N=798)
Heard about HIV/AIDS		
Yes	790 (99.00)	790 (99.00)
No	8 (1.00)	8 (1.00)
Knowledge about fearfulness of HIV/AIDS		
Yes	550 (68.90)	571 (71.60)
No	248 (31.10)	227 (28.40)
Source of HIV/AIDS media		
Doesn't know	8(1.00)	8 (1.00)
Electronic media	404 (50.60)	313 (39.20)
Print media	41 (5.10)	44 (5.50)
Counseling	53 (6.60)	46 (5.80)
Institute	62 (7.80)	196 (24.60)
Multiple source	230 (28.80)	191 (23.90)

Transmission Routes		
Doesn't know specific way	12 (1.50)	37 (4.60)
Mosquito bite	20 (2.50)	4 (0.50)
Illegal intercourse	63 (7.90)	251 (31.50)
Blood & vaginal secretion	17 (2.10)	43 (5.40)
Injection	21 (2.60)	11 (1.40)
Free intimacy	28 (3.50)	23 (2.90)
Sex worker	48 (6.00)	53 (6.60)
Mother to child transmission	73 (9.10)	96 (12.00)
Shaking hand	20 (2.50)	6 (0.80)
Sharing food	11 (1.40)	6 (0.80)
Toilet seats	17 (2.10)	9 (1.10)
Hugging	17 (2.10)	6 (0.80)
Multiple routes	451 (56.50)	253 (31.70)
Prevention ways		
Doesn't know specific way	-	-
To obey command of religious belief	86 (10.80)	128 (16.00)
Abstain from sexual relation	12 (1.50)	16 (2.00)
Use condom during intercourse	61 (7.60)	94 (11.80)
Doctor advice	8 (1.00)	41 (5.10)
Avoid multiple sex partner	62 (7.80)	5 (0.60)
Abstain sex from prostitute	25 (3.10)	2 (0.30)
Avoid homo sex	32 (4.00)	12 (1.50)
Avoid contaminated syringe & razors	166 (20.80)	173 (21.70)
Avoid kissing	17 (2.10)	10 (1.30)
Blood transfusion	87 (10.90)	131 (16.40)
Avoid mosquito bites	-	7 (0.90)
Multiple way	242 (30.30)	179 (22.40)

Notes: Figure in parenthesis indicates percentage and (-) not available

b) Bivariate Analysis

Knowledge of HIV/AIDS Transmission by background characteristics: Bangladesh is highly susceptible to the transmission of epidemic (HIV in Bangladesh, 2002). There is a huge lack of accurate knowledge about the ways in which HIV/AIDS can and cannot be transmitted among many Bangladeshi people. The knowledge of HIV/AIDS transmission among frequently moving and permanent resident respondents by background characteristics such as age, marital status, educational level and employment status are differences which are presented in Table 3. The higher proportion of respondents in age group 30-39 years, 62 percent frequently moving respondents believe that HIV/AIDS can be transmission routes by multiple routes while 42 percent permanent resident in age 50+ years believes same routes. Again, about 23 percent frequently moving population in age group 50+ years and 21 percent permanent resident population in age 40-49 years believe HIV/AIDS misconception transmission routes. The differences of various transmission routes and age are statistically highly significant for both frequently moving and permanent resident population. Table 3 shows the higher proportion of respondents about 57 percent frequently moving married believe HIV/AIDS transmission routes by multiple transmitted routes whereas, the proportion is about 33 percent permanent resident married believes same routes. According to the higher proportion of widowed frequently moving and permanent resident respondents believes HIV/AIDS transmission routes misconception routes and its percentage are about 39 and about 14 respectively. It is worth mentioning that, widow considers as has no spouse are less aware about misconception than married person and the differences of various transmission routes and marital status are statistically significant for both frequently moving and permanent resident populations. Education is strongly and positively associated with a correct understanding of HIV/AIDS transmission. The higher proportion of frequently moving and permanent resident respondents with educational level no education and its percentage are 43 percent and about 61 percent respectively believes HIV/AIDS transmission routes misconception transmission routes. According to secondary and higher education, about 70 percent frequently moving respondents believe the transmitted routes is multiple routes whereas only about 36 percent permanent resident respondents. It is notable that more educated person more awarded about HIV/AIDS transmission routes and the differences of transmission routes and education are statistically highly significant for both types of respondent. From Table 3 we also seen that according to rickshaw puller about 25 percent frequently moving believes HIV/AIDS transmission routes by misconception transmission routes whereas in

permanent resident the proportion are about only 17 percent. Again, about 59 percent frequently moving service man believes HIV/AIDS transmission routes are multiple routes whereas 40 percent permanent resident driver believes the same routes. The differences between transmission routes and occupation are statistically significant for both frequently moving and permanently resident respondents.

Table 3: Knowledge of HIV/AIDS Transmission routes: Frequently moving and Permanent resident population

Background characteristics	Transmission routes											
	Frequently Moving (N=798)						Permanent resident (N=798)					
	A	B	C	D	E	F	A	B	C	D	E	F
Age												
18-29	14.90	16.80	1.50	4.00	15.80	47.00	8.90	33.90	7.80	1.10	12.90	35.30
30-39	14.00	14.00	2.30	1.60	5.90	62.20	11.10	39.20	3.30	1.80	12.30	32.20
40-49	12.90	10.10	5.00	2.90	7.20	61.90	21.20	53.50	3.00	0.00	7.10	15.20
50+	22.70	13.30	0.00	2.70	8.70	52.70	10.50	15.80	10.50	5.30	15.80	42.10
	χ^2=40.627; d.f=15; p=0.000						χ^2=46.113; d.f=15; p=0.000					
Marital status												
Unmarried	11.30	18.60	1.00	3.10	12.40	53.60	10.20	38.30	9.20	1.50	10.20	30.60
Married	15.70	13.60	2.30	2.60	8.60	57.10	11.70	38.10	3.90	1.20	12.60	32.50
Widowed	38.90	0.00	0.00	0.00	11.10	50.00	14.30	35.70	14.30	7.10	14.30	14.30
	χ^2=14.731 ; d.f=10; p=0.142						χ^2=15.942; d.f=10; p=0.101					
Education												
No education	43.30	14.00	0.00	2.20	0.60	39.90	60.70	14.80	6.60	0.00	1.60	16.40
Primary incomplete	10.90	11.40	4.10	2.60	5.70	65.30	9.40	37.20	3.90	2.80	11.10	35.60
Primary complete	15.70	18.50	0.00	1.90	8.30	55.60	8.90	41.50	6.50	0.00	9.80	33.30
Secondary & higher	3.10	14.70	1.80	4.00	6.70	69.60	6.90	43.10	5.70	2.00	6.50	35.80
Graduate & above	3.20	11.60	5.30	1.10	38.90	40.00	4.80	37.80	5.30	0.50	25.00	26.60
	χ^2=274.870; d.f=20; p=0.000						χ^2=208.350; d.f=20; p=0.000					
Occupation												
Rickshaw	24.90	12.60	1.90	1.10	3.30	56.10	16.70	32.20	5.20	2.30	8.60	35.10
Service	5.40	10.80	3.10	2.30	20.00	58.50	4.00	40.90	4.50	1.70	24.40	24.40
Business	8.90	20.00	3.00	1.50	9.60	57.00	8.40	43.00	5.00	0.60	11.20	31.80
Driver	12.20	12.20	2.40	6.10	11.00	56.10	10.80	30.80	12.30	1.50	4.60	40.00
Sex worker	-	-	-	-	-	-	-	-	-	-	-	-
Other	15.90	14.30	1.10	4.40	8.80	55.50	16.20	38.70	4.40	1.00	7.40	32.40
	χ^2=71.193; d.f=20; p=0.000						χ^2=67.024; d.f=20; p=0.000					

Notes: A= misconception transmitted routes; B= sexual relation; C= blood and vaginal secretion; D= injection; E= mother to child transmission; F= multiple routes, (-) denote not available and tables value indicate percentage of with in different background characteristics group.

c) *Knowledge of HIV/AIDS Prevention by background characteristics*

HIV/AIDS of Bangladesh is considered as a "Low Prevalence but High Risk" country. Only prevention measure can be avoided this risk. However, prevention knowledge is one of the most important elements of social and economic life. It is also associated with control of HIV/AIDS. The differences of prevention way and among all variables are statistically significant. Table 4 indicates the proportion of frequently moving respondents reporting correct prevention knowledge of HIV/AIDS by avoid contaminated syringe and razors at about 22 percent frequently moving in age group 30-39 years while at 27 percent permanent resident in age group 40-49 years. Again, the higher proportion of frequently moving respondents about 33 percent in age group 30-39 years believe that the prevention way by avoid multiple way while the higher proportion of permanent resident respondents were 29 percent in age group 40-49. Table 4 also show that the higher proportion of prevention way were about 29 percent permanent residents widowed believe prevention method blood transfusion whereas 38 percent frequently moving unmarried believe prevention method avoid multiple way. Table 4 shows the higher proportion respondents of primary incomplete about 36 percent frequently moving believe of prevention methods by multiple way whereas about 31 percent permanent resident with secondary and higher education. The higher proportion of respondents, about 36 percent frequently moving who work business believes popular prevention methods by avoid multiple way while the proportion of 34 percent permanent resident who work driver.

Table 4: Knowledge of prevention way about HIV/AIDS by Frequently moving and permanent resident population

Background Characteristics	prevention way													
	Frequently Moving (N=798)							Permanent resident (N=798)						
	A	B	C	D	E	F	G	A	B	C	D	E	F	G
Age														
18-29	0.50	12.90	5.90	12.90	19.80	16.30	31.70	1.10	3.40	11.50	23.30	20.40	19.30	21.00
30-39	2.60	19.90	6.80	6.80	21.80	9.40	32.60	2.10	6.00	12.70	21.70	21.40	13.90	22.30
40-49	4.30	12.90	12.20	19.40	21.60	7.20	22.30	6.10	3.00	8.10	12.10	27.30	14.10	29.30
50+	1.30	17.30	7.30	13.30	19.30	10.00	31.30	0.00	0.00	21.10	21.10	21.10	21.10	15.80
	χ^2=41.951; d.f=8; p=0.001							χ^2= 28.589; d.f=18; p=0.054						
Marital status														
Unmarried	1.00	9.30	7.20	8.20	17.50	18.60	38.10	2.00	4.60	9.70	26.00	18.40	19.90	19.40
Married	2.20	17.40	7.80	12.20	20.90	10.00	29.60	1.70	4.40	12.80	19.40	22.80	15.00	24.00
Widowed	5.60	16.70	5.60	16.70	33.30	5.60	16.70	21.40	0.00	0.00	28.60	21.40	28.60	0.00
	χ^2=17.900; d.f=12; p=0.119							χ^2=41.261; d.f=12; p=0.000						
Education														
No education	1.70	11.20	9.00	19.10	21.90	10.70	26.40	3.30	3.30	23.00	23.00	19.70	9.80	18.00
Primary incomplete	3.60	9.80	5.70	11.40	18.10	15.50	35.80	3.90	4.40	15.00	21.70	22.20	15.00	17.80
Primary complete	0.00	27.80	1.90	6.50	20.40	11.10	32.40	0.80	3.30	13.80	28.50	17.90	17.10	18.70
Secondary & higher	3.10	18.30	12.10	11.20	15.20	7.60	32.60	1.20	5.70	11.00	14.60	20.30	16.70	30.50
Graduate & above	0.00	22.10	5.30	6.30	37.90	9.50	18.90	2.10	3.70	4.80	23.90	26.10	19.10	20.20
	χ^2=83.241; d.f=24; p=0.000							χ^2=47.997; d.f=24; p=0.003						
Occupation														
Rickshaw	2.60	16.00	7.10	16.00	17.50	10.80	30.10	1.10	5.70	16.10	25.30	19.00	15.50	17.20
Service	5.40	13.10	6.20	5.40	30.80	12.30	26.90	1.70	3.40	5.70	23.30	27.80	18.80	19.30
Business	1.50	23.70	8.10	4.40	22.20	3.70	36.30	1.70	5.60	10.60	17.90	19.00	15.10	30.20
Driver	0.00	13.40	15.90	12.20	15.90	19.50	23.20	3.10	3.10	10.80	20.00	12.30	16.90	33.80
Sex worker	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other	0.50	15.40	5.50	15.40	19.80	11.50	31.90	3.40	3.40	14.70	19.10	24.00	16.20	19.10
	χ^2=67.095; d.f=24; p=0.000							χ^2=39.266; d.f=24; p=0.026						

Notes: A= not prevention; B= avoid unsafe sexual relation; C= use condom during intercourse; D= advice; E= contaminated syringe & razors; F= blood transfusion; G= multiple way; (-) = not available.

d) Results of Logistic Regression Analysis

Multiple logistic regression analysis is conducted to asses the knowledge of fearfulness about HIV/AIDS as dependent variable (0= if he/she doesn't know the fearfulness about HIV/AIDS and 1= if he/she know the fearfulness about HIV/AIDS) by some selected characteristics for both floating and permanent resident respondents. There are many potential independent variables. Of all the potential independent variables we consider only those of the variables which give significant result in empirical study and that are also suitable for theoretical purpose. Here the independent variables are age, marital status, educational qualification and occupation of the respondents.

For frequently moving resident, 30-39 years, 40-49 and 50+ years age group are 2.693, 1.311 and 2.767 times more to have knowledge about fearfulness of HIV/AIDS than that of the respondent of 18-29 years age group (reference group) respectively. Here, the middle age group (40-49 years) who are less than old in age and less awarded about the fearfulness of HIV/AIDS. Consequently they have negative significant impact on the fearfulness of HIV/AIDS. For marital status married and widow-widower are 0.400, 0.228 times less to have knowledge about fearfulness of HIV/AIDS than that of the respondent with single (reference group) respectively. Here, the marital status married and widow-widower who have experienced in different purpose of life had a significant acquaintance about HIV/AIDS. Again, respondents educational level primary incomplete, primary complete, secondary & higher secondary, graduate & higher are 7.020, 8.825, 19.325 and 6.914 times more to have knowledge about fearfulness of HIV/AIDS than that of the respondent no education (reference group) respectively. Here, the educational level who have experienced in different purpose of life had a highly significant acquaintance about HIV/AIDS than no education. For respondents occupation, service man, business man, driver and others are 0.820, 0.701, 0.337 and 0.534 times less to have knowledge about the fearfulness of HIV/AIDS than that of the respondent of occupation rickshaw & auto rickshaw driver (reference group) respectively. Here, driver move here and there and consequently have had a significant acquaintance about HIV/AIDS. But the service man and business man have not such of opportunity and they have negative impact about the fearfulness of HIV/AIDS than that of rickshaw & auto rickshaw driver.

For permanent resident, 30-39 years, 40-49 and 50+ years age group are 0.259, 0.235 and 0.369 times less to have knowledge about fearfulness of HIV/AIDS than that of the respondent of 18-29 years age group (reference group) respectively. Here, there is no

significant age group. For marital status married and widow-widower are 0.927 and 0.317 times less to have knowledge about fearfulness of HIV/AIDS than that of the respondent with single (reference group) respectively. Here, the widow-widower who have experienced in different purpose of life had a negative significant acquaintance about HIV/AIDS. Again, respondents educational level primary incomplete, primary complete, secondary & higher secondary, graduate & higher are 14.115, 19.929, 28.908 and 16.867 times more to have knowledge about fearfulness of HIV/AIDS than that of the respondent no education (reference group) respectively. Here, the educational level have experienced in different purpose of life had a highly significant acquaintance about HIV/AIDS. For respondents occupation, service man, business man and driver are 0.573, 0.914 and 0.645 0 times less times to has knowledge about the fearfulness of HIV/AIDS than that of the respondent of occupation rickshaw & auto rickshaw driver (reference group) respectively. And others is 1.234 times more to have knowledge about the fearfulness of HIV/AIDS. Here, the service, move daily a specific place with respect to discipline for their service and consequently have had a significant acquaintance about HIV/AIDS. But the business man, driver and others has no such of specific place and they have negative impact about the fearfulness of HIV/AIDS than that of rickshaw & auto rickshaw driver.

Table 5: Results of Logistic Regression Analysis of Knowledge of fearfulness about HIV/AIDS for frequently moving and permanent resident

Name of Independent variables	Frequently moving		Permanent resident	
	B	Odds Ratios	B	Odds Ratios
Age				
18-29 (Ref.)				
30-39	0.990***	2.693	0.224	0.259
40-49	0.271	1.311	0.354	0.235
50+	1.018***	2.767	-0.55	0.369
Marital status				
Single(Ref.)				
Married	-0.917***	0.400	-0.076	0.927
Widow & widower	-1.479***	0.228	-1.147***	0.317
Education				
No education (Ref.)				
Primary incomplete	1.949***	7.020	2.647***	14.115
Primary complete	2.178***	8.825	2.993***	19.929
Secondary & higher secondary	2.961***	19.325	3.364***	28.908
Graduate & higher	1.934***	6.914	2.825***	16.867
Occupation				
Rickshaw & auto rickshaw (Ref.)				
Service	-0.198	0.820	-0.557*	0.573
Business	-0.356	0.701	-0.089	0.914
Driver	-1.087***	0.337	-0.438	0.645
Sex worker				
Others	-0.628***	0.534	0.210	1.234

*Notes: (Ref.) denotes Reference category, *** denotes 1% level of significance, ** denotes 5% level of significance, * denotes 10% level of significance B denotes estimate regression coefficient and others: day labor, farmer and beggar.*

V. Conclusion and Recommendations

Knowledge of HIV/AIDS has become the burning question of the day. The knowledge of HIV/AIDS in Bangladesh has long been a topic of interest to population research because of its apparent direct relationship with lack of health facilities and indirectly with the poverty. At the significance level among the selected variables we have seen that the more knowledge gathered on HIV/AIDS in frequently moving respondents than permanent resident respondent. This study reflect that wide gap exists frequently moving-permanent resident respondent by different socio-demographic; especially education, occupation and media exposure & also followed by way to prevent of HIV/AIDS between frequently moving and permanent resident. Therefore, both government and NGO's program should strengthen care and support program may build up knowledge about HIV/AIDS and to provide the prevention through mass media by creating awareness to all people also.

Conflict of Interests

The author declares that there is no conflict of interests regarding the publication of this paper.

VI. Acknowledgement

Acknowledged to my beloved daughter Aradhyajid Sarkar.

References Références Referencias

1. **Fox, J. (1984).** Linear Statistical Models and Related Methods, John Wiley and Sons, New York. xx, 449 p., Wiley Series in Probability and Mathematical Statistics. Available online http://db.jhuccp.org/ics-pd/exec/icswppro.dll?BU= http://db.jhuccp.org/ics-pd/exec/icswppro.dll&QF0=DocNo&QI0=200970&TN=Popline&AC=QBE_QUERY&MR=30%25DL=1&&RL=1&&RF=LongRecordDisplay&DF=LongRecordDisplay.
2. **HIV in Bangladesh (2003).** *HIV in Bangladesh: Is Time Running Out*? Background document for the dissemination of the Fourth round, 2002 of national HIV and behavioural surveillance, National AIDS/STD Programme, Directorate General of Health Services, Ministry of Health and Family Welfare, Bangladesh.
3. **Murray C.J.L, Lopez A.D., Mathers, C.D., et al. (2001).** *Global burden of disease 2000 project: Aims, methods, and data sources.* Global Programme on Evidence for Health Policy Discussion paper no. 36. World Health Organization, Geneva, Switzerland, 2001.
4. **Notun Bisso (2009).** *Professor's Prokasshon,* Published by Mohammad Jashim Uddin. 37/1, Banglabazar, Dhaka. Subject wary Bangladesh, pp-4.
5. **Rahman, M., Mondol, D. & Abedin, S. (2005).** *Knowledge of AIDS among Women in Bangladesh: A Multivariate Analysis.* Paper presented at the National Seminar held in 25 December, 2005, Organized by Department of Population Science and Human Resource Development, University of Rajshahi, Bangladesh.
6. **Suhadolnik, R. J. (2007)** PhD, principal investigator and professor of biochemistry at Temple University School of Medicine "New Compound Shows Promise in Halting HIV Spread". *AIDS Research and Human Retroviruses* 31 Jan. 2007, 15 Oct. 2007, Available online http://www.aegis.com/pubs/aidswkly/2007/AW070207.html
7. **Sultana, R. (2005)** "Awareness of HIV/AIDS among the Urban Poor: A case Study in Dhaka City", research fellow, social science research council, ministry of planning. Available online http://www.bssrcbd.org.html
8. **UNAIDS/WHO (2006)** AIDS Epidemic Update: 2006 Available online http://data.unaids.org/pub/epireport/2006/2006_epiupdate_en.pdf
9. **UNAIDS China (2002). HIV/AIDS.** *China's Titanic Peril, 2002 Update of the AIDS Situation and Needs Assessment Report (Beijing, UNAIDS China Office), June.*
10. **United Nations (2002).** *HIV/AIDS Awareness and Behaviour*. United Nations Publication, Sales No. E.02.XXX.
11. **UNFPA (2008).** *State of world population*. Reaching Common Ground: Culture, Gender and Human Rights.
12. **World AIDS Day (2001).** *Live and Let Live.* Sustainable Development Networking Programme, SDNP, Bangladesh.

Global Journal of Medical Research: K
Interdisciplinary
Volume 17 Issue 3 Version 1.0 Year 2017
Type: Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals Inc. (USA)
Online ISSN: 2249-4618 & Print ISSN: 0975-5888

A Disseminated Myeloid Sarcoma Case Transformed into Leukemia

By Rafet Eren, Fuat Aydınlı, Osman Yokuş, Ceyda Aslan, Cihan Gündoğan, Mehmet Hilmi Doğu, Elif Suyanı, Şermin Altındal & Habip Gedik

Abstract- Myeloid sarcoma (MS) is a tumoral mass which is derived from immature myeloid precursor cells. A 28 year old man without a medical history was diagnosed as isolated MS of testis and orchiectomy was performed. After a watch and wait approach, one year later relapse occured in the other testis without bone marrow involvement. Orchiectomy to the other testis was repeated. One year later, the patient presented to our hospital with masses at inguinal and right popliteal regions. Body 18F-FDG PET/CT showed increased FDG uptake in lymph nodes of aortocaval, paraaortic, paracaval, bilateral common iliac, right external iliac, bilateral inguinal regions with a diameter of maximum 3.7 cm and a SUVmax of 11.9; and also a heterogenous FDG uptake was observed in the muscles of posterior leg region. We performed bone marrow biopsy and aspiration resulting in no pathological infiltration. The patient was treated with induction treatment of AML, followed by consolidation with one cycle of high dose ARA-C. After the first cycle of high dose ARA-C, leucocytosis developed.

Keywords: *myeloid sarcoma, acute myeloid leukemia, testis, muscle, lymph node.*

GJMR-K Classification: *NLMC Code: WH 250*

A Disseminated Myeloid Sarcoma Case Transformed into Leukemia

Rafet Eren [α], Fuat Aydınlı [σ], Osman Yokuş [ρ], Ceyda Aslan [ω], Cihan Gündoğan [¥], Mehmet Hilmi Doğu [§], Elif Suyanı [χ], Şermin Altındal [ν] & Habip Gedik [Θ]

Abstract- Myeloid sarcoma (MS) is a tumoral mass which is derived from immature myeloid precursor cells. A 28 year old man without a medical history was diagnosed as isolated MS of testis and orchiectomy was performed. After a watch and wait approach, one year later relapse occured in the other testis without bone marrow involvement. Orchiectomy to the other testis was repeated. One year later, the patient presented to our hospital with masses at inguinal and right popliteal regions. Body 18F-FDG PET/CT showed increased FDG uptake in lymph nodes of aortocaval, paraaortic, paracaval, bilateral common iliac, right external iliac, bilateral inguinal regions with a diameter of maximum 3.7 cm and a SUVmax of 11.9; and also a heterogenous FDG uptake was observed in the muscles of posterior leg region. We performed bone marrow biopsy and aspiration resulting in no pathological infiltration. The patient was treated with induction treatment of AML, followed by consolidation with one cycle of high dose ARA-C. After the first cycle of high dose ARA-C, leucocytosis developed. Peripheral smear revealed blastoid cells. Response could not be achieved with salvage therapies. In conclusion, MS might show a complicated disease course and patients with isolated MS should be treated with systemic chemotherapy at first diagnosis.

Keywords: myeloid sarcoma, acute myeloid leukemia, testis, muscle, lymph node.

I. Introduction

Myeloid sarcoma (MS) is a tumoral mass which is derived from immature myeloid precursor cells. Although MS most commonly develops as an extramedullary presentation of acute myeloid leukemia (AML), it can also accompany myelodysplastic syndrome (MDS) or myeloproliferative neoplasms (1-3). While MS is seen in % 2-14 of AML patients (1,3), the incidence rate of isolated MS without bone marrow infiltration is only 2 per million (2). Myeloid sarcoma can occur at any time during the course of disease. It is often seen in bone, soft tissue, lymph nodes, periton and gastrointestinal system and rarely seen in genitourinary system and central nervous system (1-3). Here, we present a case presenting with isolated testicular MS, relapsing with testis, lymph node and soft tissue involvements, and ultimately experiencing bone marrow infiltration.

II. Case

A 28 year-old-man without a remarkable medical history presented to his primary care physician with pain at inguinal region. A testicular mass was found at physical examination. Laboratory results including complete blood count and biochemistry were normal. Body 18F-Fluorodeoxyglucosepositron emission tomography/computed tomography (18F-FDG PET/CT) showed increased FDG uptake in testicular mass, solely. He underwent orchiectomy and biopsy revealed MS. Examinations including bone marrow aspiration and biopsy, and bone marrow conventional cytogenetics were normal without blast infiltration. After a watch and wait approach, relapse occured in the other testis one year later. Simultaneous bone marrow examination was again normal. Orchiectomy to the other testis was repeted. One year after the second orciectomy, the patient presented to our hospital with gait disturbance. His physical examination was notable for a mass at inguinal region with a diameter of 3 cm and a mass at right popliteal region with a diameter of 7 cm. Body 18F-FDG PET/CT showed increased FDG uptake in lymph nodes of aortocaval, paraaortic, paracaval, bilateral common iliac, right external iliac, bilateral inguinal regions with a diameter of maximum 3.7 cm and a SUVmax of 11.9; and also a heterogenous FDG uptake was observed in the muscles of posterior leg region (figure 1). Complete blood cell count was normal. Pathological examination of the excisional biopsy of the lymph node was reported as MS. We performed bone marrow biopsy and aspiration resulting in no pathological infiltration. The patient was treated with induction treatment of AML (3/7: Idarubucin + Cytosine arabinoside (ARA-C)), followed by consolidation with one cycle of high dose ARA-C. His gait disturbance resolved. For monitoring response to therapy we performed 18F-FDG PET/CT which showed increased FDG uptake in lymph nodes of abdomen and iliac region and mass in the right popliteal region with a

Author α σ ρ ω: Hematologist and Internal Diseases Physician, Department of Hematology, Ministry of Health İstanbul Training and Research Hospital, İstanbul. e-mails: rafeteren@hotmail.com, fuataydinli@yahoo.com, yokus.osman@yandex.com, ceydaaslan@yahoo.com

Author ¥ § χ ν: Nuclear Medicine Physician, Department of Nuclear Medicine Physician, Ministry of Health Istanbul Training and Research Hospital, İstanbul. e-mails: cihangundogan@hotmail.com, mehmethilmi@hotmail.com, elifsuyani@hotmail.com, elifsuyani@hotmail.com

Author Θ: Associate Professor, Department of Infectious Diseases and Clinical Microbiology Ministry of Health Bakirkoy Sadi Konuk Training and Research Hospital, Istanbul, Turkey. e-mail: habipgedik@yahoo.com

diameter of 3.5x2.9x7.4 cm (SUV max: 9.2). After the first cycle of high dose ARA-C leucocytosis developed. Peripheral smear revealed blastic cells. Bone marrow involvement was confirmed by bone marrow examination. Salvage therapy with fludarabin + ARA-C + granulocyte colony stymulating factor + idarubucin (FLAG-İDA) and later etoposide + mitoxantrone + ARA-C (EMA) were applied to the patient sequentially. However response could not be achieved and patient died.

III. Discussion

Although lymph node involvement of MS is often encountered (1,2), testicular (4-6) and muscle involvements (7,8) are rare entities in these patients. Neverthless, our patient comprised both testicular and muscle involvements consecutively, and also the lymph nodes were affected which was predictable in such a spread of the tumor.

An other distictive feature of this case is the development of bone marrow infiltration nearly 2.5 years after the diagnosis with the propagation of MS. Whereas leukemic transformation of MS usually occurs after a nearly median 7 months (1). Further more leukemic transformation occured during treatment after atypical extramedullary relapses. Mostly, MS with chromosome 8 abnormality transformes to AML rapidly with high incidence (2). However cytogenetic analyze of our patient was normal, which may be the cause of late leukemic transformation, although he did not receive systemic treatment at first diagnosis.

To our knowledge, this MS case differs with its disease course, as it presented with isolated testicular MS, relapsed repeatedly with testicular and later with lymph node and muscle involvements, and ultimately experienced leukemic transformation. Patients with isolated MS should be treated at first diagnosis.

Conflict of Interest

The authors declare that they have no conflict of interest

References Références Referencias

1. Bakst RL, Tallman MS, Douer D, Yahalom J. How I treat extramedullary acute myeloid leukemia. Blood 2011; **118**: 3785-93.
2. Yilmaz AF, Saydam G, Sahin F, Baran Y. Granulocytic sarcoma: a systematic review. Am J Blood Res 2013; **3**: 265-70.
3. Avni B, Koren-Michowitz M. Myeloid sarcoma: current approach and therapeutic options. Ther Adv Hematol 2011; **2**: 309-16.
4. Constantinou J, Nitkunan T, Al-Izzi M, McNicholas TA. Testicular granulocytic sarcoma, a source of diagnostic confusion. Urology 2004; **64**: 807-9.
5. Eggener SE, Abrahams A, Keeler TC. Granulocytic sarcoma of the testis. Urology 2004; **63**: 584-5.
6. Valbuena JR, Admirand JH, Lin P, Medeiros LJ. Myeloid sarcoma involving the testis. Am J Clin Pathol 2005; **124**: 445-52.
7. Bassichis B, McClay J, Wiatrak B. Chloroma of the masseteric muscle. Int J Pediatr Otorhinolaryngol 2000; **53**: 57-61.
8. Manabe Y, Hamakawa Y, Sunami K, Ohta Y, Omori N, Abe K. Granulocytic sarcoma with orbit, cauda equina, muscle and peripheral nerve extension but without bone marrow involvement. Intern Med 2007; **46**: 633-5.

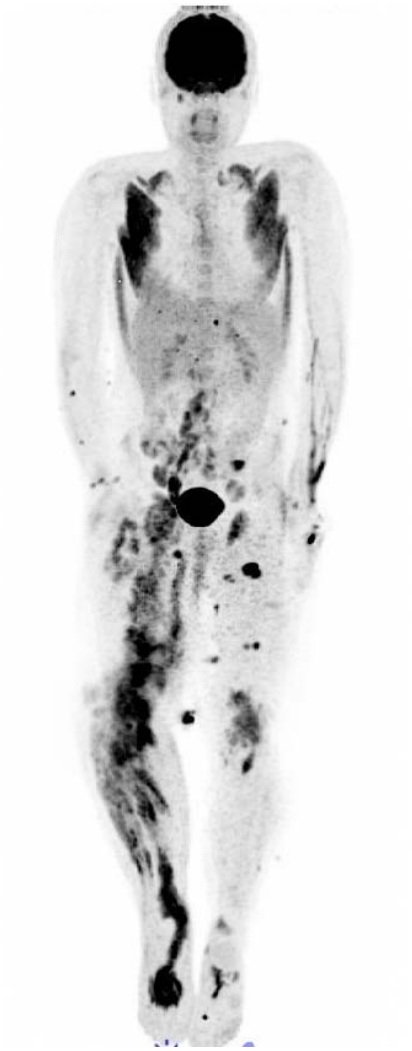


Figure 1

Global Journal of Medical Research: K Interdisciplinary
Volume 17 Issue 3 Version 1.0 Year 2017
Type: Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals Inc. (USA)
Online ISSN: 2249-4618 & Print ISSN: 0975-5888

Determinants of Maternal Care Utilization in a Rural Area of Bangladesh: A Case Study of Udaypur Village of Bagerhat District

By Moriam Khanam & Nusrat Jafrin
University of Dhaka

Abstract- The aim of the study was to identify the demand side factors that determine the decision to utilize maternal care from medically qualified providers in the rural village of Bangladesh. Different scholarly articles have divided the problem of health services into two categories of factors: demand side factors and supply side factors. In this study, we are considering only the demand side factors only because the supply has increased substantially over time. The study was conducted in Udaypur Aruakandi village of Bagerhat distrct where the government health care facility (UHC) is only 1 km away. Econometric methods are used to identify demand side determinants of health service utilization in general. Data from 60 selected women who has given birth within 2.5 years or were pregnant at the time of data collection from three strata of households from a purposively chosen village of Bangladesh were collected in the period 25 December, 2015 to 5 January, 2016. This study used both qualitative and quantitative analyses to identify the factors that affect the use of maternal health care.

Keywords: bangladesh, bagerhat, rural area, maternal care utilization, health care services.

GJMR-K Classification: NLMC Code: WA 310

Strictly as per the compliance and regulations of:

Determinants of Maternal Care Utilization in a Rural Area of Bangladesh: A Case Study of Udaypur Village of Bagerhat District

Moriam Khanam [α] & Nusrat Jafrin [σ]

Abstract- The aim of the study was to identify the demand side factors that determine the decision to utilize maternal care from medically qualified providers in the rural village of Bangladesh. Different scholarly articles have divided the problem of health services into two categories of factors: demand side factors and supply side factors. In this study, we are considering only the demand side factors only because the supply has increased substantially over time. The study was conducted in Udaypur Aruakandi village of Bagerhat distrct where the government health care facility (UHC) is only 1 km away. Econometric methods are used to identify demand side determinants of health service utilization in general. Data from 60 selected women who has given birth within 2.5 years or were pregnant at the time of data collection from three strata of households from a purposively chosen village of Bangladesh were collected in the period 25 December, 2015 to 5 January, 2016. This study used both qualitative and quantitative analyses to identify the factors that affect the use of maternal health care. In the study area out of the 60 women, 53% received antenatal care from a medically trained provider, making 4 ANC visits is only by 30% women, 49% of the delivery were attended by SBAs, 35% of the women received post natal care from medically qualified providers. So the utilization of maternal care is very low. The result of logistic regression analysis show that in general the likelihood of using maternal care services is affected by the socio-economic conditions, family education, occupation and age of the respondent individually. The level of family education was found to be the main factor associated with use of the MCH services, besides, perception of quality about the services provided by nearest health care facilities, wantedness of pregnancy, women's decision making power are also the important determinants of maternal care utilization from medically qualified sources.

Keywords: bangladesh, bagerhat, rural area, maternal care utilization, health care services.

I. Introduction

The health status of women is an important indicator of the general health and well-being of the population of a country. Over the years, many impressive initiatives have been taken globally to improve maternal health status and reduce maternal mortality. Very recently different initiatives have been taken under goals specified in MDGs and SDGs. In the United Nations Millennium Summit of 2000, improvement of maternal health was one of the Millennium Development Goals (MDGs). Finally, the declaration of Sustainable development goal 3 and target 1 is to reduce global MMR to less than 70 per 100,000 live births by 2030. Though the world has experienced considerable success in reducing maternal mortality, still about 830 women die from pregnancy- or childbirth-related complications around the world every day and the risk of a woman in a developing country dying from a maternal-related cause during her lifetime is about 33 times higher compared to a woman living in a developed country (WHO, 2015). The major determinants of maternal morbidity and mortality include pregnancy, the development of pregnancy-related complications, including complications from abortion, delivery, and the post delivery period. If the utilization of proper maternal care could be ensured, majority of the death would not occur.

Since the independence, Bangladesh has achieved remarkable progress in various health indicators including maternal health status[1]such as life expectancy at birth has increased, total fertility rate, under 5 mortality rate, maternal mortality have declined over time. Bangladesh was committed to the MDGs and developed different policies and strategies. As a result, the country has made significant progress in improving the maternal health status. Bangladesh has experienced a steady decline in maternal, neonatal, infant and under-five mortality in recent decades; however, the rate of decline is insufficient to achieve MDG 4 and 5 targets set for Bangladesh (UNICEF, 2013). Bangladesh is now preparing to welcome the post-2015 Sustainable Development Goals (SDGs) 2030. For the health sector in Bangladesh, the SDGs will create an opportunity for focusingon results through overcoming the challengesof the unfinished agenda of the MDGs (Health Bulletin, 2015). In 2000, maternal mortality ratio (MMR) was 399 deaths per 100,000 live births and by 2015, it has dramatically reduced to 176 deaths per 100,000 live births in Bangladesh (World Bank, 2015). But the condition is not yet at satisfactory stage, considerably compared to many other developing nations. Despite improvements, pregnancy-related complications remains the leading cause of death and disability amongwomen of childbearing age [2]. To achieve the

Author α: Lecturer, Institute of Health Economics, University of Dhaka, Bangladesh. e-mail: moriamkhanam@gmail.com
Author σ: Lecturer, Department of Population Sciences, University of Dhaka, Bangladesh. e-mail: nusrat_dps@du.ac.bd

target specified in SDG, Bangladesh needs to go a long way. The maternal mortality rate in Bangladesh is mainly attributable to the low utilization of maternal health care services from qualified providers. Because there are demand-side barriers that inhibit women from seeking antenatal care (ANC), delivery, and postnatal care (PNC) services, including lack of information about when or from where to obtain treatment and women's awareness of potentially life-threatening conditions (NIPORT, 2005). Utilization of antenatal care received from a medically trained provider (at least one visit) is 64%, at least four visits is 31%; delivery care with skilled attendant at birth is 42%, although 22 percent of the births were delivered in a private facility, only 13 percent were delivered in a public facility, and 62 percent delivered at home; 36% receives postnatal care (BDHS, 2014).Further, inequity exists in the utilization of maternal care among the rural and urban areas of Bangladesh. So it is an important concern to bring those women who are not using the maternal care from qualified sources under the utilization.

II. Justification of the Study

Evidence shows that the maternal mortality rate (MMR) are still at unacceptable level. So it is important to obtain information and identify reasons for low utilization of maternal health care services. In Bangladesh there are services for delivery care which may be insufficient amount, but they are not adequately used(2). Many investigations have been made to identify the underlying causes of low use of the MCH services provided through the public sector health care facilities. These mainly focused on both demand and supply side barriers. But over the time availability of maternal services at the rural level remarkably improved but the utilization has not increased remarkably. Thus, in Bangladesh, there is a research gap in this field due to inadequate research on the under-utilization issue from the perspective of users only. There are some research in this field but no research in this particular village of Bagerhat.

Against this background, it is therefore imperative that a study be conducted to analyze and describe the demand side factors that affect the utilization of maternal care by pregnant women. Therefore, the search for factors that influence utilization in that area will certainly be beneficial to improve the utilization of maternal care in rural areas of Bangladesh.

a) Research Question

What are the demand side factors influencing utilization of maternal health care services in a rural area of Bangladesh?

Research objective: Using a rural village of Bangladesh as a case study, the objective of this study is to observe the utilization pattern and establish determinant factors in the utilization of maternal health care services from qualified sources that is, the use of antenatal care services, skilled assistance during delivery, postnatal care among women of reproductive age in a rural area of Bangladesh.

b) Specific objectives

- To examine the patterns of the use of maternal care by pregnantwomen.
- To investigate the determinants of utilizing maternal care from medically trained providers.

c) Hypotheses

The study, considering only the demand side factors,hypothesized that

- Populations in higher socio-economic conditions are likely to use maternal health care services from medically qualified sources more than are those relatively in low socio-economic conditions in rural Bangladesh
- Poor knowledge and negative attitude of people towards the public sector healthcare service decreases the use of maternal care services in rural Bangladesh.

These hypotheses will be discussed and verified in the result section of the paper based on the data and information collected.

III. Literature Review

The use of health services is influenced by the characteristics of the health delivery system for example, accessibility, quality, and cost of the services [Chakraborty et al. (2003)]. However, even where there is a good supply of services, those services may not be fully used [3]. Even under the same circumstances of availability, some women are more likely to use services than others. Therefore, a health delivery system is not the only factor that determines the level of use of health care services. Other factors such as social characteristics and structure influence the use of health care services.Several studies have shown that socio-demographic factors affect the utilisation of maternal health care services. Below a review of the empirical evidence of the selected demand side factors that affect the utilisation of maternal health care services has been given.

Chowdhury et al. (2003) found that educated women are more likely to seek treatment from doctors/nurses than women who were not educated in Bangladesh. The results of their multivariate analysis showed that women with secondary or higher education were almost 1.8 times more likely to seek treatment from doctors/nurses to treat their antepartum morbidities than the women who were not so. A study of 80 Bangladeshi women in two different districts, performed by Kalim et al (2009), found a significant relationship between maternal years of education, literacy rates, and the

utilization of skilled birth attendants and maternal mortality rates.

The media can bring about changes in people's attitudestowards the use of modern maternal care services. Literature suggests thatmass media are effective in information dissemination, which increases awareness about innovations, and fosters inter-personnel communication, which could facilitate behavioral changes allowing for the adoption of new/ different behaviors (Valente et al., 1996).

Chakraborty et al. (2003) in their paper examined a number of predisposing and enabling factors that influence the use of maternal health care services in Bangladesh. The results show a high level of association between certain predisposing and enabling factors and use of maternal health services and they have found that women's education, husband's occupation, and influence of severity of disease condition in explaining the utilization of maternal health care are significant. Sunil et al. (2005) observed the relative effect of women and their husbands' education on use of maternal care services in rural India using data obtain from National Family Health Survey -2. They did not only find positive significant relative effect of spousal education on use of maternal care services, but also found impact of women education was higher in comparison to their husbands' education. They have also found women's mass media exposure was a positive and significant factor affecting the utilization of maternal care services in rural India. According to them, the percentage of utilization of maternal care services was about 19 percent almost a double for women who were exposed to media than the 10 percent of women who were not exposed to any medium of mass media.

Syed Azizur Rahman (2001) has found among the socio-economic factors - family education, income, negative attitude towards the services available were significant both individually and jointly with the variations of use of MCH services.

Additionally, women's age is an important factor which may influence the use of maternal health care services. The association between a woman's age and the use of medical services has been found to be inconsistent across studies. Because of greater exposure to and knowledge of modern health care, younger women may make more use of modern health care facilities than older women. Several studies indicate older women are less likely to use skilled delivery assistance (Banerjee et al., 2008).

It is observed from various research findings that the relative effect of joint or large family was found negative on use of maternal and child health services (Wang et al., 1987; Mishra, 2000; World Bank, 2001; Chowdhury et al, 2003 and, Sunil et al., 2005). They reasoned that larger family size might have resource constraints to utilize health services comfortably as compared to smaller family size.

A study on safe motherhood programs in Bangladesh found that women's low status in society, strong cultural and traditional ties that deter women from delivering at health centres or with medically-trained attendants because their mothers have given birth "naturally" for generations (UNICEF, 2007).

Pokhrel and Sauerborn (2004) stated that the economic model assumes that factors such as price and income covariate with a set of other socio-demographic and need factors, producing the demand for health care, usually represented by health care utilization.

As Mishra (2000) claimed that knowledge about health centre near by residence of the respondents may also have positive and significant effect on the utilization level of maternal and child health services.

Moreover, women's access to maternal health care has been expected to be limited by constraints on their autonomy, where female autonomy can be described as the ability of the women to make decisions within the household relative to her husband. Bloom et al. (2001) have found in the Indian context a positive relationship between female autonomy and the utilization of maternal care.

Several studies indicate a negative association between higher birth order and the use of maternal health care services (Babalolaet al. 2009, Ekale et al. 2007). A study from India affirms that women with more than two children are less likely to deliver at health facilities (Banerjee et al. 2008).

So cultural barriers and traditions as well as lack of information prevent women from accessing maternal and newborn health services. There is also little understanding about the need for rest and additional nutritious food during pregnancy. Moreover, the low status of women within the family means women will have her health care decided by her husband. Often her mother-in-law will be a key decision-maker. Despite being available, the utilization of emergency obstetric and neonatal care services is still low as well as postnatal care use. Families often ignore very simple healthy practices or do not accept them because it is against tradition or common belief. Similarly most people are not able to recognize when it is necessary to seek care for the mother.

IV. Conceptual Framework

The purpose of this study is to identify the determinants of maternal care utilization. To identify the determinants of maternal care utilization, a conceptual framework can be used.

The Anderson's behavioral model of health service use has widely been used to understand the determinants that affect the utilization of health use. In specifying the factors determining the type of provider chosen, this study used the modified version of the

behavioral model. The following figure is depicting the framework-

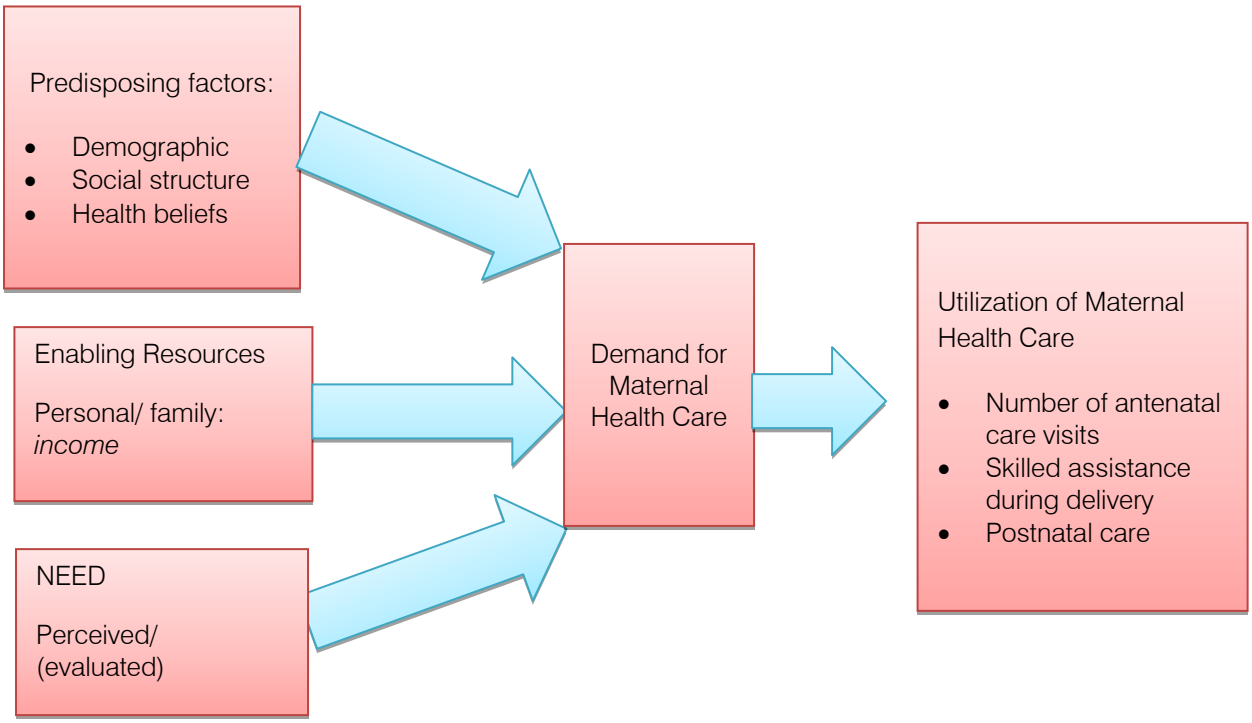


Figure1.1: The conceptual framework depicting the relationship between selected control variables and maternal health care utilization.

In the framework, the demographic factors include age, gender, family size, number of previous pregnancies. Social structure involves education, occupation and religion. Health beliefs are the knowledge about health and health care system; for example, attitudes towards disease and medical care. Enabling factors are factors that make the individual able to obtain health care services, such as husband's occupation, family income, land holding. Need factors – which are considered to be the most immediate cause of health service use –Information about risks of childbirth and about service availability in radio or TV should increase use, Pregnancy wanted, Perceived quality of care. In this study it is expected that these factors determine demands for maternal care and as a result the utilization of maternal care.

V. Methodology

This study was a cross-sectional study carried out from December 25, 2015 to January 5, 2016 and the purpose was to determine the demand side factors that affect the utilization of maternal care services. Rural Bangladesh survey has been conducted in Udaypur Aruakandi Village of MollahatUpazila, Bagerhat district, the south-western part of Bangladesh. The Udaypur Aruakandi village is 1 km away from the UHC. But most of the deliveries in that area occur with traditional birth attendants and many pregnant women do not seek care during pregnancy, sometimes they seek care from unqualified providers, a common situation in many rural area of Bangladesh which may have serious health consequences. Therefore, this village has been chosen to identify what the factors are that determine the utilization and non-utilization of maternal care services from qualified providers.

With a view to permitting scientifically grounded estimates to be made from the survey, the intention was to adopt probability sampling. The target population of this study was the women aged 15-49 years who have already given birth within 2.5 years or were pregnant at the time of data collection in a rural village of Bangladesh. The main specific issue was: to estimate the proportion of women using maternal care during pregnancy from qualified providers and identify the factors that affect the utilization of that care. The proportion was the main indicator of the survey. According to BDHS, 2014 report, the utilization of antenatal care from medically trained providers in rural Bangladesh is 58.6%. By considering this value, the value of probability has been assumed as .58 in the sampling formula.The formula for sample size calculation,

$$n = \frac{Z^2 P (1-P) (deff)}{d^2}$$

Where, n= sample size; Z = value of the standard normal variable, which is equal to 1.96 at 5% level of significance; p = expected use rate of health

care, deff. = design effect; d = the level of precision required or maximum error deemed acceptable.Using p=.58, Z=1.96, deff=1.5, d=.10, the required sample size was n= 140. But due to time and resource constraints sample size was limited to the number 60.

The list of households was collected from the BBS, 2011 data. According to the list there are 287 households in the village. The households were divided into 5 groups, 3 of these consisting of 57 households and the other two each consisting of 58 households. Then 3 of them were selected randomly, the primary sampling units. After selecting the groups of households, then author started walking from one corner until 20 eligible women were interviewed in each group. In most of the households at least one women satisfied the criteria. Thus 60 women were interviewed from the 3 PSUs, 20 from each. The instrument that was used for collecting data was a structured questionnaire for face-to-face interviews, which was designed under the guidance of the advisors. That structured questionnaire was used to collect information from the respondents to identify the level and type of maternal health care use, and determinant factors that affect the utilization. If the woman had more than one child within the 2.5 years preceding the survey, information on the use of antenatal care was collected for the last birth.

After the data collection, checking and appropriate editing, to find the association of utilization of maternal care with and the factors, data was analyzed using standard statistical packages. Excel-2013 was used for data entry and as the dependent variable is dichotomous, a multivariate logistic technique has been run using STATA-13 software.

VI. Results

A total of 60 women were included in the study. The mean age of the respondents was 23.7 (±.63) years ranging from 17 to 40 years, majority (62%) were in the age group 20-25 years. 27% of the respondents were with education level below class five, 62% of the respondents were with education level that is from class five to class eight, only 8% are with education level from class nine to twelve, only 3% were above HSC level. Regarding occupation of the respondents, 88% were housewives followed by 6% students, 2% service holders, 2% doing business, other 2% were doing part time jobs. 11% of the women were pregnant for the first time and has not given birth yet, 36.6% has one child, 33.33% of the respondents has 2 children, 8.33% has 3 children, 5% has 4 children, 3.33% has 5 children, followed by 1.67% has 6 children. The average family size of the respondents is 4.8 (± .21), where the family size ranges from 2 to 10 in number. All households living in the village are Muslims.

Among the 60 respondents, 52 has already given birth within the past 2.5 years, and the rest 8 women were pregnant at the time of data collection. 82% of the pregnancies were wanted, followed by 18% unwanted pregnancies. 60% women have some idea about the importance of using antenatal care and the rest have no idea. 83% of the respondent women received TT vaccine during their pregnancy. Among the 60 women, 36 (60%) received antenatal care and 24 (40%) did not receive antenatal care at all. Most of the respondents, about 88%, received antenatal care from the qualified providers and the rest 12% received the care from informal providers like homeopathic doctor, pharmacist etc. Only 30% of the antenatal care receiver made 4 ANC visits, 36% made one visit, 11% could not remember the number of visits. Respondent women without any formal education did not receive ANC at all, followed by 32% of the women in the education level class one to five, 86% of the respondents who attended secondary level, 100% of the respondents who attended the higher education made antenatal care visits at least once.30% of the women in the age group 25-30 years received antenatal care, 100% of them from qualified providers, among women in the age group above 30 years, 50% received antenatal care from qualified providers. Only 57% of the respondents who are housewives received antenatal care (60% of which are from qualified providers); followed by service holders, students, and who do some part time activities for money all (100%) are user of antenatal care from qualified providers.

Fifty two women among the sixty respondents have given birth. Most of the delivery (73%) occurred at home, 25% of the delivery took place at private clinics, only 2% delivery took place at the UHC. 98% delivery outcome was normal child, followed by only one percent dead child. 49% of the delivery were by trained attendants (doctor, nurses, CSBA, FWV), of which 23% births were delivered by Cesarean section (C-section). 51% of the delivery were attended by traditional birth attendants and relatives.100% of the women whose annual family income are above tk. 200000, 71% whose annual family income are 96000, 59% whose annual family income are 120000, 75% whose annual family income are 144000 received antenatal care.

The data in this study shows that only 42% of the mothers received postnatal care within 42 days after delivery, the other 58% did not receive any postnatal care. 82% of the postnatal care receiver received it from medically qualified providers (MBBS doctor, nurses, FWVs etc.), the other 18% received it from informal providers (kabiraj, pharmacists, homeopathic doctors etc.). According to them, the reasons for choosing the unqualified providers are problem was not so serious, low cost, well behave of providers, availability etc. majority (55%) of the women received postnatal care among the age group 20-25 years and the utilization is lowest (25%) among the adolescent mothers. Results also shows that all women (100%) with no formal

education did not received postnatal care at all and the utilization of postnatal care was highest (63%) among women who have attended the secondary level of education. Women who do some part time activities for earning money, all of them have used postnatal care, the utilization of postnatal care is low among housewives and those who have used only 43% of them used from qualified providers. The utilization of postnatal care is highest (100%) among both women whose husbands work outside the country and students.

a) Logistic Regression Analyses

The outcome variable being dichotomous, logistic regression analysis has been carried out by taking each independent variable against the outcome variable to estimate the effect of the indicator variables on the outcome variable. To determine the demand for maternal care among the women in the village, logit regression analysiswas conducted. There are three regression equations: one for antenatal care use, another for skilled birth attendance at delivery, and the last one for the use of postnatal care.

Determinants of ANC Utilisation: Results from multivariate logistic regression models for antenatal care utilization are given infollowing table-1,

Table-1: Results of multivariate logistic regression analyses of utilisation of antenatal care

Explanatory Variables	Dependent Variable: utilization of antenatal care from qualified providers (1=ANC visit, 0=no ANC visit) (Average marginal effects)	P value
Age of the woman (in years)	-.0407455	0.067
Education of the woman(in years)	.0170818	0.079
Occupation of woman (=1 if housewife, =0 otherwise)	-.2755223	0.191
Education of the household head (in years)	-.0380068	0.194
Husband's occupation (=1 if day laborer, =0 otherwise)	.2770648	0.063
Family size (in number)		
High Birth order	-.1193902	0.064
Household income(in taka)	9.34e-07	0.350
Family structure (=1 if singe, =0 if combined)	.0520282	0.011
Watch TV(=1 if watch, =0 if do not watch)	.1080109	0.072
Listen to radio (=1 if listen, =0 if do not listen	-.0297394	0.793
Wanted pregnancy	-.0012503	0.995
Perceived quality (=1 if good, =0 if bad)	.1896817	0.061
Women's decision making power (1=yes, 0=no)	.1896817	0.061

Source: Author's computation

The age of the women is negatively related to the use of ANC. As age increases by 1 year, on an average, the likelihood of utilization of antenatal care decreases by .041 and the result is significant at 6% level. Banerjee et al. has also found this negative relationship with age.Education of woman is positively related to the likelihood of using antenatal care. As education increases by 1 year, on an average, the probability of antenatal care increases by .097 and the result is significant at 8% level. The husband's education reduces the likelihood of using antenatal care from qualified provider but the result is insignificant as the p-value is large.

If the woman is housewife, the probability of antenatal care visit decreases by .27 compared to a woman with other occupation (either student, or service holder, or do some part time jobs), on an average but the p value is large (.191). The household income has a positive association with the utilization of antenatal care from a qualified source but the result is insignificant. Women who watch TV, for them the likelihood of utilizing antenatal care increases by .11 compared to other who do not watch TV. Watching TV and reading has a positive significant impact on antenatal care use. The multivariate logistic regression results show a negative insignificant impact on the utilization of maternal care. Here, watching TV and listening radio are serving as the proxies for consciousness about different health related matters, especially maternal health.

By running a bivariate logistic regression model where ANC visit (1=yes, 0=no) is the dependent variable and wanted pregnancy (1= wanted, 0= unwanted) is independent variable, there has a significant positive impact (at p-value 8%) on the likelihood of use of ANC. But after controlling for other variables like education, age, occupation, perceived quality, knowledge about the nearest health facilities, women's decision making power, the intendedness of

pregnancy has a negative impact on the likelihood, but it is highly insignificant (p-value is .995).

The perceived quality of nearest health facilities has a significant impact on the utilization of maternal care. The women who think the quality is good, on an average, their probability of using antenatal care from qualified sources increases by .18 compared to others who think the quality to be bad. The women's decision making power is significantly associated with the utilization of maternal care.The likelihood of using antenatal care for a woman of a single family is on an average .052 higher compared to a woman from a combined family structure and the result is highly significant (p value=.01).

The pseudo R^2 in this model is .60. Though the pseudo R^2 is not so high, the explanatory variables have explanatory power.

Determinants of Use of care from SBA at delivery: The result of multivariate logistic regression model for the use of maternal care has been represented in the following table,

Table-2: Results of multivariate logistic regression analyses of the utilization of delivery care from SBA.

Explanatory Variables	Dependent Variables: (1=SBA,, 0=not SBA) (Average marginal effects)	P value
Age of the woman (in years)	.019	0.48
Education of the woman(in years)	.0589723	0.093
Occupation of woman (=1 if housewife, =0 otherwise)	-.1059744	0.033
Education of the husband (in years)	.032427	0.033
Husband's occupation (=1 if day laborer or farmer, =0 otherwise)	-.0282797	0.874
Birth order	-.1628903	0.071
Household income(in taka)	-7.29e-07	0.529
Family structure (=1 if singe, =0 if combined)	-.1791702	0.176
Intendedness of pregnancy (=1 ifwanted, =0 if unwanted)	.1630559	0.085
Watch TV(=1 if watch, =0 if do not watch)	.0788669	0.070
Listen to radio (=1 if listen, =0 if do not listen	-.0837846	0.210
Perceived quality (=1 if good, =0 if bad)	.3948859	0.018
Women's decision making power (1=yes, 0=no)	.048071	0.028
ANC visit (1=yes, 0=no)	.0930675	0.052
Attendant choice by mother in law (1=yes, 0=no)	-.1040598	0.080

Source: Author's computation

Increase in women's age increases the likelihood of using care from SBA in time of delivery by .019, on an average but the variable is insignificant (p value is .62). Both education of a woman and the education of her husband increases the probability of using the delivery care from a skilled birth attendant, where both the variables are significant (p value is less than 10%). If a woman is housewife, her likelihood of using maternal care on an average, decreases by .11 than a woman who is not housewife and the result is significant. If the husband of a woman is day laborer or a farmer, on an average the likelihood of her use of care during birth from SBA decreases by .03 compared to women whose husbands' are of other occupation but the result is insignificant due to the p-value is high. Household income is showing a negative impact and the result is insignificant (p-value is high). High birth order has a significant negative impact on the likelihood of using care from SBAs.

Watching TV has a significant positive impact on the utilization of care from SBAs at time of deliveries while listening radio is showing an insignificant negative impact on the probability of using care from SBAs. Woman whose pregnancy was wanted has a significant positive impact (with p value .08) on the likelihood of using skilled birth attendant as an assistance at delivery.

Women who perceive the quality of nearest health facilities to be good their probability of use of delivery care from SBAs increases by .39 compared to them who perceive the quality not to be good enough and the result is highly significant. On an average, woman who made the ANC visit during pregnancy has an increased likelihood of using the care from SBAs during delivery compared to women who do not made ANC visit. Likelihood of using care from SBAs declines by .104 if the mother in law made the choice of attendant at delivery and the result is significant (p value=.08).

Pseudo R^2: Pseudo $R^2$is .55. So the model fits moderately well.

b) Determinants of Postnatal care utilization

Table-3: Results of multivariate logistic regression analyses of the utilization of postnatal care.

Explanatory Variables	Dependent Variable: use of postnatal care (1=received postnatal care from qualified providers, 0=did not seek postnatal care or seek care from informal sources) (Average marginal effects)	P value
Age of the woman (in years)	-.0046187	0.847
Education of the woman(in years)	.0158037	0.077
Occupation of woman (=1 if housewife, =0 otherwise)	.3310671	0.251
Education of the household head (in years)	.0451985	0.103
Husband's occupation (=1 if day laborer, =0 otherwise)	-.2019506	0.270
Birth order (in number)	-.142351	0.080
Household income(in taka)	2.49e-06	0.080
Family structure (=1 if singe, =0 if combined)	-.1124638	0.348
Intendedness of pregnancy (=1 ifwanted, =0 if unwanted)	-.0033296	0.989
Watch TV(=1 if watch, =0 if do not watch)	.27722	0.025
Listen to radio (=1 if listen, =0 if do not listen	.1220926	0.014
Knowledge about nearest health facilities (=1 if yes,=0 if no)	.2798133	0.013
Perceived quality (=1 if good, =0 if bad)	.2255077	0.050
Women's decision making power (1=yes, 0=no)	.075726	0.351

Source: Author's computation

Age of women reduces the likelihood of using postnatal care from qualified providers but the result is insignificant. Both the women education and the education of their husbands have significant (p value < .10) positive impact on the likelihood of utilization of postnatal care, on an average.

Both the occupation of husbands and the occupation of women is not showing any significant impact on postnatal care utilization. Watching TV, listening to radio, perceived quality to be good, knowledge about nearest health facilities have significant impact on likelihood of postnatal care utilization. Women who has some ability to make decision in the family are more likely to use postnatal care than those who don't have that ability but the result is insignificant (p value=.351).

VII. Discussion

Results showed that 53% of the women in the study area received antenatal care from a medically trained provider which is low compared to the use by 64% of the women according to BDHS, 2014. Making 4 ANC visits is only by 30% women. 49% of the delivery were attendant by SBAs which is greater than the rate in Bangladesh 42% according to BDHS report.Only 35% of the women received post natal care from medically qualified providers. So the utilization of post natal care is very low.

The use of antenatal and post natal care from informal providers is very low 12% and 18% respectively. The results of our study showed that mothers with higher education had the highest percentage of adequate ANC use compared to those with no or primary education. This result is consistent with Shahjahan et al (2012). Women who are students and service holders, 100% of both of them utilized ANC from medically qualified source. Women who has already three living children, did not seek antenatal care at all. Women from single families utilize formal ANC care more than women from combined family structures. Low use of ANC among those who has not enough ideas about the availability of services, who perceive the quality to be bad.

The findings show that age is an important factor in determining the use of skilled assistance, early antenatal care visits and more than four antenatal visits. Older women are less likely to utilize maternal health services compared to younger ones. This finding is similar to a study by Ochako (2003) in which young women are more likely to seek skilled assistance in health facilities in comparison to older ones.Banarjee et al. (2008) also found such a negative association between age and maternal care.

In cases of use of care from SBAs during deliveries and the postnatal care from medically qualified providers also have almost similar pictures in relation to socio-demographic factors as well as knowledge of health facilities and perceptions about their quality.

As expected, use of antenatal services was more likely among the literate women than among the illiterates. The use of maternal care is significantly affected by education, which is consistent with the findings by Chowdhury et al. (2003), Kalim et al. (2009), Chakraborty et al. (2003). High birth orders also has a significant negative impact on the utilization of maternal

care from a medically qualified provider. This finding is supported by that of a study by Shahjahan et al (2012). A possible explanation for these results is that high-parity women have less desire to use maternal health care services due to a beliefthat they have experienced with pregnancyand childbirth and therefore do not need such services (6).

Knowledge about the nearest health facilities and the perceptions about the quality of services provided by those facilities have a significant impact on the utilization of maternal care from qualified providers. These findings are consistent with findings of study by Syed Azizur Rahman (2001)

Shunil et al. (2005) in the context of India found a positive relationship between use of maternal care and exposure to media. The result of the study shows that exposure to mass media (watching TV, listening to radio) wasthe variable that was significant for postnatal care use. Watching TV has significantly positive for both antenatal care use and use of SBA during birth but listening radio did not have significant impact on the likelihood of ANC visit, use of care from SBAs.

The use of maternal care has no significant relationship with the income level in this study. So the result is not consistent with other studies.

a) Limitation of the Study

This study hascollected data from women of age 15 to 49 who have given birth within 2.5 years prior to the survey or were pregnant at that time. As the information was collected in regard to births 2.5 years preceding the survey, the accuracy of information relies on the ability of the respondent to recall. Therefore, there remains a chance of recall bias.

The household survey data have been collected from the female members of the households, those have less decision making power in family matters including seeking health care from different sources. Moreover, they have less knowledge about the income and expenditure of the family, as the majority (96%) of them is housewives. This was not anticipated during the design of the study. So future studies should include a considerable number of male members in order to get more precise information on those aspects.

Adequate sample size cannot be taken under consideration due to time constraints. Finally, this study focuses on a village only; therefore, its findings and are difficult to generalize in the country as a whole.

VIII. Conclusions and Policy Recommendations

Considering and analyzing findings of the study, it has been observed that the overall utilization of maternal care in the study area was at low level, especially delivery care from skilled attendants, postnatal care from qualified providers was low. The utilization of antenatal care and postnatal care from unqualified provider is very low; many of them did not seek care at all. The study has identified a number of important factors that affect the utilization of maternal care. The findings indicate that formal education, number of living children, access to mass media, knowledge about nearest health facilities and the perception of the quality of the services provided, women's decision making power in a family are important correlates in using maternal care services from medical qualified providers. However, the effect of income on the use of maternal care is not significant. So economic factors themselves do not contribute much in bringing better health outcome in this case.

The evidence from this study suggests that public health policies aimed atreducing maternal morbidities and mortalities in Bangladesh should includestrategies that will improve maternal health status through:

- Increasing maternal education at least up to secondary level in the country.
- Information, and communication on maternal care must be intensified in order to reach the rural mothers. Informal adult education for women and men can be employed as an immediate intervention to provide basic education and to increase awareness about basic maternity care.
- Campaigns against social norms that are harmful to women's health such asearly marriage and high parity etc. The campaign for health awareness as a proxy of education may increase the demand for health services.
- Education programs to women of traditionalist beliefs on theimportance of MHCS utilization. These programs can be routed through religious and traditional/community leaders.
- The health personnel need to be trained about maternal health services and should take part in educating their target populations on the importance of seeking maternal health care services on time from nearest health facilities.
- In a long run, women empowerment through informaleducation and income generating activities by informal education and vocational training for those groups of women may serve as an immediate strategy which will ultimately result in women's decision making power in the family as well as the use of maternal care.
- Involvement of husbands and mother-in-laws during information, education and communication are important to improve the use of ANC, SBAs at delivery, postnatal care.
- As unwanted pregnancies have a negative impact on the likelihood of using maternal care, so awareness about use of appropriate family planning method should be raised to avoid unwanted pregnancies.

Further studies are required to be carried out in this issue involving different areas which will clearly show the effect of variation on the use of maternal care.

Competing Interest

The authors declare that they have no competing interests.

References Références Referencias

1. Hossen, A., Westhues, A. (2011). "Rural women's access to health care in Bangladesh: Swimming against the tide?"Social Work in Public Health, 26:278-293.
2. Gill, Z., Ahmed, J.U. (2004). "Experience from Bangladesh: implementing emergency obstetric care as part of the reproductive health agenda".International Journal of Gynecology and Obstetrics; 85: 213-220.
3. Bashar A. S. M.(2012). "Determinants of the use of skilled birth attendants at delivery by pregnant women in Bangladesh".
4. Chakraborty, N., Islam, A., Chowdhury, R.I., Bari, W., Ahkter, H.H. (2003). "Determinants of the use of maternal health services in rural Bangladesh."Health Promotion International. Vol. 18. No. 4.
5. Jahan, N.A, Howlader, S.R., Sultana, N., Ishaq, F., Sikder, M. Z.H., Rahman, T. (2015). "Health Care Seeking Behavior of Slum-Dwellers in Dhaka City: Results of a Household Survey". Report prepared for Health Economics Unit (HEU) of MoHFW and World Health Organization (WHO).
6. Rahman, S.A. 'Utilization of Primary Health Care Services in Rural Bangladesh: The Population and Provider Perspectives.' (2001), London School of Hygiene and Tropical Medicine.
7. Shahjahan,M., Chowdhury, H.A.,Afroz, A., Rahman, M. (2012). "Factors associated with use of antenatal care services in a rural area of Bangladesh"South East Asia Journal of Public Health 2(2): 61-66, ISSN: 2220-9476.
8. Lidoroh, S.A. (2013). "Factors Associated With Utilization of Maternal Health Care Services in Western Province, Kenya."
9. Thind, A., Mohani, A., Banerjee, K., Hagigi, F. (2008). "Where to deliver? Analysis of choice of delivery location from a national survey in India". Bio Med Central Public Health.; 8(29): 10.1186/1471-2458-8-29.
10. Babalola, S.O. (2014). 'Factors associated with use of maternalhealth services in Haiti: a multilevel analysis.' Pan American Journal of Public Health. 36(1): 1–9.
11. Koblinsky, M., Anwar, I., Mridha, M.K., Chowdhury, M.E., Botlero, R. (2008). "Reducing maternal mortality and improving maternal health: Bangladesh and MDG 5". J Health Popul Nutr; 26: 280-94.
12. Nasreen, H.E., Ahmed, S.M., Begum, H.A., Afsan,a K. (2007). "Maternal, neonatal and child health program in Bangladesh-review of good practices and lessons learned. "Dhaka, Bangladesh: Research and evaluation division, Bangladesh Rural Advancement Committee.
13. Hogan MC, Foreman KJ, Naghavi M, Ahn SY, Wang M, Makela SM.(2010)."Maternal mortality for 181 countries, 1980-2008: a systematic analysis of progress towards Millennium Development Goal 5. Lancet." 375: 1609-23.
14. Rahman M, Islam R, Rahman M. (2010). "Antenatal care seeking behaviour among slum mothers. A Study of Rajshahi City Corporation, Bangladesh". SQU Med J; 10: 50-6.
15. Aktar, S. (2012). "Health care seeking behavior for safe motherhood: findings from Rural Bangladesh." Bangladesh e J Sociol 9, no. 2 57-70.
16. Bangladesh Bureau of Statistics (BBS). Report of Sample Vital Registration System (SVRS), Dhaka: Planning Division,Ministry of Planning, Government of the People's Republic of Bangladesh; 2011.
17. Haque, N. (2009). "Individual's characteristics affecting maternalhealth services utilization: married adolescentsandtheir use of maternal health services in Bangladesh." The Internet Journal of Health 8, no. 2.
18. Das, A.C. (2015). "Maternal health care services receiving trends in Bangladesh". European Academic Research. Vol. III.
19. Mishra, V., Retherford, R.D. (2008). The effect of antenatalcare on professional assistance at deliveryin rural India. Popul Res Policy Rev.; 27(3): 307–20.
20. Bangladesh Demographic and Health Survey (2014). Key Indicators. NIPORT.
21. Andersen, R.M.(1995). Revisiting the Behavioral model and access to medical care: Does it matter?" Journal of Health and Social Behavior, 36: 1-10.
22. Ahmed, S (2005). Exploring health-seeking behaviour of disadvantaged population in rural Bangladesh PhD dissertation, Karolinska University, Stockholm, Sweden.
23. Maternal Mortality Ratio:World Bank, 2015.
24. United Nations Children's Fund (UNICEF), New York, (2013). "Innovative Approaches to Maternal and Newborn Health: Compendium of Case Studies".
25. National Institute of Population Research and Training. Bangladesh maternal health service and mortality survey. Dhaka: National Institute of Population Research and Training, 2015
26. Ahmed S and Khan MM (2011). A maternal health voucher scheme: what have we learned from the demand side financing scheme in Bangladesh? Health Policy Plann26(1): 25-32.

27. BDHS (2007). Bangladesh demographic and health survey 2007. National Institute of Population Research andTraining. Mitra and Associates and Macro International.

Global Journals Inc. (US) Guidelines Handbook 2017

www.GlobalJournals.org

FELLOWS

FELLOW OF ASSOCIATION OF RESEARCH SOCIETY IN MEDICAL (FARSM)

Global Journals Incorporate (USA) is accredited by Open Association of Research Society (OARS), U.S.A and in turn, awards "FARSM" title to individuals.The 'FARSM' title is accorded to a selected professional after the approval of the Editor-in-Chief/Editorial Board Members/Dean.

- The "FARSM" is a dignified title which is accorded to a person's name viz. Dr. John E. Hall,Ph.D., FARSS or William Walldroff, M.S., FARSM.

FARSM accrediting is an honor. It authenticates your research activities. After recognition as FARSM, you can add 'FARSM' title with your name as you use this recognition as additional suffix to your status. This will definitely enhance and add more value and repute to your name. You may use it on your professional Counseling Materials such as CV, Resume, and Visiting Card etc.

The following benefits can be availed by you only for next three years from the date of certification:

FARSM designated members are entitled to avail a 40% discount while publishing their research papers (of a single author) with Global Journals Incorporation (USA), if the same is accepted by Editorial Board/Peer Reviewers. If you are a main author or co-author in case of multiple authors, you will be entitled to avail discount of 10%.

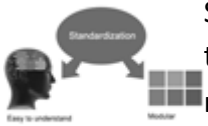
Once FARSM title is accorded, the Fellow is authorized to organize a symposium/seminar/conference on behalf of Global Journal Incorporation (USA). The Fellow can also participate in conference/seminar/symposium organized by another institution as representative of Global Journal. In both the cases, it is mandatory for him to discuss with us and obtain our consent.

You may join as member of the Editorial Board of Global Journals Incorporation (USA) after successful completion of three years as Fellow and as Peer Reviewer. In addition, it is also desirable that you should organize seminar/symposium/conference at least once.

We shall provide you intimation regarding launching of e-version of journal of your stream time to time.This may be utilized in your library for the enrichment of knowledge of your students as well as it can also be helpful for the concerned faculty members.

The FARSM can go through standards of OARS. You can also play vital role if you have any suggestions so that proper amendment can take place to improve the same for the benefit of entire research community.

As FARSM, you will be given a renowned, secure and free professional email addres with 100 GB of space e.g. johnhall@globaljournals.org. This will include Webmail, Spam Assassin, Email Forwarders,Auto-Responders, Email Delivery Route tracing, etc.



The FARSM will be eligible for a free application of standardization of their researches. Standardization of research will be subject to acceptability within stipulated norms as the next step after publishing in a journal. We shall depute a team of specialized research professionals who will render their services for elevating your researches to next higher level, which is worldwide open standardization.

The FARSM member can apply for grading and certification of standards of their educational and Institutional Degrees to Open Association of Research, Society U.S.A. Once you are designated as FARSM, you may send us a scanned copy of all of you credentials. OARS will verify, grade and certify them. This will be based on your academic records, quality of research papers published by you, and some more criteria. After certification of all your credentials by OARS, they will be published on your Fellow Profile link on website https://associationofresearch.org which will be helpful to upgrade the dignity.

The FARSM members can avail the benefits of free research podcasting in Global Research Radio with their research documents. After publishing the work, (including published elsewhere worldwide with proper authorization) you can upload your research paper with your recorded voice or you can utilize chargeable services of our professional RJs to record your paper in their voice on request.

The FARSM member also entitled to get the benefits of free research podcasting of their research documents through video clips. We can also streamline your conference videos and display your slides/ online slides and online research video clips at reasonable charges, on request.

The FARSM is eligible to earn from sales proceeds of his/her researches/reference/review Books or literature, while publishing with Global Journals. The FARSS can decide whether he/she would like to publish his/her research in a closed manner. In this case, whenever readers purchase that individual research paper for reading, maximum 60% of its profit earned as royalty by Global Journals, will be credited to his/her bank account. The entire entitled amount will be credited to his/her bank account exceeding limit of minimum fixed balance. There is no minimum time limit for collection. The FARSM member can decide its price and we can help in making the right decision.

The FARSM member is eligible to join as a paid peer reviewer at Global Journals Incorporation (USA) and can get remuneration of 15% of author fees, taken from the author of a respective paper. After reviewing 5 or more papers you can request to transfer the amount to your bank account.

MEMBER OF ASSOCIATION OF RESEARCH SOCIETY IN MEDICAL (MARSM)

The ' MARSM ' title is accorded to a selected professional after the approval of the Editor-in-Chief / Editorial Board Members/Dean.

The "MARSM" is a dignified ornament which is accorded to a person's name viz. Dr. John E. Hall, Ph.D., MARSM or William Walldroff, M.S., MARSM.

MARSM accrediting is an honor. It authenticates your research activities. Afterbecoming MARSM,you can add 'MARSM' title with your name as you use this recognition as additional suffix to your status. This will definitely enhance and add more value and repute to your name. You may use it on your professional Counseling Materials such as CV, Resume, Visiting Card and Name Plate etc.

The following benefitscan be availed by you only for next three years from the date of certification.

MARSM designated members are entitled to avail a 25% discount while publishing their research papers (of a single author) in Global Journals Inc., if the same is accepted by our Editorial Board and Peer Reviewers. If you are a main author or co-author of a group of authors, you will get discount of 10%.

As MARSM, you willbe given a renowned, secure and free professional email address with 30 GB of space e.g. johnhall@globaljournals.org. This will include Webmail, Spam Assassin, Email Forwarders,Auto-Responders, Email Delivery Route tracing, etc.

We shall provide you intimation regarding launching of e-version of journal of your stream time to time.This may be utilized in your library for the enrichment of knowledge of your students as well as it can also be helpful for the concerned faculty members.

The MARSM member can apply for approval, grading and certification of standards of their educational and Institutional Degrees to Open Association of Research, Society U.S.A.

Once you are designated as MARSM, you may send us a scanned copy of all of your credentials. OARS will verify, grade and certify them. This will be based on your academic records, quality of research papers published by you, and some more criteria.

It is mandatory to read all terms and conditions carefully.

AUXILIARY MEMBERSHIPS

Institutional Fellow of Open Association of Research Society (USA) - OARS (USA)

Global Journals Incorporation (USA) is accredited by Open Association of Research Society, U.S.A (OARS) and in turn, affiliates research institutions as "Institutional Fellow of Open Association of Research Society" (IFOARS).

The "FARSC" is a dignified title which is accorded to a person's name viz. Dr. John E. Hall, Ph.D., FARSC or William Walldroff, M.S., FARSC.

The IFOARS institution is entitled to form a Board comprised of one Chairperson and three to five board members preferably from different streams. The Board will be recognized as "Institutional Board of Open Association of Research Society"-(IBOARS).

The Institute will be entitled to following benefits:

The IBOARS can initially review research papers of their institute and recommend them to publish with respective journal of Global Journals. It can also review the papers of other institutions after obtaining our consent. The second review will be done by peer reviewer of Global Journals Incorporation (USA) The Board is at liberty to appoint a peer reviewer with the approval of chairperson after consulting us.

The author fees of such paper may be waived off up to 40%.

The Global Journals Incorporation (USA) at its discretion can also refer double blind peer reviewed paper at their end to the board for the verification and to get recommendation for final stage of acceptance of publication.

The IBOARS can organize symposium/seminar/conference in their country on behalf of Global Journals Incorporation (USA)-OARS (USA). The terms and conditions can be discussed separately.

The Board can also play vital role by exploring and giving valuable suggestions regarding the Standards of "Open Association of Research Society, U.S.A (OARS)" so that proper amendment can take place for the benefit of entire research community. We shall provide details of particular standard only on receipt of request from the Board.

The board members can also join us as Individual Fellow with 40% discount on total fees applicable to Individual Fellow. They will be entitled to avail all the benefits as declared. Please visit Individual Fellow-sub menu of GlobalJournals.org to have more relevant details.

We shall provide you intimation regarding launching of e-version of journal of your stream time to time. This may be utilized in your library for the enrichment of knowledge of your students as well as it can also be helpful for the concerned faculty members.

After nomination of your institution as "Institutional Fellow" and constantly functioning successfully for one year, we can consider giving recognition to your institute to function as Regional/Zonal office on our behalf.
The board can also take up the additional allied activities for betterment after our consultation.

The following entitlements are applicable to individual Fellows:

Open Association of Research Society, U.S.A (OARS) By-laws states that an individual Fellow may use the designations as applicable, or the corresponding initials. The Credentials of individual Fellow and Associate designations signify that the individual has gained knowledge of the fundamental concepts. One is magnanimous and proficient in an expertise course covering the professional code of conduct, and follows recognized standards of practice.

Open Association of Research Society (US)/ Global Journals Incorporation (USA), as described in Corporate Statements, are educational, research publishing and professional membership organizations. Achieving our individual Fellow or Associate status is based mainly on meeting stated educational research requirements.

Disbursement of 40% Royalty earned through Global Journals : Researcher = 50%, Peer Reviewer = 37.50%, Institution = 12.50% E.g. Out of 40%, the 20% benefit should be passed on to researcher, 15 % benefit towards remuneration should be given to a reviewer and remaining 5% is to be retained by the institution.

We shall provide print version of 12 issues of any three journals [as per your requirement] out of our 38 journals worth $ 2376 USD.

Other:

The individual Fellow and Associate designations accredited by Open Association of Research Society (US) credentials signify guarantees following achievements:

- The professional accredited with Fellow honor, is entitled to various benefits viz. name, fame, honor, regular flow of income, secured bright future, social status etc.

- In addition to above, if one is single author, then entitled to 40% discount on publishing research paper and can get 10%discount if one is co-author or main author among group of authors.
- The Fellow can organize symposium/seminar/conference on behalf of Global Journals Incorporation (USA) and he/she can also attend the same organized by other institutes on behalf of Global Journals.
- The Fellow can become member of Editorial Board Member after completing 3yrs.
- The Fellow can earn 60% of sales proceeds from the sale of reference/review books/literature/publishing of research paper.
- Fellow can also join as paid peer reviewer and earn 15% remuneration of author charges and can also get an opportunity to join as member of the Editorial Board of Global Journals Incorporation (USA)
- • This individual has learned the basic methods of applying those concepts and techniques to common challenging situations. This individual has further demonstrated an in–depth understanding of the application of suitable techniques to a particular area of research practice.

Note :

"

- In future, if the board feels the necessity to change any board member, the same can be done with the consent of the chairperson along with anyone board member without our approval.
- In case, the chairperson needs to be replaced then consent of 2/3rd board members are required and they are also required to jointly pass the resolution copy of which should be sent to us. In such case, it will be compulsory to obtain our approval before replacement.
- In case of "Difference of Opinion [if any]" among the Board members, our decision will be final and binding to everyone.

"

Process of submission of Research Paper

The Area or field of specialization may or may not be of any category as mentioned in 'Scope of Journal' menu of the GlobalJournals.org website. There are 37 Research Journal categorized with Six parental Journals GJCST, GJMR, GJRE, GJMBR, GJSFR, GJHSS. For Authors should prefer the mentioned categories. There are three widely used systems UDC, DDC and LCC. The details are available as 'Knowledge Abstract' at Home page. The major advantage of this coding is that, the research work will be exposed to and shared with all over the world as we are being abstracted and indexed worldwide.

The paper should be in proper format. The format can be downloaded from first page of 'Author Guideline' Menu. The Author is expected to follow the general rules as mentioned in this menu. The paper should be written in MS-Word Format (*.DOC,*.DOCX).

The Author can submit the paper either online or offline. The authors should prefer online submission.Online Submission: There are three ways to submit your paper:

(A) (I) First, register yourself using top right corner of Home page then Login. If you are already registered, then login using your username and password.

(II) Choose corresponding Journal.

(III) Click 'Submit Manuscript'. Fill required information and Upload the paper.

(B) If you are using Internet Explorer, then Direct Submission through Homepage is also available.

(C) If these two are not conveninet , and then email the paper directly to dean@globaljournals.org.

Offline Submission: Author can send the typed form of paper by Post. However, online submission should be preferred.

Preferred Author Guidelines

MANUSCRIPT STYLE INSTRUCTION (Must be strictly followed)

Page Size: 8.27" X 11'"

- Left Margin: 0.65
- Right Margin: 0.65
- Top Margin: 0.75
- Bottom Margin: 0.75
- Font type of all text should be Swis 721 Lt BT.
- Paper Title should be of Font Size 24 with one Column section.
- Author Name in Font Size of 11 with one column as of Title.
- Abstract Font size of 9 Bold, "Abstract" word in Italic Bold.
- Main Text: Font size 10 with justified two columns section
- Two Column with Equal Column with of 3.38 and Gaping of .2
- First Character must be three lines Drop capped.
- Paragraph before Spacing of 1 pt and After of 0 pt.
- Line Spacing of 1 pt
- Large Images must be in One Column
- Numbering of First Main Headings (Heading 1) must be in Roman Letters, Capital Letter, and Font Size of 10.
- Numbering of Second Main Headings (Heading 2) must be in Alphabets, Italic, and Font Size of 10.

You can use your own standard format also.
Author Guidelines:

1. General,

2. Ethical Guidelines,

3. Submission of Manuscripts,

4. Manuscript's Category,

5. Structure and Format of Manuscript,

6. After Acceptance.

1. GENERAL

Before submitting your research paper, one is advised to go through the details as mentioned in following heads. It will be beneficial, while peer reviewer justify your paper for publication.

Scope

The Global Journals Inc. (US) welcome the submission of original paper, review paper, survey article relevant to the all the streams of Philosophy and knowledge. The Global Journals Inc. (US) is parental platform for Global Journal of Computer Science and Technology, Researches in Engineering, Medical Research, Science Frontier Research, Human Social Science, Management, and Business organization. The choice of specific field can be done otherwise as following in Abstracting and Indexing Page on this Website. As the all Global

Journals Inc. (US) are being abstracted and indexed (in process) by most of the reputed organizations. Topics of only narrow interest will not be accepted unless they have wider potential or consequences.

2. ETHICAL GUIDELINES

Authors should follow the ethical guidelines as mentioned below for publication of research paper and research activities.

Papers are accepted on strict understanding that the material in whole or in part has not been, nor is being, considered for publication elsewhere. If the paper once accepted by Global Journals Inc. (US) and Editorial Board, will become the copyright of the Global Journals Inc. (US).

Authorship: The authors and coauthors should have active contribution to conception design, analysis and interpretation of findings. They should critically review the contents and drafting of the paper. All should approve the final version of the paper before submission

The Global Journals Inc. (US) follows the definition of authorship set up by the Global Academy of Research and Development. According to the Global Academy of R&D authorship, criteria must be based on:

1) Substantial contributions to conception and acquisition of data, analysis and interpretation of the findings.

2) Drafting the paper and revising it critically regarding important academic content.

3) Final approval of the version of the paper to be published.

All authors should have been credited according to their appropriate contribution in research activity and preparing paper. Contributors who do not match the criteria as authors may be mentioned under Acknowledgement.

Acknowledgements: Contributors to the research other than authors credited should be mentioned under acknowledgement. The specifications of the source of funding for the research if appropriate can be included. Suppliers of resources may be mentioned along with address.

Appeal of Decision: The Editorial Board's decision on publication of the paper is final and cannot be appealed elsewhere.

Permissions: It is the author's responsibility to have prior permission if all or parts of earlier published illustrations are used in this paper.

Please mention proper reference and appropriate acknowledgements wherever expected.

If all or parts of previously published illustrations are used, permission must be taken from the copyright holder concerned. It is the author's responsibility to take these in writing.

Approval for reproduction/modification of any information (including figures and tables) published elsewhere must be obtained by the authors/copyright holders before submission of the manuscript. Contributors (Authors) are responsible for any copyright fee involved.

3. SUBMISSION OF MANUSCRIPTS

Manuscripts should be uploaded via this online submission page. The online submission is most efficient method for submission of papers, as it enables rapid distribution of manuscripts and consequently speeds up the review procedure. It also enables authors to know the status of their own manuscripts by emailing us. Complete instructions for submitting a paper is available below.

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.

Structure

All manuscripts submitted to Global Journals Inc. (US), ought to include:

Title: The title page must carry an instructive title that reflects the content, a running title (less than 45 characters together with spaces), names of the authors and co-authors, and the place(s) wherever the work was carried out. The full postal address in addition with the e-mail address of related author must be given. Up to eleven keywords or very brief phrases have to be given to help data retrieval, mining and indexing.

Abstract, used in Original Papers and Reviews:

Optimizing Abstract for Search Engines

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.

The Editorial Board and Global Journals Inc. (US) recommend that, citation of online-published papers and other material should be done via a DOI (digital object identifier). If an author cites anything, which does not have a DOI, they run the risk of the cited material not being noticeable.

The Editorial Board and Global Journals Inc. (US) recommend the use of a tool such as Reference Manager for reference management and formatting.

Tables, Figures and Figure Legends

Tables: Tables should be few in number, cautiously designed, uncrowned, and include only essential data. Each must have an Arabic number, e.g. Table 4, a self-explanatory caption and be on a separate sheet. Vertical lines should not be used.

Figures: Figures are supposed to be submitted as separate files. Always take in a citation in the text for each figure using Arabic numbers, e.g. Fig. 4. Artwork must be submitted online in electronic form by e-mailing them.

Preparation of Electronic Figures for Publication

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

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.

Color Charges: It is the rule of the Global Journals Inc. (US) for authors to pay the full cost for the reproduction of their color artwork. Hence, please note that, if there is color artwork in your manuscript when it is accepted for publication, we would require you to complete and return a color work agreement form before your paper can be published.

Figure Legends: Self-explanatory legends of all figures should be incorporated separately under the heading 'Legends to Figures'. In the full-text online edition of the journal, figure legends may possibly be truncated in abbreviated links to the full screen version. Therefore, the first 100 characters of any legend should notify the reader, about the key aspects of the figure.

6. AFTER ACCEPTANCE

Upon approval of a paper for publication, the manuscript will be forwarded to the dean, who is responsible for the publication of the Global Journals Inc. (US).

6.1 Proof Corrections

The corresponding author will receive an e-mail alert containing a link to a website or will be attached. A working e-mail address must therefore be provided for the related author.

Acrobat Reader will be required in order to read this file. This software can be downloaded

(Free of charge) from the following website:

www.adobe.com/products/acrobat/readstep2.html. This will facilitate the file to be opened, read on screen, and printed out in order for any corrections to be added. Further instructions will be sent with the proof.

Proofs must be returned to the dean at dean@globaljournals.org within three days of receipt.

As changes to proofs are costly, we inquire that you only correct typesetting errors. All illustrations are retained by the publisher. Please note that the authors are responsible for all statements made in their work, including changes made by the copy editor.

6.2 Early View of Global Journals Inc. (US) (Publication Prior to Print)

The Global Journals Inc. (US) are enclosed by our publishing's Early View service. Early View articles are complete full-text articles sent in advance of their publication. Early View articles are absolute and final. They have been completely reviewed, revised and edited for publication, and the authors' final corrections have been incorporated. Because they are in final form, no changes can be made after sending them. The nature of Early View articles means that they do not yet have volume, issue or page numbers, so Early View articles cannot be cited in the conventional way.

6.3 Author Services

Online production tracking is available for your article through Author Services. Author Services enables authors to track their article - once it has been accepted - through the production process to publication online and in print. Authors can check the status of their articles online and choose to receive automated e-mails at key stages of production. The authors will receive an e-mail with a unique link that enables them to register and have their article automatically added to the system. Please ensure that a complete e-mail address is provided when submitting the manuscript.

6.4 Author Material Archive Policy

Please note that if not specifically requested, publisher will dispose off hardcopy & electronic information submitted, after the two months of publication. If you require the return of any information submitted, please inform the Editorial Board or dean as soon as possible.

6.5 Offprint and Extra Copies

A PDF offprint of the online-published article will be provided free of charge to the related author, and may be distributed according to the Publisher's terms and conditions. Additional paper offprint may be ordered by emailing us at: editor@globaljournals.org .

Before start writing a good quality Computer Science Research Paper, let us first understand what is Computer Science Research Paper? So, Computer Science Research Paper is the paper which is written by professionals or scientists who are associated to Computer Science and Information Technology, or doing research study in these areas. If you are novel to this field then you can consult about this field from your supervisor or guide.

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.

4. Make blueprints of paper: The outline is the plan or framework that will help you to arrange your thoughts. It will make your paper logical. But remember that all points of your outline must be related to the topic you have chosen.

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

6. Use of computer is recommended: As you are doing research in the field of Computer Science, then this point is quite obvious.

7. Use right software: Always use good quality software packages. If you are not capable to judge good software then you can lose quality of your paper unknowingly. There are various software programs available to help you, which you can get through Internet.

8. Use the Internet for help: An excellent start for your paper can be by using the Google. It is an excellent search engine, where you can have your doubts resolved. You may also read some answers for the frequent question how to write my research paper or find model research paper. From the internet library you can download books. If you have all required books make important reading selecting and analyzing the specified information. Then put together research paper sketch out.

9. Use and get big pictures: Always use encyclopedias, Wikipedia to get pictures so that you can go into the depth.

10. Bookmarks are useful: When you read any book or magazine, you generally use bookmarks, right! It is a good habit, which helps to not to lose your continuity. You should always use bookmarks while searching on Internet also, which will make your search easier.

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.

14. Produce good diagrams of your own: Always try to include good charts or diagrams in your paper to improve quality. Using several and unnecessary diagrams will degrade the quality of your paper by creating "hotchpotch." So always, try to make and include those diagrams, which are made by your own to improve readability and understandability of your paper.

15. Use of direct quotes: When you do research relevant to literature, history or current affairs then use of quotes become essential but if study is relevant to science then use of quotes is not preferable.

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.

19. Know what you know: Always try to know, what you know by making objectives. Else, you will be confused and cannot achieve your target.

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.

32. Never oversimplify everything: To add material in your research paper, never go for oversimplification. This will definitely irritate the evaluator. Be more or less specific. Also too, by no means, ever use rhythmic redundancies. Contractions aren't essential and shouldn't be there used. Comparisons are as terrible as clichés. Give up ampersands and abbreviations, and so on. Remove commas, that are, not necessary. Parenthetical words however should be together with this in commas. Understatement is all the time the complete best way to put onward earth-shaking thoughts. Give a detailed literary review.

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.

Informal Guidelines of Research Paper Writing

Key points to remember:

- Submit all work in its final form.
- Write your paper in the form, which is presented in the guidelines using the template.
- Please note the 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.

General style:

Specific editorial column necessities for compliance of a manuscript will always take over from directions in these general guidelines.

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

Title Page:

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.

Abstract:

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

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

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

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

Approach:

- Single section, and succinct
- As a outline of job done, it is always written in past tense
- A conceptual should situate on its own, and not submit to any other part of the paper such as a form or table
- Center on shortening results - bound background information to a verdict or two, if completely necessary
- What you account in an conceptual must be regular with what you reported in the manuscript
- Exact spelling, clearness of sentences and phrases, and appropriate reporting of quantities (proper units, important statistics) are just as significant in an abstract as they are anywhere else

Introduction:

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.
- Very for a short time explain the tentative propose and how it skilled the declared objectives.

Approach:

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

- Present surroundings information only as desirable in order hold up a situation. The reviewer does not desire to read the whole thing you know about a topic.
- Shape the theory/purpose specifically - do not take a broad view.
- As always, give awareness to spelling, simplicity and correctness of sentences and phrases.

Procedures (Methods and Materials):

This part is supposed to be the easiest to carve if you have good skills. A sound written Procedures segment allows a capable scientist to replacement your results. Present precise information about your supplies. The suppliers and clarity of reagents can be helpful bits of information. Present methods in sequential order but linked methodologies can be grouped as a segment. Be concise when relating the protocols. Attempt for the least amount of information that would permit another capable scientist to spare your outcome but be cautious that vital information is integrated. The use of subheadings is suggested and ought to be synchronized with the results section. When a technique is used that has been well described in another object, mention the specific item describing a way but draw the basic principle while stating the situation. The purpose is to text all particular resources and broad procedures, so that another person may use some or all of the methods in one more study or referee the scientific value of your work. It is not to be a step by step report of the whole thing you did, nor is a methods section a set of orders.

Materials:

- 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.

Methods:

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

Approach:

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

What to keep away from

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

Results:

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

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

Content

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

The Discussion is expected the trickiest segment to write and describe. A lot of papers submitted for journal are discarded based on problems with the Discussion. There is no head of state for how long a argument should be. Position your understanding of the outcome visibly to lead the reviewer through your conclusions, and then finish the paper with a summing up of the implication of the study. The purpose here is to offer an understanding of your results and hold up for all of your conclusions, using facts from your research and generally accepted information, if suitable. The implication of result should be visibly described. Infer your data in the conversation in suitable depth. This means that when you clarify an observable fact you must explain mechanisms that may account for the observation. If your results vary from your prospect, make clear why that may have happened. If your results agree, then explain the theory that the proof supported. It is never suitable to just state that the data approved with prospect, and let it drop at that.

- Make a decision if each premise is supported, discarded, or if you cannot make a conclusion with assurance. Do not just dismiss a study or part of a study as "uncertain."
- Research papers are not acknowledged if the work is imperfect. Draw what conclusions you can based upon the results that you have, and take care of the study as a finished work
- You may propose future guidelines, such as how the experiment might be personalized to accomplish a new idea.
- Give details all of your remarks as much as possible, focus on mechanisms.
- Make a decision if the tentative design sufficiently addressed the theory, and whether or not it was correctly restricted.
- Try to present substitute explanations if sensible alternatives be present.
- One research will not counter an overall question, so maintain the large picture in mind, where do you go next? The best studies unlock new avenues of study. What questions remain?
- Recommendations for detailed papers will offer supplementary suggestions.

Approach:

- When you refer to information, differentiate data generated by your own studies from available information
- Submit to work done by specific persons (including you) in past tense.
- Submit to generally acknowledged facts and main beliefs in present tense.

Please carefully note down following rules and regulation before submitting your Research Paper to Global Journals Inc. (US):

Segment Draft and Final Research Paper: You have to strictly follow the template of research paper. If it is not done your paper may get rejected.

- The **major constraint** is that you must independently make all content, tables, graphs, and facts that are offered in the paper. You must write each part of the paper wholly on your own. The Peer-reviewers need to identify your own perceptive of the concepts in your own terms. NEVER extract straight from any foundation, and never rephrase someone else's analysis.

- Do not give permission to anyone else to "PROOFREAD" your manuscript.

- Methods to avoid Plagiarism is applied by us on every paper, if found guilty, you will be blacklisted by all of our collaborated research groups, your institution will be informed for this and strict legal actions will be taken immediately.)
- To guard yourself and others from possible illegal use please do not permit anyone right to use to your paper and files.

Criterion for Grading a Research Paper (Compilation) by Global Journals Inc. (US)

Please note that following table is only a Grading of "Paper Compilation" and not on "Performed/Stated Research" whose grading solely depends on Individual Assigned Peer Reviewer and Editorial Board Member. These can be available only on request and after decision of Paper. This report will be the property of Global Journals Inc. (US).

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

INDEX

save our planet

Global Journal of Medical Research

Visit us on the Web at www.GlobalJournals.org | www.MedicalResearchJournal.org
or email us at helpdesk@globaljournals.org

ISSN 9755896