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Diseases

Cancer, Ophthalmology & Pediatric

MSEIRS Model for Pediatrics

Clinical Profile of Dengue Fever

Highlights

Respiratory Infection Assessment

Provision and Management of HHS

Discovering Thoughts, Inventing Future

VOLUME 18 ISSUE 1 VERSION 1.0

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Discuss the Pathogenesis, Presentation and Management of HHS

By Ismat Abdelrhman Alborhan
Cardiff University

Introduction- Hyperosmolar hyperglycaemic state (HHS) classically happens in type 2 diabetes formerly recognised as hyperosmolar non-ketotic (HONK) state. The level of blood glucose can be greater than that is DKA (>50 mmol/litre) however there is no ketone in urine. It is accompanying with severe dehydration and patients necessitate importunate, directed fluid resuscitation, correction of electrolyte disturbances and insulin. The characteristic features of HHS a syndrome are severe hyperglycaemia, hyper osmolality and excessive water loss in the non-appearance of ketoacidosis. Occurrence of HHS among diabetic patients is approximately less than 1%. Higher percentage of cases occur in elder type 2 diabetic patients still, young adult and children are also prone to develop HHS. The mortality rate approximately 20% which is around 10 times DKA mortality rate. The dehydration severity, existence of comorbidities and old age determined the prognosis of HHS. The management of HHS is focussed on correction of volume deficit, hyper osmolality, hyperglycaemia, and electrolyte abnormalities in addition to treating the underlying causes which trigger the metabolic decompensation. Although regime of intravenous low dose insulin meant for mange DKA seem to be effectual, the better therapy approaches for the treatment of HHS have not established by any prospective randomized studies.

GJMR-F Classification: NLMC Code: QZ 40

Discuss the Pathogenesis, Presentation and Management of HHS

Ismat Abdelrhman Alborhan

I. Introduction

Hyperosmolar hyperglycaemic state (HHS) classically happens in type 2 diabetes formerly recognised as hyperosmolar non-ketotic (HONK) state. The level of blood glucose can be greater than that is DKA (>50 mmol/litre) however there is no ketone in urine. It is accompanying with severe dehydration and patients necessitate importunate, directed fluid resuscitation, correction of electrolyte disturbances and insulin.1 The characteristic features of HHS a syndrome are severe hyperglycaemia, hyper osmolality and excessive water loss in the non-appearance of ketoacidosis. Occurrence of HHS among diabetic patients is approximately less than 1%.2 Higher percentage of cases occur in elder type 2 diabetic patients still, young adult and children are also prone to develop HHS.3 The mortality rate approximately 20% which is around 10 times DKA mortality rate.45 The dehydration severity, existence of comorbidities and old age determined the prognosis of HHS.67 The management of HHS is focussed on correction of volume deficit, hyper osmolality, hyperglycaemia, and electrolyte abnormalities in addition to treating the underlying causes which trigger the metabolic decompensation. Although regime of intravenous low dose insulin meant for mange DKA seem to be effectual, the better therapy approaches for the treatment of HHS have not established by any prospective randomized studies. 8

II. Pathophysiology

The pathophysiological abnormality of HHS is determined by life-threatening raises in glucose serum levels besides hyper osmolality without noteworthy ketosis. These metabolic imbalances outcome from synergistic factors including deficient insulin and augmented levels of counter regulatory hormones such as glucagon, catecholamines, cortisol and growth hormone.910 In patient with HHS shows higher hepatic and circulating insulin and lower glucagon in comparison with DKA patients.6 11 Hyperglycaemia results in a rise in oxidative stress markers such as membrane lipid peroxidation.12 The Pathophysiology of HHS can be summarized in the following diagram 8

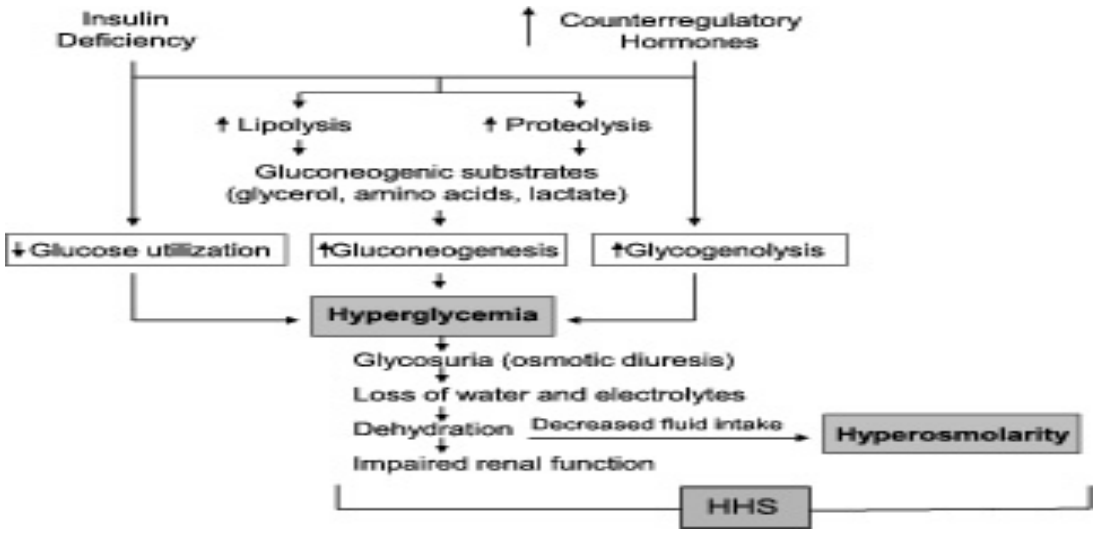

Figure 1

III. Presentation

HHS occurred typically in non-discovered diabetes between 55 – 70 years old. HHS in many patients develops over several days and weeks through patients develops over several days and weeks through which they develop polyuria, polydipsia and deterioration conscious level. HHS patients commonly presented clinically with altered sensorium.13 On physical examination of HHS there are:14

- Sign of Dehydration.
- Fever is common for underlying infection.

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- Usually absent signs of acidosis (Kussmaul respiration, acetone breath).
- Abdominal pain and vomiting is not typical feature of HHS although common in DKA.
- Focal neurological signs (hemiparesis, hemianopsia) and seizures occurred in some patients.

The standards for hyperglycaemic hyperosmolar state (HHS) consist of1516:

1.	Plasma glucose level >33.3 mmol/L.
2.	Arterial pH > 7.30; venous pH > 7.25.
3.	Serum bicarbonate >15 mmol/L.
4.	Small ketonuria, absent to small ketonemia.
5.	Effective serum osmolality >320 mOsm/kg.
6.	Altered consciousness e.g. Obtundation, combativeness, or seizures.

Classically patients with HHS may not look dehydrated due to the fact that hypertonicity leads to safeguarding of intravascular volume (producing intracellular water shifted to the extracellular compartments) and it is well demonstrated in below diagram 1718

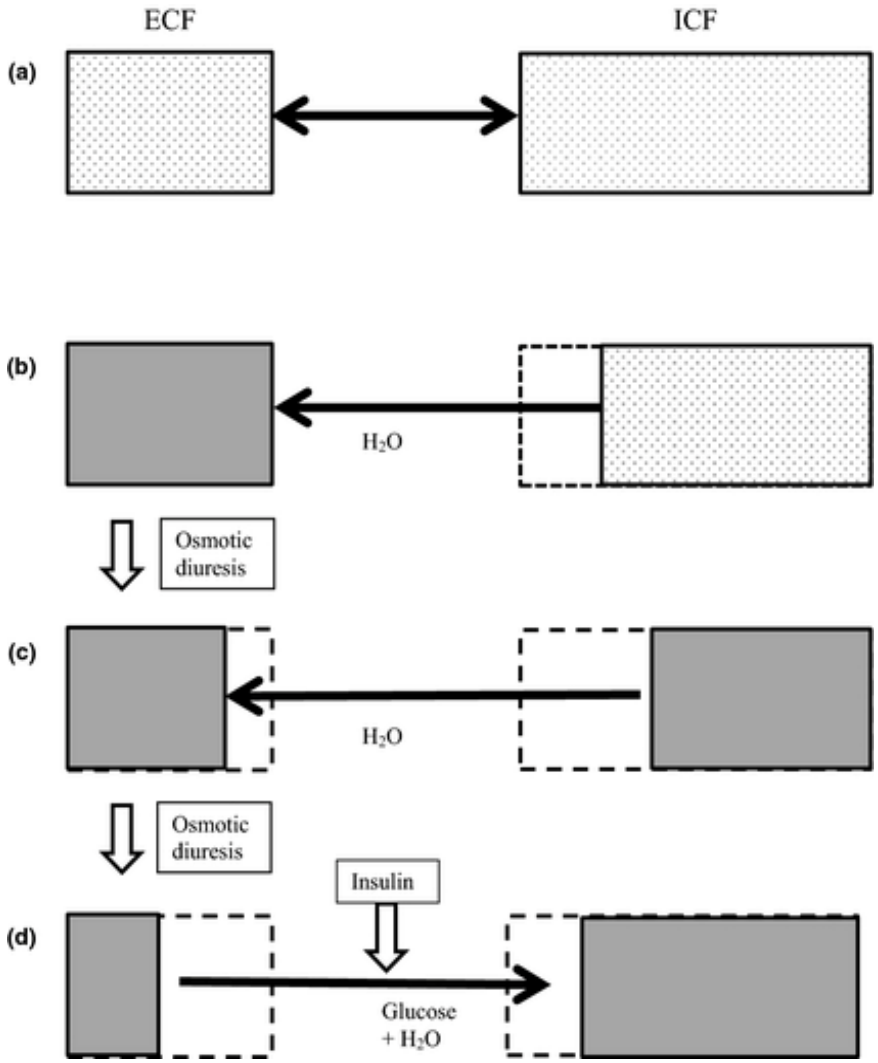

Figure 2

IV. Management

Treatment of HHS necessitates regular patient's monitoring, adjustment of hypervolemia and hyperglycaemia, electrolyte disturbances correction, and wise investigate for the triggering reason(s). The suggested algorithm recommended by the recent American Diabetes Association position statement on treatment of HHS:19

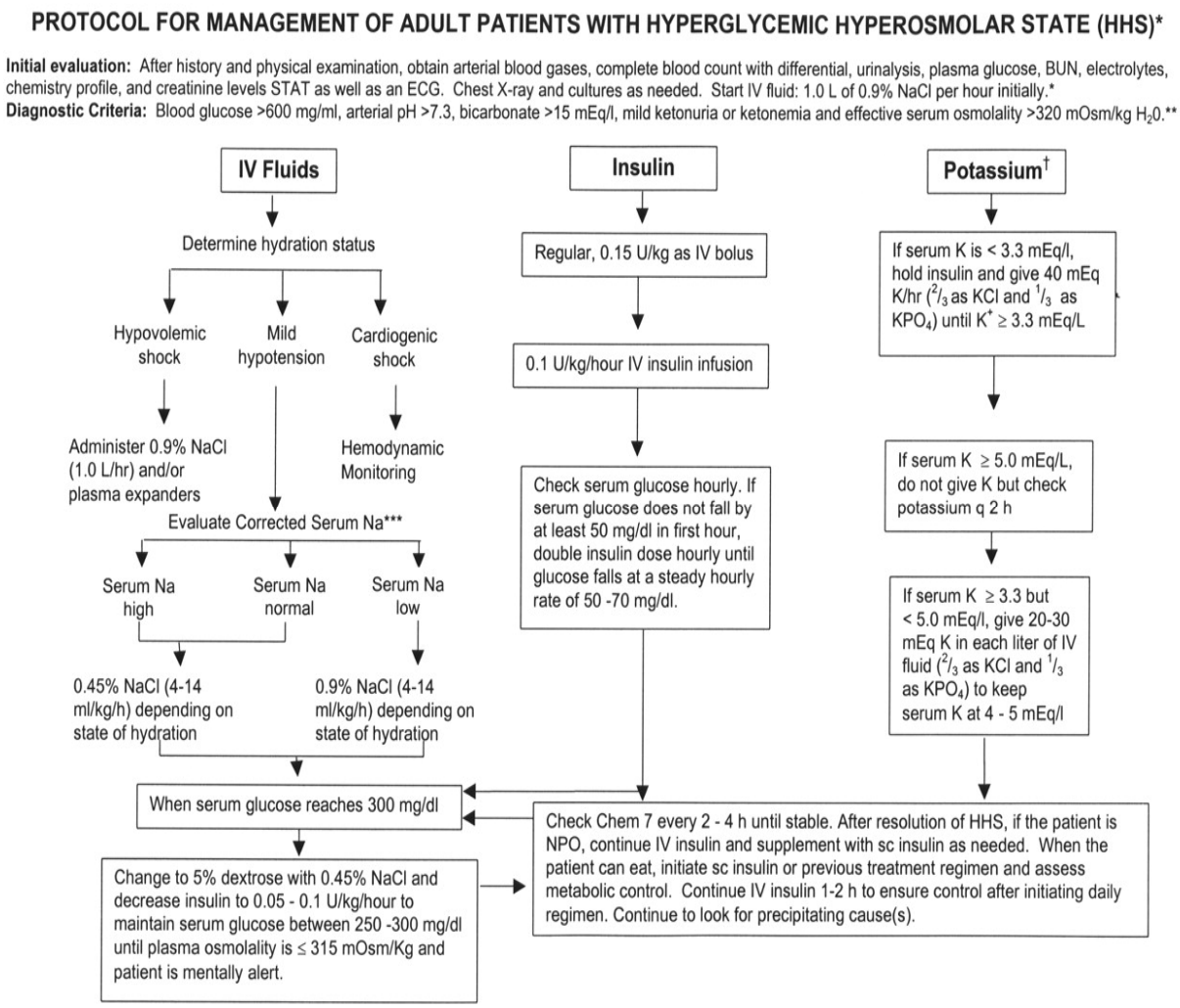

Figure 3:

a) Fluid Therapy

The water deficit in HHS patients is approximately 100 ml/kg.20 In HHS sick patients' crystalloid fluids is recommended instead than colloid fluids.21 Ringer's Lactate is not indicated in in management of HHS while 0.9% normal saline solution with potassium added as necessitated is highly recommended.2223 The aim of first fluid infusion is to increase intravascular volume and restore kidney perfusion. During the first 2-hour infusion of 500–1,000 mL/h 0.9% normal saline is generally acceptable, nevertheless in patients with hypovolemic shock, 3 to 4 liter of normal saline may be required to maintain normal blood pressure and restore tissue perfusion. According to serum sodium level and state of hydration, reduction of the rate of 0.9% sodium chloride infusion to 250 mL/h or altered to 0.45% saline (250–500 mL/h) is required. The target is to restore half of the assessed water deficit over a period of 12–24 h.16 When the plasma glucose attains 250 mg/dl in 300 mg/dl, additional infusion should include 5–10% glucose while averting hypoglycaemia. Replacement the volume of urinary losses is key part of fluid management in hyperglycaemic states. Inability to correct fluid replacement for urinary losses may defer adjustment of water and electrolytes deficit.24 Extracellular volume depletion necessitates correction, reliant upon the degree of free sodium and water deficit in any specific case as shown in below table:25

Table 1: Typical Fluid and Electrolyte Losses in HHS 12

	Typical Rates of Loss	For a 60 kg Patient	For a 100 kg Patient
Water	100-220 mL/kg	6-13 L	10-22 L
Na^+	5-13 mmol/kg	300-780 mmol	500-1300 mmol
Cl^-	5-15 mmol/kg	300-900 mmol	500-1500 mmol
K^+	4-6 mmol/kg	240-360 mmol	400-600 mmol

Treatment of hyperglycaemic hyperosmolar state (HHS) sown in below diagram: 26

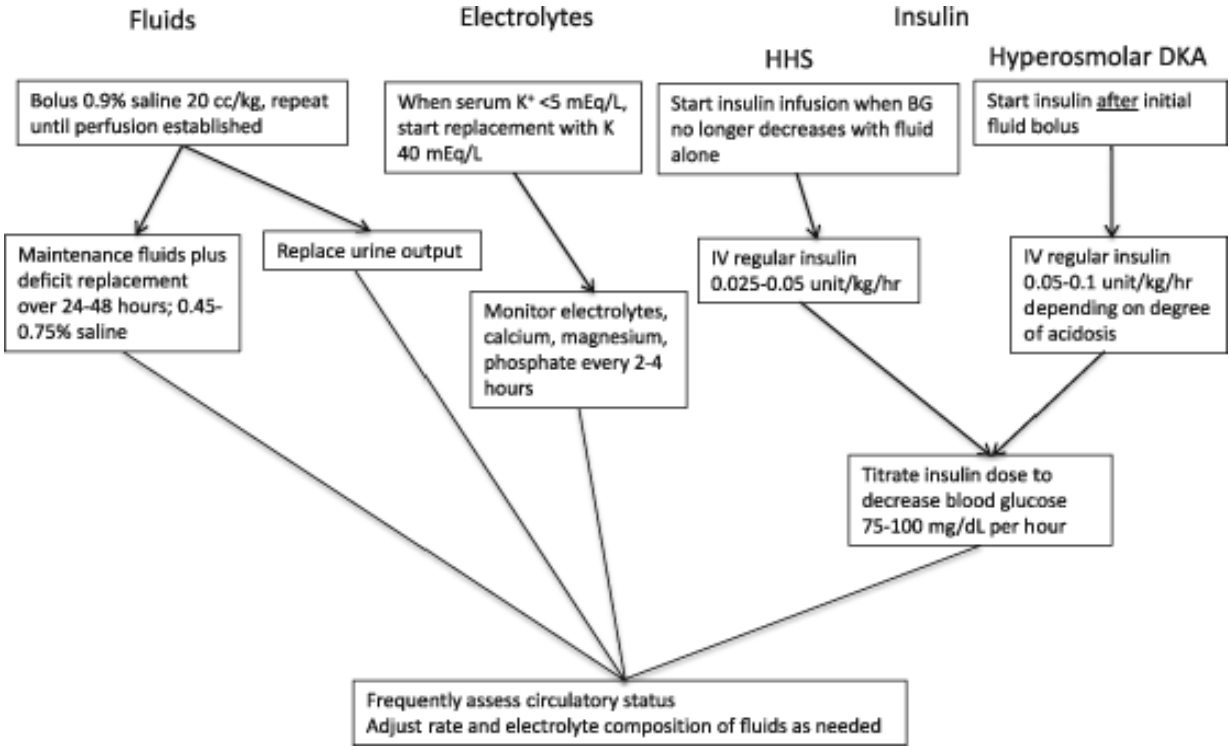

Figure 4

b) Insulin Therapy

Insulin enhances peripheral glycolysis and reduces liver gluconeogenesis, thus decreasing blood glucose levels. Moreover, insulin treatment prevents the release of FFAs from adipose tissue and reduces ketone bodies production, both of which direct to the reverse of ketogenesis. Regular continuous insulin infusion is the optimal treatment for critically sick patients. Regular insulin intravenous of 0.15 unit/kg as bolus dose should be given initially, followed by administration a continuous infusion of regular insulin at a dose of 0.1 unit/kg/h (5–10 unit/h). This regime will help reducing plasma glucose concentration at a rate of 65–125 mg/h.27

Reduction of insulin infusion rate to 0.05 unit/kg/h (3–5 units/h) is required when plasma glucose reached 300 mg/dl in HHS pulse addition of dextrose (5–10%) to the intravenous fluids. Afterwards, adjustment of insulin rate is required to sustain the above glucose values until mental obtundation and hyper osmolality are fixed. Throughout therapy, close monitoring of blood glucose, blood urea nitrogen, creatinine, magnesium, phosphorus, and venous pH are essential. The standards for resolve of HHS include progress of mental status, blood glucose <300 mg/dL, and a serum osmolality of <320 mOsm/kg. Subcutaneous insulin can be initiated whenever these standards are achieved. regular (short-acting) and intermediate-acting insulin in split dose can be started when patient tolerate oral intake.16 It is suggested that existence of more than one of the following may direct the necessity for admission to a high-dependency unit/ level 2 environment:28

➢ Osmolality >350 mOsm/kg
➢ Sodium >160 mmol/L
➢ Venous/arterial pH <7.1
➢ Low potassium (<3.5 mmol/L) or high potassium (>6 mmol/L) on admission
➢ GCS <12
➢ O2 saturation <92% on air
➢ SBP <90 mmHg
➢ Pulse >100 or <60 bpm
➢ Urine output <0.5 mL/kg/h
➢ Serum creatinine>200 μmol/L
➢ Body core temperature below 35.0 °C
➢ Macrovascular event (e.g. myocardial infarction or stroke)
➢ Other serious co-morbidity

Depletion of potassium is recognized in HHS, nevertheless less acidotic than DKA so potassium transfers are less noticeable, the insulin dose is lesser, and there is frequently co-existing kidney failure.28

Table 2: Potassium Replacement in HHS

Potassium Level in first 24h (mmol/L)	Potassium Replacement in Infusion Solution
> 5.5	Nil
3.5 – 5.5	40 mmol/L
< 3.5	Senior review as additional potassium required (via central line in High Dependency Unit)

V. Complications

- ✓ Insertion of central venous line in HHS can lead to venous thrombosis. 29
- ✓ Rhabdomyolysis can happen in children with HHS.30
- ✓ Unexplained malignant hyperthermia can occur in many children with HHS.313233
- ✓ Adults with serum osmolality more than 330 mOsm/kg commonly experience altered mental status; nevertheless, cerebral edema is rare.34

VI. Conclusion

It is highly recommended for prospective clinical trials to address many unanswered queries about the pathogenesis and management of HHS in adults and children. A chief enquiry is the reason of the absence of ketone bodies in HHS patients equated with DKA patients. Further researches are required to determine the function of oxidative and inflammatory stress markers and clinical results in patients with hyperglycaemic emergencies.35

References Références Referencias

1. Hoy C, Beecroft C. The patient with endocrine disease. Surgery (Oxford). 2016 Jun 10.
2. Fishbein HA, Palumbo PJ. Acute metabolic complications in diabetes. In Diabetes in America. National Diabetes Data Group, National Institutes of Health, 1995, p. 283–291 (NIH publ. no. 95-1468).
3. Rosenbloom AL. Hyperglycemic hyperosmolar state: an emerging pediatric problem. J Pediatr 2010; 156: 180–184.
4. Milionis HJ, Elisaf MS. Therapeutic management of hyperglycaemic hyperosmolar syndrome. Expert Opin Pharmacother 2005; 6: 1841–1849.
5. Fadini GP, de Kreutzenberg SV, Rigato M, et al.. Characteristics and outcomes of the hyperglycemic hyperosmolar non-ketotic syndrome in a cohort of 51 consecutive cases at a single center. Diabetes Res Clin Pract 2011; 94: 172–179.
6. Kitabchi AE, Umpierrez GE, Miles JM, Fisher JN. Hyperglycemic crises in adult patients with diabetes. Diabetes Care 2009; 32: 1335–1343.
7. Umpierrez GE, Kelly JP, Navarrete JE, Casals MM, Kitabchi AE. Hyperglycemic crises in urban blacks. Arch Intern Med 1997; 157: 669–675.
8. Pasquel FJ, Umpierrez GE. Hyperosmolar hyperglycemic state: a historic review of the clinical presentation, diagnosis, and treatment. Diabetes Care. 2014 Nov 1; 37(11): 3124-31.
9. Macaulay MB. Hyperosmolar non-ketotic diabetes. Postgrad Med J 1971; 47: 191–196.
10. Luzi L, Barrett EJ, Groop LC, Ferrannini E, De Fronzo RA. Metabolic effects of low-dose insulin therapy on glucose metabolism in diabetic ketoacidosis. Diabetes 1988; 37: 1470–1477.
11. Chupin M, Charbonnel B, Chupin F. C-peptide blood levels in keto-acidosis and in hyperosmolar non-ketotic diabetic coma. Acta Diabetol Lat 1981; 18: 123–128.
12. Rains JL, Jain SK. Oxidative stress, insulin signaling, and diabetes. Free Radic Biol Med 2011; 50: 567–575
13. Wachtel TJ, Tetu-Mouradjain LM, Goldman DL, Ellis SE, O'Sullivan PS: Hyperosmolality and acidosis in diabetes mellitus: a three-year experience in Rhode Island. J Gen Int Med 6: 495–502, 1991.
14. Umpierrez GE, Murphy MB, Kitabchi AE. Diabetic ketoacidosis and hyperglycemic hyperosmolar syndrome. Diabetes Spectrum. 2002 Jan 1; 15(1): 28-36.
15. Kitabchi AE, Nyenwe EA. Hyperglycemic crises in diabetes mellitus: diabetic ketoacidosis and hyperglycemic hyperosmolar state. Endocrinol Metab Clin North Am 2006: 35: 725–751.
16. Zeitler P, Haqq A, Rosenbloom A, Glaser N. Hyperglycemic hyperosmolar syndrome in children: pathophysiological considerations and suggested guidelines for treatment. J Pediatr 2011: 158: 9–14 14 e11–12.
17. Coller FA, Maddock WG. A study of dehydration in adults. Annals of Surgery 1935; 947–960.
18. Bartoli E, Bergamaco L, Castello L, Sainaghi PP. Methods for the quantitative assessment of electrolyte disturbances in hyperglycaemia. Nutr Metab Cardiovasc Dis 2009; 19: 67–74.
19. American Diabetes Association: Hyperglycemic crises in patients with diabetes mellitus (Position Statement). Diabetes Care 24: 1988–1996, 2001.
20. Ennis ED, Stahl EJVB, Kreisburg RA: The hyperosmolar hyperglycemic syndrome. Diabetes Rev 2: 115–126, 1994.

21. Perel P, Roberts J. Colloids vs crystalloids for fluid resuscitation in critically ill patients. Cochrane Database Syst Rev 2011 Mar 16; (3): CD000567.
22. Van Zyll DG, Rheeder P, Delport E. Fluid management in diabetic-acidosis-Ringer's lactate versus normal saline: a randomized controlled trial. QJM 2012; 105: 337-43.
23. National Patient Safety Agency. Patient Safety Alert: Potassium solutions: risks to patients from errors occurring during intravenous administration. London 2002.
24. Kitabchi AE, Umpierrez GE, Murphy MB, Barrett EJ, Kreisberg RA, Malone JI, Wall BM: Management of hyperglycemic crises in patients with diabetes. Diabetes Care 24: 31–53, 2001.
25. English P, Williams G. Hyperglycaemic crises and lactic acidosis in diabetes mellitus. Postgrad Med J 2004; 80: 253-61a.
26. Zeitler P, Haqq A, Rosenbloom A, Glaser N. Hyperglycemic hyperosmolar syndrome in children: pathophysiological considerations and suggested guidelines for treatment. J Pediatr 2011: 158: 9–14 14 e11–12.
27. Morris LR, Kitabchi AE: Efficacy of low-dose insulin therapy for severely obtunded patients in diabetic ketoacidosis. Diabetes Care 3: 53–56, 1980.
28. Scott AR. The management of the hyperosmolar hyperglycaemic state in adults with diabetes: a summary of a report from the Joint British Diabetes Societies for Inpatient Care. British Journal of Diabetes. 2015 Jun 8; 15(2): 89-93.
29. Gutierrez JA, Bagatell R, Samson MP, Theodorou AA, Berg RA. Femoral central venous catheter-associated deep venous thrombosis in children with diabetic ketoacidosis. Crit Care Med 2003: 31: 80–83.
30. Mannix R, Tan ML, Wright R, Baskin M. Acute pediatricrhabdomyolysis: causes and rates of renal failure. Pediatrics 2006: 118: 2119–2125.
31. Hollander AS, Olney RC, Blackett PR, Marshall BA. Fatal malignant hyperthermia-like syndrome with rhabdomyolysis complicating the presentation of diabetes mellitus in adolescent males. Pediatrics 2003: 111 (6 Pt 1): 1447–1452.
32. Kilbane BJ, Mehta S, Backeljauw PF, Shanley TP, Crimmins NA. Approach to management of malignant hyperthermia-like syndrome in pediatric diabetes mellitus. Pediatr Crit Care Med 2006: 7: 169–173.
33. Morales AE, Rosenbloom AL. Death caused by hyperglycemic hyperosmolar state at the onset of type 2 diabetes. J Pediatr2004: 144: 270–273.
34. Rosenbloom AL. Hyperglycemic hyperosmolar state: an emerging pediatric problem. J Pediatr 2010: 156: 180–184.
35. Pasquel FJ, Umpierrez GE. Hyperosmolar hyperglycemic state: a historic review of the clinical presentation, diagnosis, and treatment. Diabetes Care. 2014 Nov 1; 37(11): 3124-31.

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Clinical Profile of Dengue Fever in a Tertiary Care Hospital Hyderabad

By Lakshmi Deepa V & Rajendra Prasad Suram
Osmania Medical College

Abstract- Dengue Fever is a health concern in India, the incidents of which are increasing in recent years.

Aim: To study clinical manifestations trend and outcome of the disease in confirmed cases of Dengue admitted to tertiary care hospital between May 2009 and May 2010.

Methods: The study was prospective and hospital-based.

Results: The most common presentation was Fever (100%) followed by headache (56%), myalgia (42%), joint pain (36%), rash (26%), Jaundice (6%), respiratory distress (4%), CNS symptoms (4%) and hemorrhagic manifestations (36%). Dengue fever was the most common manifestation (56%), DHF is lesser (36%), and DSS is least (8%). Deaths reported were 6%.

Keywords: dengue, dengue hemorrhagic fever, dengue shock syndrome, hyderabad, telangana.

GJMR-F Classification: NLMC Code: WC 528

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I. Introduction

Dengue fever (DF) an acute febrile viral illness is the most common arboviral illness transmitted worldwide and caused by infection with one of the four serotypes of Dengue viruses and transmitted by mosquitoes of genes Aedes[1]. The disease characterized by clinical manifestations like high fever; joint pain, hemorrhagic phenomena, often with hepatomegaly and in severe cases signs of circulatory failure[2].

Dengue fever is endemic in areas of Southeast Asia, i.e., India, Bangladesh, Srilanka, Maldives and Thailand[4]. During an epidemic of dengue, attack rates among susceptible are 40-90%. Case fatality rates in endemic countries are 2.5 to 5%[5]. A major outbreak of dengue-like illness in India is reported in 1956 from Vellore Tamilnadu[3] and since then in various parts of the country, i.e., Kolkata (1964) and Vishakhapatnam[6] (1965).

The present study attempts to describe the salient clinical and laboratory findings of serologically confirmed hospitalized cases of dengue fever during the study period in the adult population.

II. Materials and Methods

The study conducted at the upgraded department of medicine, Osmania General Hospital Hyderabad. It included 100 patients presenting with Dengue fever and tested positive for IgM dengue antibodies during October 2009 to October 2011.

Only those patients with classical features of Dengue, i.e., fever with chills, body aches, rash bleeding manifestations and positive IgM ELISA test included in the study. Seronegative patients for dengue and patients with other causes and those aged less than 12 years excluded from the study. The diagnosis of Dengue fever, Dengue Hemorrhagic fever and, Dengue shock syndrome based on WHO criteria.

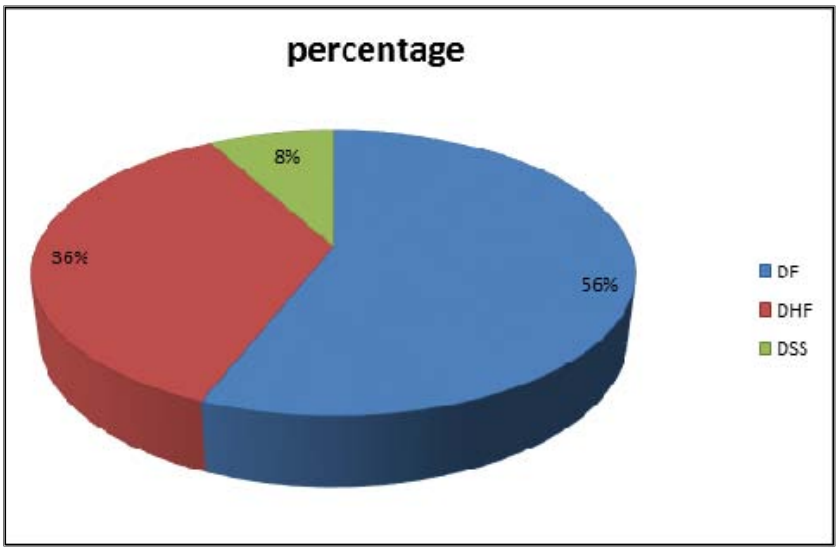

Fig. 1: Shows the clinical spectrum of disease. DF was the most common manifestation (56%), DHF is lesser (36%), and DSS is the least (8%)

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Table 1: Laboratory Parameters

	No. of Patients				
Investigations	DF	DHF	DSS	Total	Percentage
Hb<12 gm%	10	8	4	22	22%
Hb 12-14 gm%	22	16	2	40	40%
Hb>14 gm%	24	12	2	38	38%
TLC 4000-11,000	30	14	2	46	46%
TLC>11,000	6	8	2	16	16%
TLC<4,000	20	14	4	38	38%
SGOT>45	4	12	6	22	22%
SGPT>45	4	10	6	20	20%
Bilirubin>2	0	4	2	6	6%
Hematocrit>45	2	18	6	26	26%
Platelets<10,000/cu mm	0	4	6	10	10%
Platelets 10,000-1 lakh/cu mm	52	32	2	86	86%
Platelets>1,00,000/cu mm	4	0	0	4	4%

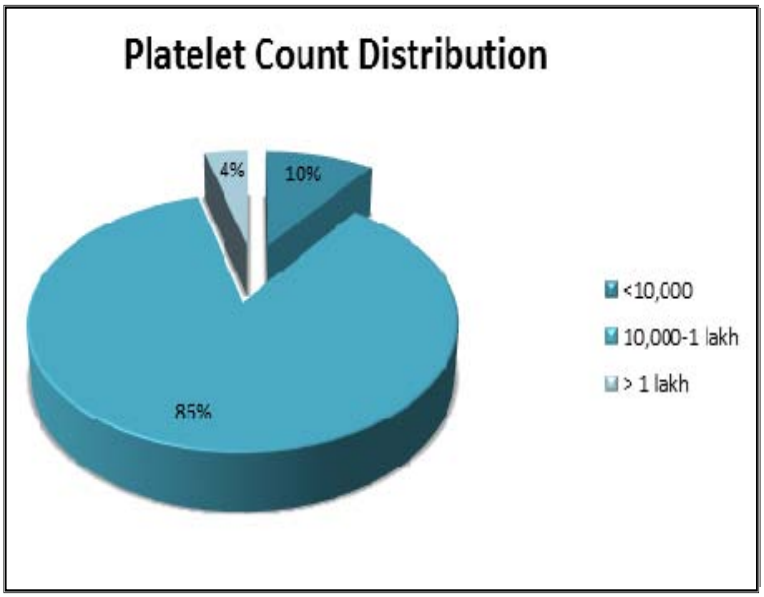

Fig. 2: Association of platelet count with positive dengue cases

III. Results

A total of 100 patient admitted to hospital between October 2009 to October 2011 were studied and statistically analyzed. Most cases occur during August, September, and November, i.e., in the monsoon and post monsoon season. Majority of the cases were males 66% and Females 34%, which accounts for a ratio of Male: Female of 1.9:1. Distribution of age group is between 14 to 69 years most common being the third decade. Fever was the most common symptom (100%) followed by Headache (56%), Myalgia (44%), Bleeding (40%), Jaundice (6%) and CNS symptoms (4%). Hemorrhagic manifestations included petechiae, rash, ecchymosis (2.6%), bleeding gums (16%), bleeding from puncture sites (24%), Hematuria (4%), Malaena and Hematemesis (2%). Complications occurred in 22% among which (4%), had ARDS, (22%) had pleural effusion, (6%) had Pneumonia, and (6%) had a multi-organ failure. Deaths reported were 4%.

IV. Discussion

Our study describes the clinical profile, laboratory features and outcome of DF, DHF, and DSS in adult patients.

The common age of patients was 30-39 with a range of 14 to 69 Years comparable to other studies, i.e., Priyadharshini et al7 and Neeraja et al8. The disease shows seasonal distribution, more during months from August to November similar to Ashwini Kumar et al9 (2008).

Dengue illness in our study manifested as DF (56%), DHF (36%), and DSS (4%). A study by Malavige et al10 showed high number of DHF cases.

The mean Hematocrit value of Dengue positive cases was 34.2 ± 5. In DHF and DSS, an increase in Hematocrit levels is noted.

In this study, 10% of patients had platelet count less than 10,000. 86% had platelet counts between 10,000 to 1 lakh and 4% had platelet count more than 1

lakh. Similar observations found in a study by Rachel Daniel et al11 and Khan et al12.

Out of 100 patients, 96% recovered, and mortality seen in 4% of patients.

V. Conclusion

Dengue is one of the emerging infectious diseases in the recent years, and our study highlights the pattern of presentation of disease in correlation with laboratory parameters, complications and disease outcomes.

References Références Referencias

1. World Health Organization. Dengue haemorrhagic, fever: diagnosis, treatment, prevention and control, 2nd edn. Geneva: WHO, 1997.
2. Kumar A, Sharma SK, Padbidri VS, Thakara JP, Jain DC and Datta KK. An outbreak of dengue fever in rural areas of Northern India. J Commun Dis 2001; 33 (4): 274-81.
3. Kamal S, Jain SK, Patnaik SK and Lal S. An outbreak of dengue fever in Veerrannapet village, Cherial Mandal of Warangal district, Andhra Pradesh. J Commun Dis 2005; 37 (4): 301-06.
4. Park K. Epidemiology of Communicable Diseases. In: Park's textbook of Preventive and Social Medicine. 21st ed. Jabalpur, India: M/s Bhanarsidas Bhanot; 2007: 206-9.
5. Chaturvedi UC, Shrivastava R. Dengue hemorrhagic fever: A global challenge. Indian J Med Microbiol 2004; 22 (1): 5-6.
6. Gomber S, Ramachandra VG, Kumar S, Agarwal KN, Gupta P. Hematological observations as diagnostic marker in dengue hemorrhagic fever – A reappraisal. Indian Pediatr 2001; 38: 477-
7. Clinical Findings and Pro-Inflammatory Cytokines in Dengue Patients in Western India: A Facility-Based Study *Priyadarshini 1, Rajesh R. Gadia 2, Anuradha Tripathy 1, K. R. Gurukumar 1, Asha Bhagat 1, Sampada Patwardhan 3, Nitin Mokashi 4, Dhananjay Vaidya 5, Paresh S. Shah 1, D. Cecilia 1*.*
8. Neeraja M, Lakshmi V, Teja VD, Umabala P and Subbalakshmi MV. Serodiagnosis of dengue virus infection in patients presenting to a tertiary care hospital. Indian J Med Microbiol 2006; 24: 280-2.
9. Ashwini Kumar et al Department of Community Medicine, Kasturba Medical College, Hubli, Karnataka.
10. Patterns of disease among adults hospitalized with dengue infections G.N. Malavige1, V.G.N.S. Velathanthiri1, E.S. Wijewickrama2, S. Fernando1, S.D. Jayaratne3, J. Aaskov4 and S. L. Sseneviratne QJj Med 2006; 99:299–305 Advance Access publication 7 April 2006doi:10.1093/qjmed/hcl039.
11. A Study of Clinical Profile of Dengue Fever in Kollam, Kerala, India. Rachel Daniel*!, Rajamohanan** and Aby Zachariah Philip Bishop Benziger Hospital, Kollam, Kerala, India44 Sree Avittom Thirunal Hospital, Thiruvananthapuram, Kerala, India Kerala Institute of Medical Sciences, Thiruvananthapuram, Kerala, India.
12. Khan E, Siddiqui J, Shakoor S, Mehraj V, Jamil B and Hasan R. Dengue outbreak in Karachi, Pakistan, 2006: Experiences at a tertiary care center. Trans R Soc Trop Med Hyg 2007; 101: 1114-19.

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MSEIRS Model for Pediatrics with Lower Respiratory Tract Infection

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Abstract- The immune system help to detect and eliminate most pathogens is essential for the survival of lower respiratory tract infection (Olubadeji, 2016). Lower respiratory tract infection (LRTI) constituted the second leading cause of death in all age bracket in Nigeria (Loddenkemper, 2013) Chronic lower respiratory diseases rank as the third leading cause of death in the United States (National Center for Health, 2015). The emerging and reemerging diseases have led to a revived interest in infectious diseases in which mathematical models have become important tools in analyzing the spread and control of infectious diseases. The model formation process clarifies assumptions, variables and parameters: moreover, a model provides conceptual results such as threshold and basic reproduction number. Mathematical models are used in comparing, planning, implementing, evaluating and optimizing various detection, prevention therapy and control programs. In this paper, we adopt the Passive Immunity Infant (M)–susceptible-Exposed-infected-recovered-susceptible (SEIRS) model to depict the spread of infections in our environment.

Keywords: *mathematical model, basic reproductive number, lower respiratory tract infection.*

GJMR-F Classification: *NLMC Code: WC 505*

Strictly as per the compliance and regulations of:

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Keywords: mathematical model, basic reproductive number, lower respiratory tract infection.

I. Introduction

The model uses the techniques of epidemiological models, the idea is to abstract away the particular details of an infection and express individuals as progressing through a set of states at different rates. Child mortality and morbidity is a factor that can be associated with the well-being of a population. It is also taken as one of the development indicators of health and socioeconomic status in any country (Alderman and Behrman, 2004). In order to reduce child mortality and morbidity which is one of the important Millennium goals, there is need to develop an effective and efficient model that can be used to assess the attributes that are responsible for the prevalence of the diseases in pediatrics patients that are having Lung Respiratory Tract Infections (LRTIs). In this epidemiological model, individuals transition from a Passive Immunity Infant to Susceptible state to Latent period to an Infectious one to a Recovered state at a certain rate, and become Susceptible again at a different rate. This model is called the MSEIRS model, because individuals move between them M (Passive Immunity infant), E (Latent period) S (Susceptible) and I (Infectious states) R (Recovered).

The Passive Immunity for Infant - Susceptible – Latent – Infected – Recovered - Susceptible (MSEIRS) model was introduced by Kermack and McKendrick, in 1927 (Leah Edelstein-Keshet 2005). In the model, the population is divided into three distinct groups of: the Passive Immunity for Infant (M), Latent period (E), Susceptibles (S), Infecteds (I) and Recovereds (R) where M, E, S, I and R represent the number of children in each of the groups respectively and the total population $N = M + E + S + I + R$. The Susceptibles are those who are not infected and not immune, the Infecteds are those who are infected and can transmit the disease, and the Recovered are those who are immune to re-infection. The characteristic feature of LRTI is that immunity after infection is temporary, such that the recovered children can become susceptible again if all the risk factors are still present.

II. Mathematical Model Formulation

Passive Immunity is an immunity obtained from external source: immunity from disease acquired by the transfer of antibodies from one person to another, e.g. through injections or between a mother and a fetus through the placenta looking at the case of infection spread on the population of children, there is an arrival of new susceptible population. In this type of situation, births and deaths rate must be included in the model. The differential equations represent the model which indicates the rate of change of number of individuals in each compartment with respect to time. Below is the Schematic diagram for the single age class M - Passive Immunity Infant, S- Susceptible, E – Latent period, I – Infectious, R – Recovered (MSEIRS) model for LRTI transmission (Weber et al., (2001).

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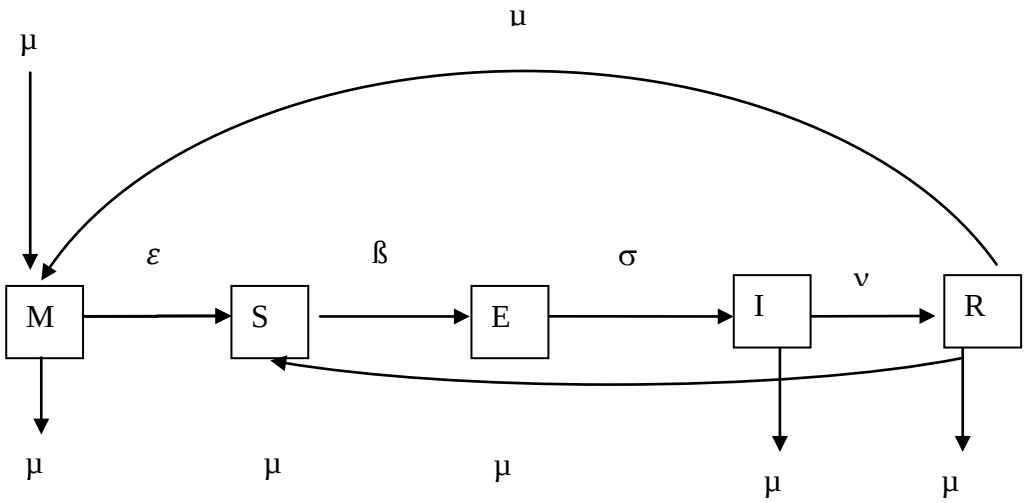

Fig. 1: Schematic diagram for the single age class MSEIRS (M = Passive Immunity Infants) Susceptible Latent Immune Recovered Susceptible Model for LRTI transmission

The above assumptions lead to the following differential equations for LRTI.

An additional feature of LRTI is employed. By this Newborn babies whose mothers are immune are taken into consideration .As a result, these children are protected by the antibodies present in their mothers. Thus, group M of children who are completely protected by these antibodies are considered. The ratio of these newborn babies M is equal to the ratio of the general population that is immunized after recovering from infection. Protection reduces and these children M become susceptible at a rate . Under the above assumptions, the following are the results.

$$\frac{dM}{dt} = \mu - (+\mu)M, \qquad M(0) \tag{2.1}$$

$$\frac{dS}{dt} = M - \beta SI - \mu S + \gamma R, \quad S(0) \tag{2.2}$$

$$\frac{dE}{dt} = \beta SI - (\sigma + \mu)E, \quad E(0) \tag{2.3}$$

$$\frac{dI}{dt} = \sigma E - (v + \mu)I, \qquad I(0) \tag{2.4}$$

$$\frac{dR}{dt} = vI - (\mu + \gamma)R, \qquad R(0) \tag{2.5}$$

Table 1: The description of parameters used in the model

Parameter	Description	Unit
S	Susceptible population	Number/unit time
M	Birth rate of the children i.e. the mortality rate	Number / unit time
I	Infected population	Number/unit time
R	Infected population that Recovered	Number/unit time
M	Passively immune infants	Number/unit time
μ	Birth rate of the children i.e. the mortality rate	Number/unit time
γ	rate of loss of immunity	Number/unit time
ν	Rate of loss of infections	Number/unit time
ß	Transmission parameter (constant rate)	Number/unit time
R_0	Basic reproduction number	Number/unit time
Σ	Contact number	Number/unit time
E	Rate of loss of protection by maternal antibodies	Number/unit time

The unit time is (per year)

III. Model Analysis

a) *Two Classes of Epidemiology Models*

To introduce the terminologies, notation, and standard results for epidemiology models, two different types of models are formulated and analyzed. They are Epidemic models and Endemic models. Epidemic model is used to describe rapid outbreaks that occur in less than a year due to the availability of some risk factors, while endemic models are used for studying diseases of longer periods, during which there is a renewal of susceptibles by births or recovery from temporary immunity. The two classic SIR models provide an intuitive basis for understanding more complex epidemiology modeling results.

i. *Model Equilibrium Solutions*

$$\frac{dM}{dt} = \frac{dS}{dt} = \frac{dE}{dt} = \frac{dI}{dt} = \frac{dR}{dt} = 0$$

Thus we have,

$$\frac{dM}{dt} = \mu - (+\mu)M \quad 0 \tag{3.1}$$

$$\frac{dS}{dt} = M - \beta SI - \mu S + \gamma R = 0 \tag{3.2}$$

$$\frac{dE}{dt} = \beta SI - (\sigma + \mu)E = \quad 0 \tag{3.3}$$

$$\frac{dI}{dt} = \sigma E - (v + \mu)I = 0 \tag{3.4}$$

$$\frac{dR}{dt} = vI - (\mu + \gamma)R = 0 \tag{3.5}$$

From equations 3.1, 3.2, 3.3, 3.4 and 3.5 simultaneously, we obtained the Virus – free equilibrium

From equation 3.3

$$\sigma E - \mu I - vI = 0$$

Since the infection Free State is known to be diseases free, then,

I = 0, Thus

This Become

$$\sigma E = 0, i.e\ E = 0$$

From Equation 3.4

$$vI - \mu R - \gamma R = 0$$

Since, I=0, the Equation Becomes

$$-(\mu + \gamma)R = 0$$

Thus, R =0

Summary, I= 0, E =0 and R = 0

From Equation 1.0

$$\mu - \varepsilon M - \mu M = 0$$

$$\mu = \varepsilon M + \mu M = 0$$

$$\mu = (\varepsilon + \mu)M$$

This Gives

$$M = \frac{\mu}{\varepsilon + \mu}$$

From Equation 3.1

$$\varepsilon M - \beta SI - \mu S + \gamma R = 0$$

Since I = 0 and R =0, this reduces to

$$\varepsilon M - \mu S = 0$$

$$\varepsilon M = \mu S$$

$$MS = \frac{\varepsilon}{\mu}$$

But

$$M = \frac{\mu}{\varepsilon + \mu}$$

Thus,

$$\frac{\varepsilon}{\mu} * \frac{\mu}{\varepsilon + \mu} = \frac{\varepsilon}{\varepsilon + \mu}$$

Finally for, virus free equilibrium, the solution set is as follows:

$$\left[M = \frac{\mu}{\varepsilon + \mu}, S = \frac{\varepsilon}{\varepsilon + \mu}, E = 0, I = 0, R = 0\right]$$

b) Local stability for Virus-free Equilibrium

We linearize the system of equations given, using the Jacobian matrix approach to obtain:

Evaluating the Jacobian matrix at the virus – free equilibrium E give

$$J(M,S,E,I,R)\begin{bmatrix} -\varepsilon - \mu & 0 & 0 & 0 & 0 \\ \varepsilon & -\beta I - \mu & 0 & -\beta S & \gamma \\ 0 & \beta I & -\mu - \sigma & \beta S & 0 \\ 0 & 0 & 0 & -\mu - v & 0 \\ 0 & 0 & 0 & v & -\mu - \gamma \end{bmatrix} = 0$$

We defined the characteristic polynomial equation for the J (E) solve for the eigen valves, to get: After a while, the eigen values λ_1, i=1, 2, 3, 4, 5 are given as

$$\lambda_1 = -\mu$$

$$\lambda_2 = -\mu - \gamma$$

$$\lambda_3 = -\xi - \mu$$

$$\lambda_4 = \frac{1}{2(\xi + \mu)}\left[-2\mu^2 \mu v - 2\mu\varepsilon - \mu\sigma - v\varepsilon - \sigma\varepsilon + A\right]$$

$$\lambda_5 = \frac{-1}{2(\xi + \mu)}\left[2\mu^2 \mu v - 2\mu\varepsilon - \mu\sigma - v\varepsilon - \sigma\varepsilon + A\right]$$

Where

$$A = \sqrt{\mu^2v^2 - 2\mu^2v\sigma + \mu^2\sigma^2 + 2\mu v^2\varepsilon - 2\mu v^2\varepsilon - 4\mu v\varepsilon\sigma + 4\mu\varepsilon\beta\sigma + 2\mu\varepsilon\sigma^2} + v^2\varepsilon^2 - 2v\varepsilon^2\sigma + 4\varepsilon^2\beta\sigma + \varepsilon^2\sigma^2$$

From the results above, $\lambda_1, < 0, \lambda_2 < 0$, $\lambda_3 < 0$, and $\lambda_5 < 0$ provided

$$\mu^2v^2 - 2\mu^2v\sigma + \mu^2\sigma^2 + 2\mu v^2\varepsilon - 4\mu v\varepsilon\sigma + 4\mu\varepsilon\beta\sigma + 2\mu\varepsilon\sigma^2 + v^2\varepsilon^2 - 2v\varepsilon^2\sigma + 4\varepsilon^2\beta\sigma + \varepsilon^2\sigma^2 \geq 0$$

That is,

$$\mu^2v^2 - \mu^2\sigma^2 + 2\mu v^2\varepsilon + 4\mu\varepsilon\beta\sigma + 2\mu\varepsilon\sigma^2 + v^2\varepsilon^2 + 4\varepsilon^2\varepsilon\sigma + \varepsilon^2\sigma^2 \geq 2\mu^2v\sigma + 4\mu v\varepsilon\sigma + 2v\varepsilon^2\sigma$$

So also, λ_4 must be less than zero, i.e, $\lambda_4 < 0$

Hence,

$$\lambda_4 = \frac{1}{2(\varepsilon + \mu)}(-2\mu^2 - \mu v - 2\mu\varepsilon - \mu\sigma - v\varepsilon - \sigma\varepsilon + A) < 0,$$

Which implies that,

$$\frac{A}{2(\varepsilon+\mu)} < \frac{1}{2(\varepsilon+\mu)}(2\mu^2 - \mu v - 2\mu\varepsilon - \mu\sigma - v\varepsilon - \sigma\varepsilon)$$

That is

$$A < 2\mu^2 - \mu v - 2\mu\varepsilon - \mu\sigma - v\varepsilon - \sigma\varepsilon$$

Finally, the result is

$$\text{Ro} = \frac{A}{2\mu^2 + \mu v + 2\mu\varepsilon + \mu\sigma + v\varepsilon + \sigma\varepsilon} < 1$$

A has been defined earlier above.

Where R_0 is the basic reproduction number,

It is imperative to note that the *Basic Reproductive Number*, denoted asR_0 , is an important threshold in modelling of infections diseases since it tells us if a population is at risk from a disease or not. Thus, whenever $R_0 < 1$the new cases (i.e. incidence) of the disease will be on the decrease and the disease will eventually be eliminated.

Based on foregoing, the Basic Reproduction number (R_0) for our model is less than unity i.e.

$$\text{Ro} = \frac{A}{2\mu^2 + \mu v + 2\mu\varepsilon + \mu\sigma + v\varepsilon + \sigma\varepsilon} < 1$$

Then, I(t) decreases monotonically to zero as t→∞. Therefore, the virus – free equilibrium is locally stable.

Local stability for endemic equilibrium we have:

$$\frac{dM}{dt} = \frac{dS}{dt} = \frac{dE}{dt} = \frac{dI}{dt} = \frac{dR}{dt} = 0$$

This gives

$$\frac{dM}{dt} = \mu - \varepsilon M - \mu M = 0 \quad (3.6)$$

$$\frac{dS}{dt} = \varepsilon M - \beta SI - \mu S + \gamma R = 0 \quad (3.7)$$

$$\frac{dE}{dt} = \beta SI - \sigma E - \mu E = 0 \quad (3.8)$$

$$\frac{dI}{dt} = \sigma E - \sigma E - \mu I - vI \quad (3.9)$$

$$\frac{dR}{dt} vI - \mu R - \gamma R = 0 \quad (3.10)$$

In this scenario, the state is assumed to be virus endemic, I >0

From equation 3.6

$$\mu - \varepsilon M - \mu M = 0$$

$$\mu = (\varepsilon + \mu)M = 0$$

$$M = \frac{\mu}{\varepsilon + \mu} \quad (3.11)$$

From equation 3.9

$$\sigma E - \mu I\, vI = 0$$

i.e.

$$\sigma E = (\mu + v)I$$

Hence,

$$E = \frac{\mu + v)}{\sigma} I \quad (3.12)$$

From equation 3.10

$$vI - \mu R - \gamma R = 0$$

$$vI = (\mu + \gamma)R$$

$$R = \left(\frac{v}{\mu + \gamma}\right) I \quad (3.13)$$

From Equation 3.8

$$\beta SI - \sigma E - \mu E = 0$$

$$\beta SI = (\sigma\, \mu)E$$

$$S = \left(\frac{\sigma + \mu}{\beta I}\right) E$$

But

$$E = \left(\frac{\mu + v}{\sigma}\right) I$$

Thus,

$$S = \left(\frac{\sigma + \mu}{\beta I}\right) E$$

$$S = \left(\frac{\sigma + \mu}{\beta I}\right)\left(\frac{\mu + \nu}{\sigma}\right) I$$

$$= \frac{(\delta+\mu)(\mu+\nu)}{\beta\sigma} \tag{3.14}$$

Substitute for M, E, R and S in Equation 3.7

$$\varepsilon M - \beta SI - \mu S + \gamma R = 0$$

That is:

$$\varepsilon * \frac{\mu}{\varepsilon + \mu} - \beta * \frac{(\delta + \mu)(\mu + v)}{\beta\sigma} * I - \mu * \frac{(\delta + \mu)(\mu + v)}{\beta\sigma} + \gamma^* \left(\frac{v}{\mu + \gamma}\right) I = 0$$

Solving for I yields:

$$I = \frac{-(\mu + \gamma)(\mu^3 + \mu^2 v + \mu^2\varepsilon + \mu^2\sigma + \mu v\varepsilon + \mu v\sigma + \mu\varepsilon\sigma + v\varepsilon\sigma - \varepsilon\beta\sigma)}{\beta(\mu^3 + \mu^2 v + \mu^2\varepsilon + \mu^2\gamma + \mu^2\sigma + \mu v\varepsilon + \mu v\gamma + \mu v\sigma + \mu\varepsilon\gamma + \mu\varepsilon\sigma + \mu\gamma\sigma + v\varepsilon\sigma + \varepsilon\gamma\sigma)}$$

Consequently,

$$R = (\frac{\nu}{\mu + \gamma})I$$

The above yields,

$$\frac{-v(\mu + \gamma)(\mu^3 + \mu^2 v + \mu^2\varepsilon + \mu^2\sigma + \mu v\sigma + \mu\varepsilon\sigma + v\varepsilon\sigma - \varepsilon\beta\sigma}{\beta(\mu^3 + \mu^2 v + \mu^2\varepsilon + \mu^2\gamma + \mu^2\sigma + \mu v\varepsilon + \mu v\gamma + \mu v\sigma + \mu\varepsilon\sigma + \mu\gamma\sigma + v\varepsilon\gamma + v\varepsilon\sigma + \varepsilon\gamma\sigma}$$

Also,

$$E = \left(\frac{\mu + \nu}{\sigma}\right) I$$

$$\frac{-v(\mu + \gamma)(\mu^3 + \mu^2 v + \mu^2\varepsilon + \mu^2\sigma + \mu v\sigma + \mu\varepsilon\sigma + v\varepsilon\sigma - \varepsilon\beta\sigma}{\beta\sigma(\mu^3 + \mu^2 v + \mu^2\varepsilon + \mu^2\gamma + \mu^2\sigma + \mu v\varepsilon + \mu v\gamma + \mu v\sigma + \mu\varepsilon\sigma + \mu\gamma\sigma + v\varepsilon\gamma + v\varepsilon\sigma + \varepsilon\gamma\sigma}$$

For mathematical acceptability, (M_E, S_E, E_E, I_E, R_E) > 0

Thus,

$$I_E = \frac{-v(\mu + \gamma)(\mu^3 + \mu^2 v + \mu^2\varepsilon + \mu^2\sigma + \mu v\sigma + \mu\varepsilon\sigma + v\varepsilon\sigma - \varepsilon\beta\sigma}{\beta(\mu^3 + \mu^2 v + \mu^2\varepsilon + \mu^2\gamma + \mu^2\sigma + \mu v\varepsilon + \mu v\gamma + \mu v\sigma + \mu\varepsilon\sigma + \mu\gamma\sigma + v\varepsilon\gamma + v\varepsilon\sigma + \varepsilon\gamma\sigma} > 0$$

Let,

$$A = -(\mu + v)(\mu^3 + \mu^2 v + \mu^2\varepsilon + \mu^2\sigma + \mu v\varepsilon + \mu v\sigma + \mu\varepsilon\sigma + v\varepsilon\sigma)$$

$$B = \varepsilon\beta\sigma \text{ and}$$

$$C = (\mu^3 + \mu^2 v + \mu^2\varepsilon + \mu^2\gamma + \mu^2\sigma + \mu v\varepsilon + \mu v\gamma + \mu v\sigma + \mu\varepsilon\sigma + \mu\gamma\sigma + v\varepsilon\gamma + v\varepsilon\sigma + \varepsilon\gamma\sigma))$$

Hence,

$$I_E = \frac{(\mu + \gamma)(A - B)}{B * C} > 0$$

$$= -(\mu + \gamma)(A - B) > 0$$

$$= -(\mu + \gamma)A + B(\mu + \gamma) > 0$$

$$= B(\mu + \gamma) > (\mu + \gamma)A$$

Dividing through by A, we then have,

$$R_0 = \frac{B}{A} > 1$$

More elaborately, we have:

$$R_0 = \frac{\varepsilon\beta\sigma}{\mu^3 + \mu^2 v + \mu^2\varepsilon + \mu^2\sigma + \mu v\varepsilon + \mu v\sigma + \mu\varepsilon\sigma + v\varepsilon\sigma} > 1$$

If β 64.5, v = 36, ε= 13, δ= 91, μ =0.041 are all parameter for a period of one year, then we have the following expression:

$$\frac{13 * 64.5 * 91}{(0.041)^3 + (0.041)^2 36 + (0.041)^2 13 + (0.041)^2 91 + (0.041)(36)(13) + (0.041)(36)(91) + (0.041)(91)(13) + (36)(13)(91)} > 1$$

$$R_0 = 2.944076535 > 1$$

If $R_0 > 1$ then I (t) increases and reaches its maximum and reduces as $R_0 \to \infty$. When the number of children infected increases in this state, it is called the epidemic state. In the long run, the whole population become susceptible if $R_0 > 1$

IV. Numerical Solution and Simulation

The SEIRS model was solved numerically using Runge – Kutta method. We adopted Matlab ode45 program, which is based on an explicit Runge Kutta (4, 5) formula. It is a one-step solver used in solving a system of first – order ordinary differential equation (ODE). So, in computing $y(t_n)$, it needs only the solution at the immediately preceding time point, $y(t_{n-1})$. In general, ode45 is the best function to apply as a first try for most problems involving systems of first order ODES. Runge kutta of order four is also used in plotting the graphs; it's a powerful and popular method because of its accuracy and stability. Also, its simplicity and stability make it one of the most widely used numerical algorithms for stiff and non-stiff equations, while it converges faster than that of order two or three.

Table 4.1: Simulating the MSEIRS model using the following parameter values

Parameters	V	b_0	b_1	δ	ϕ	μ	γ	ζ	β	R_0
MSEIRS (Virus free State)	36	50	0.14	91	0.15	0.041	1.8	13	64.5	0.9515728172
MSEIRS (Epidemic State)	36	20	0.20	91	0.15	0.041	1.8	13	27	2.944076535

These are the parameters used in plotting the graphs: although some of it changes are due to the fact that they are the major factors that are determining the situations of the environment that is, if it is of the virus – free and endemic state.

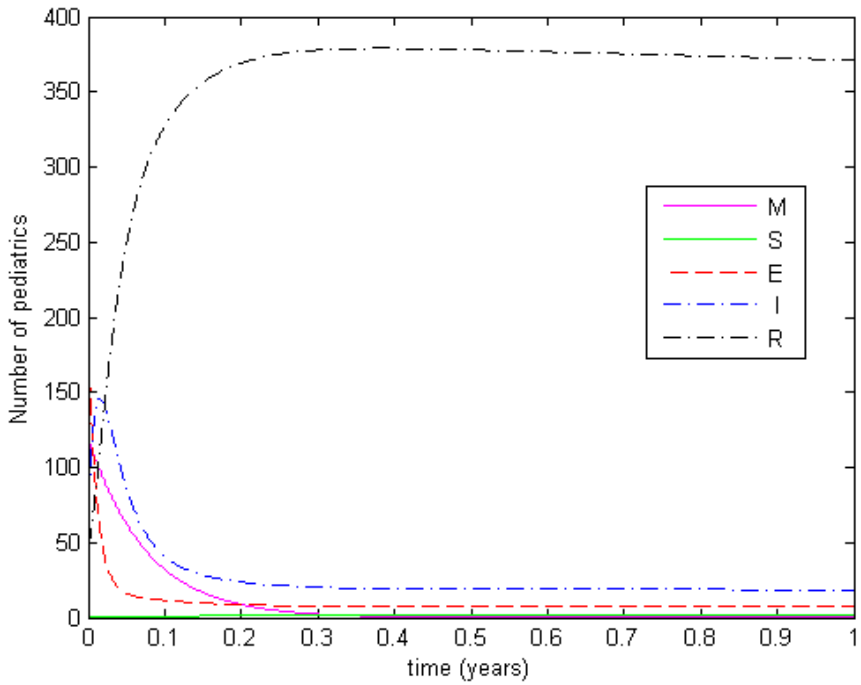

Figure 4.1(a): Graphical representation of MSEIRS model between the space of one year with M_0 = 120, S_0 = 100, E_0 = 82 , I_0 =67, R_0 = 46

Figure 4.1 shows the graphical representation of MSEIRS model between the space of one year. In these model, we assume newborn infants of immune mothers that are protected by maternal antibodies. We then introduce a group of M of children that are born completely protected. According to the graph above, we assume the fraction of newborns that are protected is equal to the fraction of the general population that have temporary immunity after recovering from infection . The protected children become susceptible.

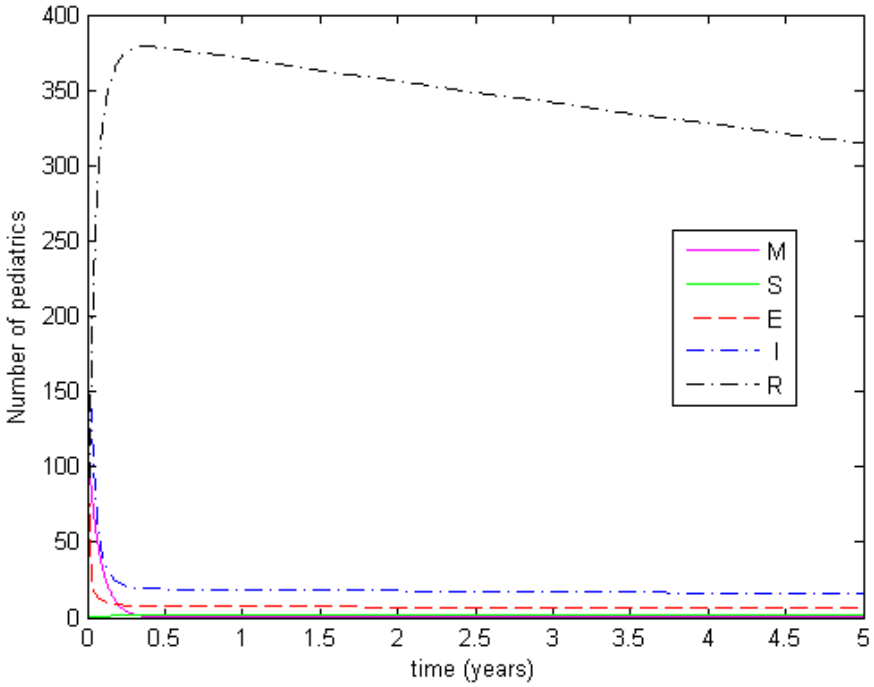

Figure 4.2: Graphical respresentation of MSEIRS model between the space of five years

Figure 4.2 shows the graphical representation of MSEIRS model between the space of five years. In these model, we assume newborn infants of immune mothers that are protected by maternal antibodies. We then introduce a group of M of children that are born completely protected. According to the graph above, we assume the fraction of newborns that are protected is equal to the fraction of the general population that have temporary immunity after recovering from infection . The protected children become susceptible.

V. Conclusion

To conclude, while this model would benefit against real world data, in its present form it has been shown to be useful in three areas: providing a systems-level view, exposing weaknesses and dependencies and evaluating new technologies. With more data this sort of model could provide valuable insight and prediction for the entire LRTI disease.

References Références Referencias

1. Ahmed P.A, Yusuf Dawodu K.K (2015) A Childhood acute lower respiratory tract infection in Northern Nigeria: As risk factors.
2. Alderman H, Behrman J. R. (2004) Health and Economic Growth Australian Health Ministers' Advisory Council.
3. Kermack W. O, McKendrick A. G. (1927) A contribution to the Mathematical Theory of Epidemics Published August 927. DOI: 10.1098/ rspa.1927.0118.
4. Leah Edelstein-Keshet (2005): "Mathematical models in Biology" Proc. Roy. Soc. London A 115, 700-721.
5. Loddenkemper R, Gibson G. J. and Sibille Y. (2013) "Respiratory health and disease in Europe: the new European Lung White Book," European Respiratory Journal, vol. 42, pp. 559–563.
6. Marlais. M, Evans. J and Abrahamson E (2011) ''Clinical Predictors of admission in infants with acute bronchiolitis''.
7. Olubadeji,. B (2016): Development of An Auto-Immune Dendritic Cell Algorithm for Classification problems. PhD Thesis, department of computer science, Federal University of Technology, Akure, Ondo State.
8. WHO (World Health Organization) (2010) Child Adolescent Health. Forthcoming. Report on the Methodology and Assumptions Used to Estimate Costs of Scaling Up Selected Child Health Interventions to 95% in Order to Reduce Under-Five Mortality. Geneva: WHO.

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Assessment of Health Care Seeking Behavior among House Hold Heads in Dale Woreda, Sidama Zone, Southern Ethiopia, Ethiopia

By Fikre Bojola, Samuel Dessu, Zinabu Dawit, Fessahaye Alemseged & Fasil Tessema
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Abstract- *Introduction:* Health seeking behavior refers to activities undertaken by persons related to diseases experience. The initiation and treatment need for sick women, children, adolescents, and the old household members are usually determined by household heads. While household heads who are sick will independently decide to seek health care. There is limited information on the level of health care seeking behavior and associated factors among household heads. Therefore, assessing factors associated with health care seeking behavior among household heads have significant role in filling the information gap to control inappropriate health care seeking practice and its outcomes.

Objective: To assess health care seeking behavior & its associated factor among household heads of Dale woreda from February to March 2017.

Methods: A community-based cross-sectional study was conducted in Dale woreda by using quantitative data collection methods. Stratified random sampling technique was employed to select household heads from rural and urban areas. Data were collected using a structured and pretested questionnaire and entered into a computer using Epi data 4.13 and analyzed using SPSS for windows version 20.

Keywords: *appropriate health seeking behavior, inappropriate health-seeking behavior, keble, urban, rural.*

GJMR-F Classification: *NLMC Code: W 84*

Strictly as per the compliance and regulations of:

Assessment of Health Care Seeking Behavior among House Hold Heads in Dale Woreda, Sidama Zone, Southern Ethiopia, Ethiopia

Fikre Bojola [α], Samuel Dessu [σ], Zinabu Dawit [ρ], Fessahaye Alemseged [Ω] & Fasil Tessema [¥]

Abstract- Introduction: Health seeking behavior refers to activities undertaken by persons related to diseases experience. The initiation and treatment need for sick women, children, adolescents, and the old household members are usually determined by household heads. While household heads who are sick will independently decide to seek health care. There is limited information on the level of health care seeking behavior and associated factors among household heads. Therefore, assessing factors associated with health care seeking behavior among household heads have significant role in filling the information gap to control inappropriate health care seeking practice and its outcomes.

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Result: A total of 804 household heads (625 rural and 179 urban) giving a response rate of 95.3%. Among the study participants male comprises 693(86.2%) and female comprises 111(13.8%).Majority of the sick individual lies in age group of 18-30 years which accounts for 372(46.3%). The overall appropriate health care seeking behavior of household heads was 585 (72.8%) at the study area. Residence [AOR=3.32, 95% CI: 1.94, 5.68], Educational level [AOR=4.26, 95%CI: 2.16, 8.43], Monthly income [AOR=2.98, 95%CI: 1.37, 5.68] and Family size [AOR=2.29, 95%CI: 1.64, 3.19] were the independent predictor of health seeking behavior.

Conclusion: The magnitude of appropriate health-seeking behavior was satisfactory. Residence, educational level, monthly income, and family size affects the household's heads health care seeking behaviors.

Keywords: appropriate health seeking behavior, inappropriate health-seeking behavior, keble, urban, rural.

I. Introduction

Health seeking behavior refers to activities undertaken by persons related to diseases experience. (1). It is affected by different factors such as individuals' Characteristics, disease status and access to health services (2). Also, it is affected by the Individuals knowledge and awareness. Among different populations, this behavior has difficult outcome of many factors operating at different hierarchical levels especially in rurals including their biologic, social profile, previous experiences with the health care services, community level influences, availability of health care providers alternatives (1).

Many of health-seeking behavior studies indicate that health service and resources remain inadequately used. To adopt and increase the health practices understanding human behavior is a factor. Regarding the provision of health care services and health policy different experts were aware. (3).

The general prevalence in south-west Ethiopia was 58.4% (4) 38.7% in rural populations in Ethiopia (5). The factors which alter the health-seeking behavior are Cultural customs, residence, distance to functioning health centers and finance in health facilities (6). Worldwide Health promotion supports providing knowledge about the causes of illness and possible alternatives will go a long way to promote a change in health-seeking behavior. However, in the world, the recognition is growing up, and health education and the level of knowledge is not adequate to promote a change in behavior. Different Studies conducted on health-seeking behavior, confirm that various factors, demonstrates the individual behaviors complexity and its influence in a specified period and area (7).

Generally, it is recognized that identifying and controlling the determinants associated with health care seeking behavior have positive impacts on modern health services utilization.

Recognition of manifestation of diseases is essential for early initiation of health care seeking. Household-level illness diagnosis is related with the choice made between health treatment alternatives. The resulting patterns of health-seeking behavior determine the net disease magnitude in a given society.

At the household level, the process of seeking modern health care was found to vary considerably between the adult men on one hand, and other household members on the other. While adult men who fall sick can independently decide to seek health care, women, children, adolescents and the old consistently indicated that it is another household member who

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usually determines the timing and the type of treatment when they are attributable to illness episodes.

In different regions of Latin America, Asia and Africa traditional medicine (TM) is performed. 80% of the population's in Africa and also 80% in Ethiopia traditional medicine is used for health care because the populations culture accepts the traditional healers due to the inaccessibility of the modernized health institutions and in need of cost minimization (3, 8).

Early detection of diseases or its indicator is needed to initiate health seeking and treatment. Household-level illness diagnosis is related with the choice made between health treatment alternatives. The resulting patterns of health-seeking behavior determine the net burden of disease in a given society.

At the household level, the process of seeking modern health care was found to vary considerably between the adult men on one hand, and other household members on the other. While adult men who fall sick can independently decide to seek health care, women, children, adolescents, and the old consistently indicated that it is another household member who usually determines the timing and the type of treatment when they are subject to illness episodes. The main underlying reason for the above decision-making process is that adult men are responsible for the health care costs for women and children. The study found that even in situations where the wife pays for her health care, the husband must reimburse the money spent on her afterward. Depending on whether or not he is willing and able to pay for medical attention, the husband/father of a sick woman/child may decide to delay modernized treatment and rely on cheaper traditional medicines for a while. Depending on their assessment, adult males may also judge the illness of a woman/child as not enough to merit medical attention.

When community members get sick, they do not usually seek health care from modern health facilities immediately. Instead, they opt for other alternatives, including not seeking medical care at all, self-medication with drugs obtained from drug vendors, back street marketers, over the counter in shops and pharmacies, and traditional medicine (9).

The study conducted in Addis Ababa indicated that One-third of all illnesses were treated by modern services 19.9% by self-care. The utilization rates of modernized medicine is varied due to the type of disease and its duration, socioeconomic characteristics and level, sex, age and the area of residence (10).

Health care policies and programs' planning requires knowledge about health-seeking behavior for early diagnosis, effective treatment, and appropriate intervention implementation (11).

Also, health service delivery was inefficient and unfair, and quality of healthcare was usually poor between urban and rural (12). The former residents are expected to be open to different new ideas and exposures, and they are committed to practicing different things on a trial and correct errors (13). But also they are exposed to a certain tradition, not changing and does not accept change and refuse the cultural values and expectations (14, 15).

Most studies on health-seeking behavior in Ethiopia have been disease specific particularly on malaria, TB, & Maternal health etc (16). Since no similar study in the study area on health care seeking behavior among household heads, this study helped to assess the health-seeking behavior among household heads and identified factor affecting health care seeking behavior.

This study determined the magnitude of health care seeking behavior and identified the common determinants that affect health care seeking behavior. The results of this study are expected to provide evidence-based information to the community, local government and health care providers and policy makers'. Based on the available information possible intervention will be made.

The objective of this study was to assess health care seeking behavior & its associated factors among household heads in Dale woreda, Sidama Zone, Ethiopia, 2017.

II. Methods and Materials

a) Study Area

Dale woreda is one of nineteen woredas in Sidama Zone having total population 242,658 of Which 122,918 are males and 119,740 are females. Yirgalem town is one of the town administration in Sidama Zone found in Dale woreda which is 45 km far from Hawassa. Dale woreda has a total of 31 rural kebele and seven urban kebeles and 49, 244 households. The health service coverage of the woreda in 2010 is 86%. (Census 2007, CSA).

b) Study Period

The actual data collection was carried in February- March 2017.

c) Study Design

A community-based cross-sectional study was conducted among household heads residents of Dale Woreda to assess health-seeking behavior and its associated factors. This design was selected considering the time allocated for data collection and availability of study subject.

III. Population

a) Source Population

All households in Dale woreda with household heads were sick in the last four week before the survey date.

b) Study Population

Randomly selected household heads from the source population.

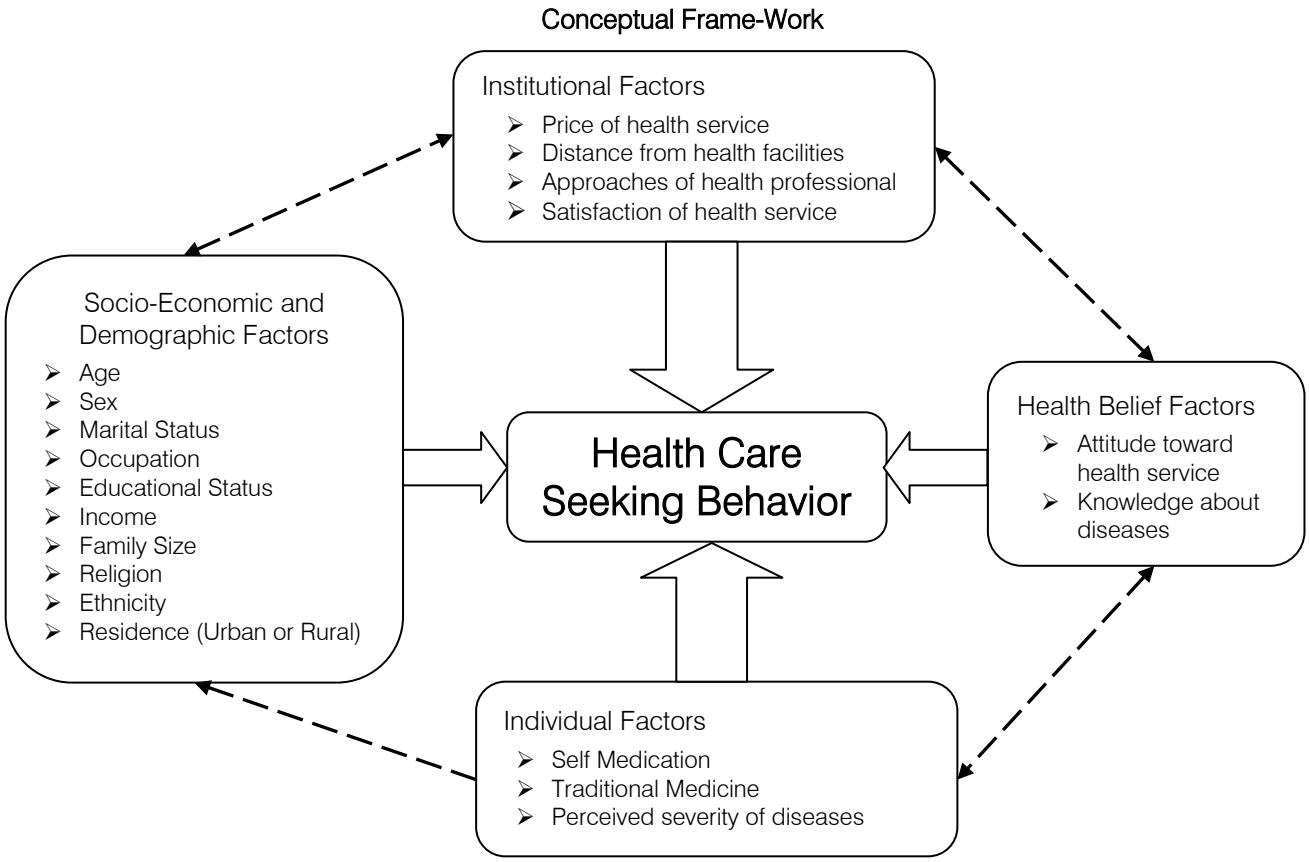

Figure 1: Conceptual frame-work of health-seeking behavior

c) *The Sampling Unit*

Household heads who were sick in the last four weeks from the survey date.

d) *Inclusion and Exclusion criteria Inclusion Criteria*

Household head's who were sick in the last four weeks from the survey date.

i. *Inclusion Criteria*

Household head's who were sick in the last four weeks from the survey date.

ii. *Exclusion Criteria*

- Household heads who were critically sick and non-communicative for the last four Weeks.
- Household heads who were sick for the last four week with self-limiting diseases like common cold.

IV. Sample Size Determination and Sampling Procedure

a) *Sample Size Determination*

The final sample size was determined using a single population proportion formula through considering the following assumptions; P=proportion of health care seeking behavior. Since the proportion for this particular study was unknown, p = 50%, to get the maximum sample size.

Z= the standard normal deviation of 95% i.e. 1.96

d= the margin of sampling error i.e.5 %

$$n = \frac{(Z_{\alpha/2})^2 \, \mathrm{P} \, (1 - \mathrm{P})}{d^2}$$

Where,

n= Initial Sample Size

$$n = \frac{(1.96)^2 \, 0.5 \, (1 - 0.5)}{(0.05)^2}$$

n= 384

By considering the design effect of the sampling technique (2) and 10% non response rate the final sample size was= 844.

b) *Sampling Techniques*

A multi-stage sampling design was used to select primary sampling units (kebeles) and secondary sampling units (households) from the woreda. The kebeles were selected using simple random sampling method. A complete census was carried out in all the selected kebeles before the actual data collection time. By using the information from census, representative sample of individuals/household head from each Kebeles included in the study by using PPS. Systematic sampling method was employed to select the household heads from each kebele, where the sampling interval was the total numbers of sick household heads in each kebele divided by the corresponding number of sick household heads were interviewed in each kebele. Data was collected from the first household head by

using the kebele house number given during census for urban and rural household head register using simple random sampling method.

The next household heads were interviewed systematically. The corresponding number of sick household heads were interviewed in each kebele /total number of sick household heads in each kebele, =1/5.3, a k=5 interval for urban household heads and systematically at (corresponding number of sick household heads were interviewed in each kebele /total number of sick household heads in each kebele 1/3.8, k =4) interval for rural household heads.

V. Measurements

a) Questionnaires

The data was collected by using structured a local language (sidamigna) version questionnaires consisting of Socio-demographic characteristics of sick household heads different questions regarding health-seeking behavior including the utilization of health services and types of health care needed and factor affecting health-seeking behavior.

b) Data Collection Techniques

The data collection was carried out using structured questionnaires filled by data collectors. The data collection format was prepared in English and was translated from English to local language (sidamigna) and was re-translated back to English to check the reliability of the instrument. Datas were collected by interviewing the Household heads .The house to house visit continued until the sample size required was secured. During data collection, the data collectors found locked houses and re-visited.

c) Quality Assurance

Before undertaking the data collection, instrument was tested taking 44 household heads in Abesto kebele for the feasibility of the questionnaires. Based on the findings Modifications were done. The pre-tested data was not included in the data. Validity and reliability of the questionnaire was checked.

The Grades 10th completed ten interviewers were selected as data collectors who could speak the local language (Sidamign) fluently. Two nurses were recruited as supervisor considering their knowledge of biomedical practice (this was taken as a resource of information for data collectors). Both interviewers and supervisors were trained, demonstrated, and practiced on the data collection technique.

The data collectors were given data collecting instrument on the morning of each day. At the end of each day, the supervisors checked the completeness of the questionnaires. The data collectors came cross with the locked house during data collection and re -visited.

VI. Data Analysis

To ensure that all needed information was collected and recorded appropriately, the supervisors and principal investigator checked data in the field. Data analysis was started by sorting and performing quality control checked up at the field.

The data entered into Epi Info version 3.5.1 and analyzed using SPSS version 20 software. It was justified that all totals correspond to the total number of study units. There were columns for no response or missing data to arrive at accurate total figures. Data clean up was performed by cheek for frequencies, accuracy, outliers, and consistencies and missed values and variables. Frequencies, proportions, and summary statistics were used to describe the study population about relevant variables using tables, charts and graphs. Odds ratio and the chi-square test were computed to assess the strength of the associations. The bivariate analysis was carried out to calculate the crude odds ratio (OR) and a 95% confidence interval (CI). For all statically significance tests, the cut of value set was P<.05 as this considered statically significant. Since crude odds ratio (OR) did not take into account the effect of the confounding variable(s), multivariate analysis were applied by fitting the logistic regression.

VII. Ethical Considerations

Before data collection, ethical clearance was taken from the ethical clearance committee of the Jimma University, Institute of health science. A formal letter of permission was obtained from administrative bodies of the zone to the woreda and then to the respective kebeles. Moreover, confidentiality assured for the information provided since the name of study participant was not stated on the questionnaire rather coding system was applied. The purpose of the study was described to the study participants. Before starting the interview, the respondents were requested for their verbal consent to participate in the study and obtained. During survey, the interviewer did not find the debilitated, neglected and sick individuals in critical condition

VIII. Result

a) Socio-Economic and Demographic Factors

A total of 804 households heads were involved in giving a response rate of 95.3 %. Among the study participants male comprises 693 (86.2%) and 111 (13.8%) were females. Majority of the sick individual lies at the age group of 18-25 years which accounts for 372 (46.3%). Seven hundred thirty-one (90.9%) of study participant had monthly income <1170 birr.

Table 1: Socio-economic and demographic characteristics of household head respondents (n=804) in Dale woreda, Sidama Zone, SNNPR, May 2017

Characteristics	No	%
Residence		
Urban	179	22.3
Rural	625	77.7
Sex		
Male	693	86.2
Female	111	13.2
Age in year		
18-25	372	46.3
26-35	324	40.3
36-45	66	8.2
46+	42	5.2
Religion		
Orthodox	125	15.5
Protestant	558	69.4
Muslim	63	7.8
Others	58	7.2
Ethnicity		
Sidama	503	62.6
Amhara	74	9.2
Gurage	67	8.3
Woilata	92	11.4
Others	68	8.5
Occupation		
Farmer	561	69.8
Employee	169	21
Others	74	9.2
Marital status		
Married	528	65.8
Single	197	24.5
Others	78	9.7
Educational status		
Illiterate	336	41.8
Primary education (1-8)	333	41.4
High school and above	135	16.8
Monthly income (in birr)		
<1170	731	90.9
≥1170	73	9.1
Family size		
<5	480	59.7
≥5	324	40.3

b) Health care seeking behavior

i. *Appropriate health care seeking behavior*

Overall appropriate health care seeking behavior of household heads was 585 (72.8%) at the study area. Public health center was the most common place where two hundred twenty-two (37.9%) participants sought health care, and only 10 (1.7%) participants sought health service from a private hospital.

Inappropriate health seeking care behavior reported among household heads was self-treatment 81(37.0%), traditional healer 38(17.4%) and did not know where to go/ nothing 100(45.6%). In addition to that 34 (15.5%), respondents did not know where best treatment is available. But 145 (66.2%) and 40 (18.3%) respondents believed that best treatment is available in a modern health institution and traditional healer respectively.

Table 2: Health-seeking behavior among household heads in Dale woreda, Sidama Zone, SNNPR, May 2017

Characteristics	No	%
Appropriate health care seeking (n=585)		
Public Health Center	222	37.9
Private Clinic	95	16.2
Health Post	96	16.4
Public Hospital	162	27.7
Private Hospital	10	1.7
Inappropriate health care seeking (n=219)		
Self-Treatment	81	37
Traditional Healer	38	17.4
Did not know where to go/ nothing	100	45.6

ii. *Reason for not seeking modern health care*

Two hindered Nineteen (27.2%) of household heads did not seek health care from modern health facility. The main reason reported for not seeking health care were lack of money 94 (42.9%), not effective treatment available 54 (24.7), symptom is not serious 17 (7.8%) and long distance 13 (5.9%). Among the participants who did not seek health care from the modern health facility 81 (37%) practiced self-treatment. The main reason reported for practicing self-treatment were I know the treatment by myself 26 (32.1%), it is cost effective 22 (22.7%), diseases is not critical 17 (21%).

Table 3: Reason for not seeking modern health care among household heads in Dale woreda, Sidama Zone, SNNPR, May 2017

Variable	No	%
Reason for not visiting modern health facilities (n=219)		
Lack of money	93	43
Not effective treatment available	55	25
The symptom is not critical	17	7.8
Long distance	14	6.4
Others	40	18
Reason for preferring self-treatment(n=81)		
I know the treatment my self	26	32
It is cost effective	22	27
Diseases is not serious	17	21
Long waiting time	6	7.4
Others	10	12
Time of health care seeking in response to symptom experienced (n=585)		
Immediately as illness start	118	54
≤1 days	110	19
2-5 days	98	17
≥6 and above days	299	51

iii. *Approaches of health professional and Satisfaction of health service seeker*

The title of health professionals reported among modern health facility visitors were Doctors 162 (27.7%), Nurses 145 (24.8%), health officer 16 (2.7%), health extension workers 94 (16.7%) and 168 (28.7) did not know the title of health care providers. Participants reported Health professional approach during health care provision as respectful 301 (73.6%), polite 299 (72.6%), knowledgeable 276 (67.3%) and friendly 358 (87.3%) and 417 (71.3%) of participants reported they would return to seek medical care, but 168 (28.7%) of households reported that they would not return to seek medical care from those health care giver.

Table 4: Approaches to the health professional and households Satisfaction with health service sought in Dale woreda, Sidama Zone, May 2017

Variable	No	%
Who did you talk to / see at modern health service care unit? (n=585)		
Doctors	162	27.7
Nurse	16	2.7
Health extension workers.	94	16.1
I do not know	168	28.7
Health professional approach during treatment provision (n=585).		
Respectful	301	73.6
Polite	299	72.9
Knowledgeable	276	67.3
Friendly	358	87.5
Would you return to seek advice or treatment (n=585)		
Yes	417	71.3
No	168	28.7

iv. *Factors associated with the outcome variable*

Urban residents were 3.32 times more likely to seek appropriate health care as compared to rural residents [AOR=3.32, 95% CI: 1.94, 5.68]. Having family size <5 were 2.29 times more likely to seek appropriate health care as compared to whose family size were ≥5 [AOR=2.29, 95% CI: 1.64, 3.19]. Educational level of High school and above households were 4.26 times more likely to seek appropriate health care as compared to those households who did not have formal education [AOR=4.26,95% CI: 2.16, 8.43]. The odds of having appropriate health - seeking behavior for symptom experienced among household heads earning a monthly real per capita income of ≥1170 ETB was 2.98 times higher than those household heads earning a monthly real per capita income of <1170ETB [AOR=2.98,95% CI:1.37, 6.44].

Table 5: Bivariate analysis of factor associated with outcome variables, May 2017

	Health Care Seeking Behavior		
Variables	Yes No (%)	No No (%)	COR (95% CI)
Ethnicity			
Sidama	359(71.4)	144(28.6)	1
Amhara	50 (67.6)	24(32.4)	0.84(0.49,1.41)
Gurage	55(82.1)	12(17.9)	1.84(0.96,3.53)
Woilata	68 (73.9)	24(26.1)	1.14(0.69,1.89)
Others	53(77.9)	15 (22.1).	1.42(0.77,2.59)
Residence			
Urban	161(89.9)	18(10.1)	4.23(2.53,7.09)**
Rural	424(67.8)	201(32.2)	1
Family size			
<5	380(79.2)	100(20.8)	2.21(1.61,3.02)**
≥5	205(63.3)	119(36.7)	1
Educational status			
Had no formal education	225(67.0)	111(33.0)	1
Primary education (1-8)	236(70.9)	97(29.1)	1.20(0.86,1.67)
High school & above	124(91.9)	11(8.1)	5.56(2.88,10.72)**
Monthly income (in birr)			
<1170	520(71.1)	211(28.9)	1
≥1170	65(89.0)	8(11)	3.29(1.56,6.99)*
Occupational status			
Farmer	391(69.7)	170(30.3)	1
Employee	135(79.9)	34(20.1)	1.73(1.14,2.62)*
Others	59(79.7)	15(20.3)	1.71(0.99,3.10)

Table 6: Multivariable logistic analysis of independent predictors of health seeking behavior in Dale Woreda, May 2017

Variables	Health Care Seeking Behavior			
	Yes No (%).	No No (%)	COR (95% CI)	AOR (95%CI)
Ethnicity				
Sidama	359(71.4)	144(28.6)	1	
Amhara	50 (67.6)	24(32.4)	0.84(0.49,1.41)	
Gurage	55(82.1)	12(17.9)	1.84(0.96,3.53)	
Woilata	68 (73.9)	24(26.1)	1.14(0.69,1.89)	
Others	53(77.9)	15 (22.1).	1.42(0.77,2.59)	
Residence				
Urban	161(89.9)	18(10.1)	4.23(2.53,7.09)**	3.32(1.94,5.68)**
Rural	424(67.8)	201(32.2)	1	1
Family size				
<5	380(79.2)	100(20.8)	2.21(1.61,3.02)**	2.29(1.64, 3.19)**
≥5	205(63.3)	119(36.7)	1	1
Educational status				
Had no formal education	225(67.0)	111(33.0)	1	1
Primary education (1-8)	236(70.9)	97(29.1)	1.20(0.86,1.67)	1.32(0.94,1.86)
High school & above	124(91.9)	11(8.1)	5.56(2.88,10.72)**	4.26(2.16,8.43)**
Monthly income (in birr)				
<1170	520(71.1)	211(28.9)	1	1
≥1170	65(89.0)	8(11)	3.29(1.56,6.99)*	2.98(1.37,5.68)*
Occupational status				
Farmer	391(69.7)	170(30.3)	1	
Employee	135(79.9)	34(20.1)	1.73(1.14,2.62)*	
Others	59(79.7)	15(20.3)	1.71(0.99,3.10)	

*Note: *-significant result, 1-reference category, ** p-value <0.001, * p-value <=0.05*

IX. Discussion

In this study, the magnitude of appropriate health care seeking behavior among household heads for symptom experienced was 72.8 % in the surveyed communities with urban household heads sought 89.9 % and 67.8 % rural household heads. There is an increment of utilization of modern health service in both residences in current study compared to a study done in Amhara region, Ethiopia revealed that 52.3% in urban and 29.6% in rural and similar Study conducted in Zambia and Nigeria indicated 43.5% and 48.9% respectively (35,24). The study conducted in Senegal showed almost similar findings (75%) with current study (28).

The improvement might be due to continuous efforts to strengthen the health system, infrastructure, increase public awareness, and involvement of community health extension workers and building staff capacity.

Similarly, study conducted in Tanzania indicated 87.7% of rural respondents sought health service from the modern facility (37). This finding is high compared to current study findings which shows 67.8% of rural households sought health service from a modern facility. The big difference observed here might be due to the differences in methodologies (difference in geographical differences, sampling techniques and the difference in definition of health care seeking behavior).

In this study, the magnitude of inappropriate health care seeking behavior among household head for symptom experienced was 27.2 % in the surveyed communities. The research conducted in Amhara region, Ethiopia, Kenya and Zambia indicated that preference for non formal facilities was 47.3%, 37.5% and 56.5 % respectively (35, 36). The difference might be due to improvement in accessibility of institutions and health information delivery by health extension program (HEP). Forty-three percent of household heads reported lack of money was the most common reason for not seeking health service from a modern health facility. Study conducted in Pakistan and Nigeria 62% & 50.3% respectively supported the current study findings (34, 25).

The study conducted in Tanzania showed that only 12.3% did not seek health service from a modern health facility which is three times less than the current findings (37). The possible explanation might be due to the differences in methodologies (the different approach in data the collection, study population, the location of studies, and difference in definition of health seeking behavior).

Average monthly income was significantly affects health care seeking behaviors of household heads in the study area. The odds of having appropriate health-seeking behavior for symptom experienced among household heads earning a monthly real per

capita income of ≥1170 ETB was 2.98 times higher than those household heads earning a monthly real per capita income of <1170ETB [AOR=2.98,95% CI: 1.37,6.44]. Study conducted in Pakistan, Kenya, Nigeria and Ethiopia supported the findings (34, 36 24, 19). The possible explanation might be those household heads who earn high monthly income may have more access to information. The affordability of health care service may not bother them.

In this study, family size showed highly significant (p=0.00) association with health care seeking behavior. Households heads whose family size < 5 were 2.29 times more likely to have appropriate health-seeking behavior than those households heads whose family size ≥5. Population-based cross sectional Study conducted in North West Ethiopia revealed similar findings (19). This might be because that those who have the larger family members should carry more responsibilities and experienced severe socio-economic hardship which prevented them from seeking appropriate health care from modern health facilities for symptom experienced.

Educational status was highly significant (p=0.00) with the utilization of modern health service. Those households heads whose Educational level high school and above were (AOR =4.26, 95%CI 2.16, 8.43) 4.26 times more likely to have appropriate health-seeking behavior than those households heads who had non-formal education. The study conducted in four regions of Ethiopia revealed that household heads with informal education are 1.6 times (95% CI 1.07 to 2.46, p=0.02) more likely to take their children to health centers for ARI/pneumonia (baseline is health posts) which potentially offer a higher quality of care as compared with household heads with no education. Household heads with primary or secondary education are systematically more likely to seek care immediately as opposed to their less educated counterparts. Study conducted in Pakistan showed that educational status of head of household (OR =3.4 95%CI 2.1,5) were significantly related to utilization of modern health institutions.

A similar study conducted in Benue state also revealed that educational level is statistically significant on health-seeking behavior (34, 47, 18).

This might be due to that better-educated people are aware of health problem, know more about the availability of health-care services, and use this information more effectively to maintain or achieve good health status.

Residence of household's heads was highly significant with appropriate health-seeking behavior. Urban households were 3.32 times more likely to seek health care than rural households (AOR=3.32, 95% CI: 1.94, 5.68) at p-value <0.001. This study is similar to the findings in Jamaica that indicated healthcare seeking behavior could be explained by area of residence in which urban households were more likely to have health-seeking behavior than rural households. Consistent study conducted in Pakistan showed that urban residence (AOR= 2.8, 95%CI 1.8, 4.5) were significantly related to utilization of modern health institutions (44, 34). This might be due to urban households had better accessibility to service.

The limitation of the study is it may have social desirability bias and recall bias.

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References Références Referencias

1. Keith Tones. Health promotion, health education and the public health. 2004; Oxford Textbook of Public Health. Fourth Edition. Oxford University Press. pp 829-863.
2. Bayu B, Thomas T. Healthcare Utilization among Urban and Rural Households in Esera District: Comparative Cross-sectional Study. American Journal of Public Health Research. 2016: 4(2).
3. Health-seeking behavior and the health system response 3 Institute of African Studies, University of Nairobi, Nirobi, Kenya August 2003.
4. Begashaw B, Tessema F, Gesesew HA (2016) Health Care Seeking Behavior in Southwest Ethiopia. PLoS ONE 11(9).
5. P. Dupas, "Health Behavior in Developing Countries," vol. 3, no. Annual Review of Economics, pp. 1-39, 2011.
6. O. Omotoso, "Health Seeking Behaviour among the Rural Dwellers in Ekiti State, Nigeria," *An Int. Multi-Disciplinary J. , Ethiop.*, vol. 4, no. 2, pp. 125-139, 2010.
7. A review of health seeking behavior: Problems and Prospects University of manchistry health system development programme, 2003.
8. Negussie B. Traditional wisdom and modern development: A case study of traditional peri-natal knowledge among women in southern Shewa, Ethiopia. Doctoral dissertation, University of Stockholm, December 1988.
9. Fassil H. "We do what we know". Local health knowledge and home-based medicinal plant use in Ethiopia. Doctoral dissertation, International Development Center, Oxford University, 2003.
10. K. Helmut etal. Illness and health behavior in Addis Ababa and rural central Ethiopia; Social Science & Medicine 1987; Volume 25, Issue 9, Pages 1003-1019.
11. Van der Hoeven M, Kruger A, Greeff M: Differences in health care seeking behaviour between rural and urban communities in South

Africa. International journal for equity in health 2012, 11:31.
12. MoFED, "Health Sector Development Programme IV 2010/11-2014/15," vol. 39, no. October 2010, pp. 1-110, 2010.
13. Cronin T, Sheppard J, de Wildt G: Health-seeking behavior for schistosomiasis: a systematic review of qualitative and quantitative literature. The Pan African medical journal 2013, 16: 130.
14. Mebratie AD, Van de Poel E, Yilma Z, Abebaw D, Alemu G, Bedi AS: Healthcare- seeking behavior in rural Ethiopia: evidence from clinical vignettes. BMJ open 2014, 4(2).
15. MK. M: The determinants of health-seeking behavior in a Nairobi slum, Kenya. Eur Sci J 2013, 9(8).
16. Meseret S. Takele T. and Tesfahun M. Appropriate health-seeking behavior and associated factors among people who had cough for at least two weeks in northwest Ethiopia: a population-based cross-sectional study: 2013.
17. A review of health seeking behavior: Problems and Prospects University of manchistry health system development programme, 2003.
18. Elvis. J, Eze Uchenna.G and Chinelo. H: Educational Level, Sex and Church Affiliation on Health Seeking Behaviour among Parishioners in Makurdi Metropolis of Benue State, 2014.
19. Meseret. S Takele. T and Tsfahun M .Appropriate health-seeking behavior and associated factors among people who had cough for at least two weeks in northwest Ethiopia: a population-based cross-sectional study: 2013.
20. Sèye. M etal. Intra-Household Decision-Making on Health and Resource Allocation in Borgou, Béni; 2000.
21. Espino F, Manderson L: Treatment seeking for malaria in Morong, Bataan, the Philippines. Soc Sci Med. 2000; 50.
22. Nuwaha F: People's perception of malaria in Mbarara Uganda. Trop Med Int Health 2002; 7.
23. PM. P etal. Assessing health seeking behavior among tuberculosis patients in rural South Africa. 2001; 5(7)
24. Benjamin. U and Obinna. E. Socio-economic differences and health seeking behavior for the diagnosis and treatment of malaria: a case study of four local government areas operating the Bamako initiative programmed in south-east. 2004.
25. Abdulraheem IS: Health needs assessment and determinants of health-seeking behavior among elderly Nigerians: A house-hold survey: 2007; 6(2).
26. Babar T. Shaikh and Juanita Hatcher. Health seeking behavior and health service utilization in Pakistan: challenging the policy makers; Journal of Public Health Advance. 2004.
27. M Jain, D Nandan, S K Misra; Qualitative Assessment of Health Seeking Behavior and Perceptions Regarding Quality of Health Care Services among Rural Community of District Agra Indian Journal of Community Medicine - September, 2006; Vol. 31, No. 3, July.
28. Aurelin. F and Richard. L. Health seeking behavior for child hood malaria; household dynamics in rural Senegal, journal of Biosocial science 41, 1(2009) 1-19.
29. A Country Status Report on Health and Poverty; the World Bank Africa Region Human Development & Ministry of Health Ethiopia; June 2004.
30. Balabanova D, McKee M, Mills A. Good health at low cost 25 years on: what makes a successful health system? London: London School of Hygiene & Tropical Medicine, 2011: 83–116.
31. Ebrahim G.J. and Rarker J.P. Primary health care. Reorienting organization support Macmillan.
32. WHO regional publication European series. The use of health services measurement of levels of health, Holland W.W. et al health services.
33. Gupta I. And Dasgupta. Health seeking behavior in urban Delhi. An exploratory study.
34. Abdullah. L et al. The health seeking behavior of elderly Population in a poor-urban community of Karachi, Pakistan. Journal of Pakistan medical association, 2007.
35. Mesganaw. F and Getu. D: Health Service Utilization in Amhara Region of Ethiopia; Ethiop. J. Health Dev. 2003; 17(2): 141-147].
36. African Economic Research Consortium. Nairobi, Kenya.1999.
37. K. John et al. Health-seeking behavior of human brucellosis cases in rural Tanzania. BMC Public Health 2007,. http://www.biomedcentral.com/1471-2458/7/315.
38. Fanta F. Effect of cost sharing (in terms of revolving drug fund) on health service utilization in Wolaita Zone, SNNPR, Ethiopia. A thesis submitted to Addis Ababa University. 2004.
39. Olijira L and G/ Silassie S. Satisfaction with outpatient health service at Jimma hospital south West Ethiopia. Ethiopia journal health devel. Dec. 2001; 15(3).
40. Worku S. and G/mariam A. Practice of self-medication in Jimma town. Ethiopia journal health devel. 2009; 17(2): 111-116.
41. Andualem T. and G/Mariam T. Self-medication practice in Addis Ababa. A prospective study. Ethiopia Journal health devel. 2003; 14(1): 1-11.
42. Abula T. and Worku A. Patient non-compliance with drug regimens for chronic disease in northwest Ethiopia. Ethiopia journal health devel. Dec 2001; 15(3).
43. Goldman N. and Heuveline P. Office population research. Health seeking behavior for child illness in Guatemala. August 2004.

44. P. A. Bourne, "Socio-demographic determinants of Health care-seeking behavior, self- reported illness and Self-evaluated Health status in Jamaica," Int. J. collaborative Res. Intern. Med. Public Heal. vol. 1, no. 4, pp. 101-130, Jun. 2009.
45. Federal Democratic Republic of Ethiopia Ministry of Health. Health Sector Transformation Plan (HSTP), October 2015.
46. Mariam DH. Bridging the availability-utilization gap: the issue of quality in the provision of health care. Ethiop J Health Dev 2011; 25: 1–2.
47. Anagaw. D. etal. Health seeking behavior in rural Ethiopia evidence from clinical vignettes, March and April, 2011.
48. V. S. Tejas Shah, Mitel Patel, "Health care seeking behavior of urban and rural community in Ahmedabad district," *Int. J. Med. Sci. Heal.*, vol. 2, no. 4, pp. 4-7, Jun. 2013.

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Determinants of Delay in Malaria Treatment Seeking for Under-Five Children with Malaria Attending Health Centers of Bench-Maji Zone, South-Western Ethiopia Case-Control Study

By Daniel Shiferaw, Mesfin Geremew & Abera Kumalo
Mizan-Tepi University

Abstract- *Introduction:* Malaria has continued to be a public health problem in the World today despite concerted efforts aimed at its control and elimination. Prompt diagnosis and timely treatment of malaria within 24 hours after onset of first symptoms can reduce illness progression to severe stages, and therefore, decrease mortality. Thus the current study assessed determinants of delayed malaria treatment seeking for under-five children with malaria attending health centers of Bench-Maji zone from March 1 – June 30/2016.

Methods: Community based Unmatched Case control study design with a total sample size of 354 identified using systematic sampling. Cases were under - five children who had confirmed Malaria and Sought treatment after 24 hrs of developing sign and symptom, and controls were under-five children who had clinical malaria and came for treatment within 24 hrs of developing sign and symptom. The association between the outcome variable and the explanatory variables was analyzed by multiple Logistic regressions. The strength of association was interpreted using odds ratio and confidence interval. The P value < 0.05 was considered statistically significant in this study.

Keywords: *delay in malaria treatment seeking, malaria, under-five children, care takers.*

GJMR-F Classification: *NLMC Code: WC 750*

Strictly as per the compliance and regulations of:

Determinants of Delay in Malaria Treatment Seeking for Under-Five Children with Malaria Attending Health Centers of Bench-Maji Zone, South-Western Ethiopia Case-Control Study

Daniel Shiferaw [α], Mesfin Geremew [σ] & Abera Kumalo [ρ]

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Result: The study was carried out on 326 under-five children with confirmed malaria with the response rate of 92.1%. Among them, 132 (40.5%) cases and 194 (59.5%) were controls which show cases to control ratio was 1:1.5. The annual income of the caretaker, Number of under-five children, having information about malaria, perceived distance and cost of transport to the health center are significantly associated with malaria treatment seeking among under-five children.

Conclusion and Recommendation: Most under-five children seek malaria diagnosis and treatment earlier (within 24 hrs). Malaria control programmed should focus on increasing access to public health facilities through the expansion of infrastructures such as road and health centers, and also emphasis should be given on family planning, raising source of income of the family; increasing awareness of the community about early diagnosis and treatment of malaria.

Keywords: delay in malaria treatment seeking, malaria, under-five children, care takers.

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I. Introduction

Malaria is a protozoal infection caused by four species of Plasmodium known to affect humans. Life-threatening disease occurs from Plasmodium Falciparum infection, which usually presents with acute fever, chills, sweating, and headache progressing to icterus, coagulation defects, shock, renal and liver failure, acute encephalopathy, pulmonary or cerebral edema, coma and death. Prompt diagnosis and treatment are essential even in mild cases to prevent complications (1-3).

The World Health Organization recognizes that early diagnosis and prompt treatment, within 24 hours of onset of symptoms, is an essential element of malaria control. Primarily timely and appropriate treatment preferably within 24 hours of onset of illness symptoms resulted in reduced severe morbidity and probability of mortality among children under the age of five years. In addition to early diagnosis and treatment, vector control measures such as chemical, biological or environmental management remain the most effective measure to prevent malaria transmission and hence morbidity and mortality reduction (4).

The concept of treatment seeking especially as regards to time taken from recognition of the illness to do so involves how people employ the healthcare systems in their respective socio-cultural, economic circumstances which determine access to health services are the major factors that affect prevention and control of the disease. All these define the social position of health and provide a better understanding of the disease process (3, 5).

Regardless of this, in malarious countries morbidity related to malaria occur at home because of delayed treatment or without receiving appropriate medical care. A considerable proportion of deaths among under-five children in sub-Saharan Africa occur in part because of delays in seeking medical care (6).

Therefore, in addition to health care service, other factors such as socioeconomic status can determine the health care seeking behavior (7).

Thus, the investigators need to address the determinants of delayed malaria treatment seeking among under- five children with confirmed malaria attending health centers of Bench-Maji zone.

II. Methods and Materials

a) Study Design and Population

A community based unmatched case-control study conducted in 8 public health centers found in 7 woredas of Bench-Maji zone which are selected by random sampling method from March 1- June 30/2016. The study population was under five children who had confirmed malaria and sought treatment in the health centers.

The Cases were under five children who had confirmed Malaria and sought treatment after 24 hrs of developing sign and symptom, and controls were under-five children who had confirmed malaria and sought treatment within 24 hrs of developing sign and symptom.

A total of 330 under-five children (132 cases and 198 controls) were selected by two population proportion formula for unmatched case-control study design using Open Epi version 2.3.1 statistical software. By considering 22 % of the respondents sought treatment within 24 hour for their children with malaria (controls) (8); using the default odds ratio of 2.01; with 95% confidence level; 80% power of the study; 1:1.5 cases to control ratio and 5% maximum acceptable difference.

Both cases and control were allocated for each selected health centers proportional according to the under-five population. Sampling frames were prepared for both cases, and controls for each health centers. Study participant within the health centers were selected by using systematic random sampling techniques using patient history card and laboratory request. Those under-five children, who were positive for any species of Plasmodium, were included and the care takers placed in private room for interview until.

b) Data Collection Instrument

The data were collected through face to face interview, and record review using pre-tested structured questionnaires. The structured interview questionnaire had taken 15 minutes with closed-ended questions and predetermined response options which are developed specifically for this study.

The questionnaire has three parts. The first part had socio-demographic factors that encompass age, sex, occupation, educational status, income, ethnicity, marital status, family size and communication materials. In the second, mothers/caretakers factors such as knowledge, perception, and practice were assessed, and finally, health system related factors were identified.

The questionnaire was prepared in English and translated to local language (Amharic). Then pre-tested on 5% of sample size a week before actual data collection period in other public health center and after pre-test necessary modifications were done.

Trained nurses hired from hospitals were administered the questionnaire and technical support was given by the Principal Investigator. At the time of data collection, filled questionnaires were checked for completeness and consistency of information by the supervisor on daily basis and typing errors were manually edited.

III. Study Variables

a) Dependent Variables

Delay in malaria treatment seeking among under-five children.

b) Independent Variables

1. Sociodemographic Characteristics: Age, Sex, Marital status, Educational status, and Income of the caretaker or the mother. Age and sex of the child. Presence of communication materials in the house; Total family size; Number of under-five children in house; Cost of transport; Distance of health Institution from the house.
2. Knowledge, perception, and practice of the caretakers/mothers/about malaria and its treatment.
3. Health system factors: Health personnel's approach; Health care satisfaction; Types of anti-malarial drugs.

c) Data Analysis Procedure

The coded Data was checked, cleaned and entered into Epi Info version 3.5.4 and then exported into SPSS window version 20.0 for analysis. Bivariate analysis was conducted first for each potential explanatory risk factor to select for multivariate analysis. Multivariable Logistic regressions were performed to assess the association between binary outcomes and different explanatory variables. The strength of association was interpreted using odds ratio and confidence interval. A P value < 0.05 was considered statistically significant in this study.

d) Operational Definitions

Malaria Treatment-Seeking is any attempt made by the mother/caretaker to obtain expert opinion or treatment from health care provider when the child is illness.

Delayed in Malaria Treatment Seeking is an attempt made by the mother/caretaker for the diagnosis and treatment of malaria after 24hrs of developing sign and symptoms of malaria for under five children.

Non-Delayed in Malaria Treatment Seeking- is an attempt made by the mother/caretaker for the diagnosis and treatment of malaria within 24hrs of developing sign and symptoms of malaria for under five children

Caretaker: Anybody who cares the child by providing food, cloth and other necessary support that a child needs to survive.

IV. Ethical Considerations

Before the data collection, Ethical clearance and Cooperation letter were written from Mizan-Tepi University, and then submitted to respective district health office and all study health centers for permission. The purpose of the study was informed to the study subjects, and their oral consent was obtained. The respondents' right to refuse or withdraw from participating in the interview was maintained, and the information provided by each respondent was kept strictly confidential by making each questionnaire coded and not sharing personal information of any patient to the third party.

V. Result

a) Socio-Demographic Characteristics

The numbers of respondents were 132 (40.5%) cases, and 194 (59.5%) controls with a total response rate of 98.8%. Seventy nine (59.8%) respondents of cases and 126 (64.9%) respondents of controls were mothers of the children. The mean age of the under-five children was 28 months (SD=14.16). One hundred eighty eight (56.4%) children (in both cases and controls) were up to 2 years of age. In 120 (90.9%) home of cases and 188 (96.9%) home of controls have children up to 2 years of age (Table 1).

Concerning the educational status and occupation of the caretakers and the father 53 (40.3%) caretakers of cases and 64 (33%) caretakers of controls were unable to read and write. Thirty five (26.5%) caretakers of cases and 70 (36.1%) caretakers of controls were able to read and write. Seventy six (57.6%) caretakers of cases and 102 (52.6%) caretakers of controls were Farmers. Twenty eight (21.2%) caretakers of cases and 57 (29.4%) caretakers of controls were Housewives. Forty-five (34.1%) fathers of cases and 64 (33%) fathers of controls were unable to read and write. Forty (30.3%) fathers of cases and 76 (39.2%) fathers of controls were able to read and write. One hundred eleven (84.1%) fathers of cases and 146 (75.3%) fathers of controls were Farmers. The average Annual income (in cash) of respondents was 22,300 ET. Birr (SD=24, 205.58) birr, and 89 (67.4%) caretakers of cases and 143 (73.7%) caretakers of controls earned more than 10,000 birr (Table 2).

Table 1: Socio-demographic characteristics of Under-five Children, the caretakers and father of the children in Selected Health Centers of Bench-Maji Zone, South Western Ethiopia, 2016. (n=326)

Variable	Patient Category	
	Controls	Cases
Residence		
Urban	71(36.6%)	41(31%)
Rural	123(63.4%)	91(69%)
Relationship of the care takers to the under-five children		
Mother	126(64.9%)	79(59.8%)
Father	54(27.8%)	39(29.5%)
Others[1]	14(7.2%)	14(10.7%)
Age Category of the Child		
≤ 2 years	119(61.3%)	65(49.2%)
>2 years	75 (38.7%)	67(50.8%)
Sex of the Child		
Male	117(60.3%)	80(60.6%)
Female	77(39.7%)	52(39.4%)
Family Size		
≤3	16(8.3%)	25(18.9%)
4-7	144(74.2)	83(62.9%)
≥8	34(15.5%)	24(18.2%)
No of <5 Children in the House		
≤ 2 years	188(96.9%)	120(90.9%)
>2 years	6(3.1%)	12(9.1%)

[1]*Brother, Sister, Grandmother*

Table 2: Socio-demographic characteristics Under-five Children, the caretakers and father of the children in Selected Health Centers of Bench-Maji Zone, South Western Ethiopia, 2016. (n=326) continued

Variable	Patient Category	
	Controls	Controls
Occupational Status of the Care Takers		
Farmer	102(52.6%)	76(57.6%)
Housewives	57(29.4%)	28(21.2%)
Government Employee	21(10.8%)	12(9.1%)
Students	12(6.2%)	10(7.6%)
Others[1]	2(1%)	6(4.5%)
Educational Status of the Care Takers		
Unable to read and write	64(33%)	53(40.3%)
Able to read and write	70(36.1%)	35(26.5%)
Primary school	18(9.1%)	23(17.4%)
Secondary school	21(10.8%)	9(6.8%)
Preparatory school	4(2.1%)	2(1.4%)
College and above	17 (8.9%)	10(7.6%)
Educational Status of the Father		
Unable to read and write	64 (33%)	45 (34.1%)
Able to read and write	76 (39.2%)	40 (30.3%)
Primary school	21(10.8%)	31 (23.5%)
Secondary school	4 (2.1%)	6 (4.5%)
College and above	29 (14.5%)	10 (7.6%)
Occupation of the Father		
Farmer	146 (75.3%)	111 (84.1%)
Government employee	29 (14.9%)	11 (8.3%)
Merchant	19 (9.8%)	8 (7.6%)
Others[2]	8 (4.1%)	2 (1.5%)
Annual Income (birr)		
≤ 5,000	28(14.4%)	8(6.1%)
5,000-10,000	23(11.9%)	35(26.5%)
>10,000	143(73.7%)	89(67.4%)

[1]*Nongovernmental organization & Merchant*
[2]*Student, NGO Employee, Daily Laborers*

b) Caretaker /mother's perception, Knowledge and practice, and health system factors related factors

Out of the total, 120 (90.9%), respondents from the cases and 184 (94.8%) of respondents from the control group reported malaria as a health problem in their area. Fever reported as a symptom of malaria by 112 (84.4%) of respondents from cases and 177 (91.2%) of respondents from the control group. 38 (28.8%) caretakers of cases and 87 (44.8%) caretakers of the control group responded malaria is a communicable disease. 115 (87.1%) caretakers of cases and 186 (95.9%) caretakers of the control group responded malaria is a preventable disease. 103 (78%) of caretakers of the cases and 170 (87.6%) caretakers of the controls mentioned bed net as a means of prevention. 76 (57.6%) caretakers of the cases and 134 (69.1%) caretakers of the controls responded that they are using ITN for their under five children.

Regarding malaria-related information, 113 (85.6%) caretakers of cases and 188 (96.9%) caretakers of controls reported that they have seen or heard about malaria-related messages from different sources.

Most caretakers of cases, 128 (97.0%), and 181 (93.3%) caretakers of controls seek treatment from health centers when their children's are ill. 107 81.1%) respondents of the cases, and 180 (92.8%) respondents of the controls traveled > 1km to arrive at the health centers, and 26 (19.7%) caretakers of cases and 20 (10.3%) caretakers of control reported perceived the cost of transport rate as expensive. (Table 3)

Table 3: Caretakers/Mother's Knowledge, Perception and Practice, and Health System Factors in selected health centers of Bench-Maji Zone, South-Western Ethiopia, 2016. (n=326)

Variable	Patient Category	
	Controls	Cases
Use ITN for the child		
Yes	134(69.1%)	76(57.6%)
No	60(30.9%)	56(42.4%)
Malaria-Related Message		
Yes	188(96.9%)	113(85.6%)
No	6(3.1%)	17(14.4%)
Perceived Cost of Transport Rate		
Expensive	20(10.3%)	26(19.7%)
Fair	46(23.7%)	36(27.3%)
Cheap	30(15.5%)	2(1.5%)
Free	74(38.1%)	38(28.8%)
Perceived Distance from Home to Health Centers		
Very far	22(11.3%)	26(19.7%)
Far	85(43.8%)	29(23%)
Optimum	56(28.9%)	32(24.4%)
Near	31(16%)	45(34.1%)
Mode of Transport		
Foot	92(47.4%)	70(53.1%)
Public transport	70(36.1%)	54(40.9%)
Animal's Back	19(9.8%)	2(1.5%)
Others [1]	13(6.7%)	6(4.5%)
Distance from Home to HC (In KM)		
≤ 1km	14(7.2%)	25(18.9%)
>1km	180(92.8%)	107(81.1%)
The Time Taken from Home to HC on Foot (In hr)		
≤ 1hr	100(75.6%)	108(55.7%)
>1hrs	32(24.4%)	86(44.3%)

[1] *Ambulance & Carried by People*

c) *Determinants of delay in malaria treatment seeking for under-five with malaria attending Selected Health centers of Bench-Maji Zone, South-Western Ethiopia in 2016*

The final model was constructed using enter method of logistic regression method. On Bivariate analysis, the factors found to fulfill the minimum requirement (p-value < 0.2 in this study) were entered in to multivariable logistic regression for further analysis in order to control confounding effects.

Annual income of the caretaker; Number of under-five children; having heard or observed message about malaria; distance from residence to the health center and the cost of transport to reach to the health center were significantly associated with malaria treatment seeking among under-five children (Table 4).

Caretakers of the children's with malaria who earned an annual income of 5000-10,000 Birr were 5 times more likely to delay the child for the treatment of malaria than caretakers who earned an annual income of > 10,000 Birr (OR, 5.415; 95% CI, 1.98, 14.83).

Caretakers/mothers of the children's with malaria who had two children and less were 0.15 times less likely to delay the child for the treatment of malaria than caretakers who had > two children (OR, 0.15; 95% CI, 0.03,0.68).

Caretakers/mothers of the children's with malaria who ever heard or observed about malaria-related message were 0.12 times less likely to delay the child for the treatment of malaria than caretakers who never heard or observed about malaria-related information (OR, 0.12; 95% CI, 0.04,0.40).

Mothers/caretakers who perceive the distance between the residence and health center as optimum during visit were 0.13 times less likely to delay in seeking treatment for their than those who perceive the distance between residence and health center as near to during the current visit (OR, 013; 95% CI, 0.04, 0.40).

Mothers/caretakers who perceive the cost of transport to reach to the health center as expensive were 4 times more likely to delay in seeking treatment for their children than those who perceive the distance

between residence and health center as near (OR, 4.01; 95% CI, 1.30, 12.36).

Also mothers who perceive the cost of transport to reach to the health center as fair were 5 times more likely to delay in seeking treatment for their children than those who perceive the distance between residence and health center as near (OR, 5.36, 95% CI, 2.09, 13.77) (Table 4).

Table 4: Variables significantly associated with delay in malaria treatment seeking for under-five children with Malaria Attending Selected Health Centers of Bench-Maji Zone, South-Western Ethiopia in 2016. (n=326)

Variables	Patient Category		Crude OR (95% CI)	Adjusted OR (95% CI)
	Control	Cases		
Annual income of the caretaker (in Birr)				
<=5,000	28(14.4%)	8(6.1%)	0.46(0.20, 1.05)	0.325 (.087,1.219)
5001-10,000	23(11.9%)	35(26.5%)	2.45(1.36, 4.41)*	5.415(1.98, 14.83)*
>10,000	143(73.7%)	89(67.4%)	1.00	1.00
Number of under-five children in the house				
≤2	188(96.9%)	120(90.9%)	0.32 (0.12,0.87)*	0.15 (0.03, 0.68)*
>2	6(3.1%)	12(9.1%)	1.00	1.00
Care takers ever heard or seen about malaria related message				
Yes	188(96.9%)	113(85.6%)	0.21(0.81, 0.55)*	0.118(0.04, 0.40)*
No	6(3.1%)	17(14.4%)	1.00	1.00
Caretaker's perception of distance from residence to the Health Center				
Very Far	22(11.3%)	26(19.7%)	0.81 (0.39, 1.69)	0.37(0.10, 1.40)
Far	85(43.8%)	29(23%)	0.24 (0.13,0.44)	0.08(0.02, 0.27)
Optimum	56(28.9%)	32(24.4%)	0.39 (0.21, 0.74)*	0.13(0.04,0.40)*
Near	31(16%)	45(34.1%)	1.00	1.00
Caretakers perception of the cost of transport to reach to the Health Centers				
Expensive	20(10.3%)	26(19.7%)	2.53 (1.25, 5.11)*	4.01(1.30,2.36)*
Fair	46(23.7%)	36(27.3%)	1.52 (0.85, 2.74)	5.36(2.09,13.77)*
Cheap	30(15.5%)	2(1.5%)	0.13 (0.03, 0.57)*	0.37 (0.07, 1.93)
Free	74(38.1%)	38(28.8%)	1.00	1.00

**P value<0.05*

VI. Discussion

Ensuring prompt diagnosis and timely malaria treatment will prevent most cases of uncomplicated malaria from progressing to severe and fatal illness. To avoid this, treatment must begin as soon as possible, generally within 24 hours after symptoms onset. The reason why mothers/caretakers delay in malaria prompt diagnosis and timely treatment for under-five is not well studied in the study area as well as in many parts of Ethiopia.

According to the current study, caretakers of the children's with malaria who earned an annual income of 5000-10,000 Birr were 5 times more likely to delay the child for the treatment than those who earned annual income of > 10,000 Birr. This shows that having more income could motivate parents to bring their children for early diagnosis and treatment of malaria and also those who had better income could have better access to a health care facility as well as those with better income can able to cover any expenses related to diagnosis and treatment of malaria. Because of limited resources, an individual caretaker may fail to take timely treatment seeking decision for her perceived sick child because she might be forced to first attend to income-generating activities to meet basic day-to-day needs, including food for the household. This finding is similar with the result of a study done in southern Ethiopia which shows parents who had a monthly income 500 Birr and below were a more likely delay to get their children for prompt diagnosis and timely malaria treatment than who had 1000 ETB and above (9). Also, the research finding from Myanmar is in line with this study and states that families with an average yearly income per person more than US$200 were more likely to seek treatment for malaria within 24 hours (10). Similarly, some Nigerian study revealed that children's from higher social class were the predictor of early presentation of the children to the health institution (11), and 21.4% of mothers who sought treatment for their children after 24 hours were due to

financial difficulties (3). But the current study finding is not consistent with the Tanzanian study which showed household wealth status was not associated with delay to seek medical care (12, 13).

Caretakers of the children's with malaria who had two children and less were 0.15 times less likely to delay the child for the treatment of malaria than caretakers who had > two children. This finding is supported by the study done in central Tanzania children from households with two to three under-five children were more likely to be delayed for medical care compared to children from households with only one child (12). Having planned and limited number of children increases the family's financial capabilities, enough time to care for the children and the whole family; generally it could contribute to the early diagnosis and treatment of malaria.

The current study finding indicates the importance of having information among the parents about malaria as a determinant of delay in treatment of malaria. Caretakers/mothers of the children's with malaria who ever heard or observed about malaria-related information were 0.12 times less likely to delay the child for the treatment of malaria than caretakers who never ever heard or observed about malaria-related message. Those parents who are knowledgeable of the fatal consequence of malaria can bring the child to the health institution earlier. Since most of the study subjects (62.9%) are mothers of the under-five children the information or message related to malaria may show the knowledge or educational level of the mothers. Some literature indicates the educational attainment of the mothers as a predictor of treatment seeking for children with malaria (9, 3). The study from southern Ethiopia revealed that illiteracy of mothers was one of the factors which contributed to the delay in malaria prompt diagnosis and timely treatment of under-five children (9). In contrary, one of Nigerian study finding indicates attending secondary school were a predictor of late presentation of children's to health institutions (11).

Caretaker's perception of distance from residence to the Health Center was among the current study findings. Caretakers of the child who perceived the distance as optimum were 0.13 times less likely to delay for treatment than those who perceived the distance from home to health center as near). This finding was supported by a study report from southern Ethiopia that, caretakers of children who had difficulties to cover the costs transport were more likely to receive delayed malaria treatment (14). Also, the current finding is supported by Tanzanian study showing children living at a distance of≥5 kilometers from the nearest health facility were about twice as likely to delay to be taken for medical care as those in the shorter distances (12). Households located more than 3 km from a health facility were more likely to delay seeking malaria treatment. Similarly, the study finding form Myanmar reveals households located more than 3 km from a health facility were more likely to delay seeking malaria treatment (10). The present study finding is also consistent with a study from Uganda found that shorter distances were associated with timely malaria treatment seeking (15).

According to the current finding, one of the factors which affect malaria treatment seeking among children < 5 years was caretaker's perception of the cost of transportation to reach to the health centers. Caretakers who perceived the cost of transportation is expensive and fair was 4.01 and 5.36 more likely to delay respectively than those who perceive the cost was free. This is obvious that as the parents perceive the cost of transport is expensive they will try other treatment modalities which are found in their locality, which will, in turn, decrease the chance of the child to be treated at the health institutions. This study finding is similar with the study finding from Jimma, which states that Mothers of children who complained about the higher cost of transportation to reach the health institutions were more likely to be late for the treatment of malaria in under-five children (14).

VII. Conclusion and Recommendation

Most of fewer than five children seek malaria diagnosis and treatment earlier (within 24 hrs) from the surrounding health centers. Low or middle income of the caretaker, having more children in the household, having malaria-related message by the caretaker, Caretaker's perception of distance and the cost of transport to reach to the health center were the determinants for the delay in malaria treatment seeking among under-five children.

The study finding indicates the need to improve awareness of mothers and caretakers about seeking early, appropriate and effective treatment for their children who have malaria.

Malaria control programmed should focus on increasing access to malaria treatment through increasing access to public health facilities such as health center. Stakeholders should address raising family source of income. Also emphasis should be given on planned and limited number of children. Increasing awareness of the community about malaria prevention, and early diagnosis and treatment by means of different source of information such as radio, TV, posters and health education sessions is important. Distance and cost of transport to reach to health institutions should be addressed through the expansion of infrastructures such as road and additional health centers in the localities.

VIII. Declarations

a) Ethical Approval

Before the data collection, Ethical clearance and Cooperation letter were written from Mizan-Tepi

University, and then submitted to respective district health office and all of the selected health centers for permission. The purpose of the study was informed to the respondents, and their oral consent was obtained. The respondents' right to refuse or withdraw from participating in the interview was maintained, and the information provided by each respondent was kept strictly confidential by making each questionnaire coded and not sharing personal information of any patient to the third party.

b) Consent for participants or Respondants

Survey Questionnaire developed to Collect Information on Determinants of Delay in Malaria Treatment Seeking among care takers of under five Children in selected health centers of Bench- Maji Zone.

Dear respondent my name is _____and I am working as data collector of research from Mizan-Tepi University. The aim of this study is to assess determinants of delay in malaria treatment seeking among care takers of under five children with malaria attending this health center and you are chosen to participate in this study. Your genuine response will help us to find out the real factors responsible for delay in malaria treatment seeking, so that possible intervention will be conducted by responsible bodies including the community. The interview will take about 15 minutes. You have the right not to participate or withdraw at the middle of the interview. All the information you will give us will be used for research purposes only and kept confidential.

Do you agree to participate? 1. Yes 2. No

c) Consent for Publication

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

d) Availability of Data and Materials

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

e) Competing Interests

The study was done by Daniel S. Mesfine G. and Abera K. only. The authors have declared that no competing interests exist.

f) Funding

The total cost of the research, from the proposal preparation till the result, was covered by Mizan-Tepi university research directorate from budget code: 4101.

g) Authors' Contributions

DS initiated the study, DS and MG designed the study. DS, MG and AK supervised the data collection. DS, MG and AK did the data analysis and interpretation; DS wrote and reviewed the manuscript. All authors read and approved the final manuscript.

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References Références Referencias

1. Longo, Fauci, Kasper, Hauser, Jameson, Loscalzo. Harrison's principles of internal medicine. Volume I. 18th edition. 2012.
2. Drug Administration and Control Authority of Ethiopia Contents. Standard treatment guideline for primary hospitals. January 2010.
3. Chukwuocha UM, Okpanma AC, Chukwuocha AN and Nwakwuo GC. Social Determinants of Malaria Treatment Seeking Time by Mothers for Children (0-5 Years) in South Eastern Nigeria. Journal of Tropical Disease. 2013, 3: 1.
4. WHO. Global Malaria Programmes. World Malaria Report 2011.
5. WHO; The World Health Report. Fighting disease, Fostering development. 1996.
6. WHO. Guidelines for the Treatment of Malaria. 2nd Edition. 2010.
7. Shaikh BT Understanding social determinants of health seeking behaviour providing a rational framework for health policy and systems development. J Pak Med Assoc. 2008. 58: 33-36.
8. Uchechukwu M., Austin C., Geoffrey C., Ikechukwu N. Determinants of Delay in Seeking Malaria Treatment for Children Under-Five Years in Parts of South Eastern Nigeria. J Community Health (2014) 39: 1171–1178.
9. Ermias A., Kassahun A., and Teresa K. Determinants of Delay in Malaria Prompt Diagnosis and Timely Treatment among Under-Five Children in Shashogo Woreda, Hadiya Zone, Southern Ethiopia. Scientific research. Health, 2014, 6, 950-959.
10. Jian-Wei Xu, Qi-Zhang Xu, Hui Liu and Yi-Rou Zeng. Malaria treatment-seeking behaviour and related factors of Wa ethnic minority in Myanmar. Malaria Journal 2012, 11: 417.
11. Mohammed B. Abdulkadir, Rasheedah M. Ibraheem and Wahab B.R. Johnson. Sociodemographic and Clinical Determinants of Time to Care-Seeking Among Febrile Children Under-Five in North-Central Nigeria. Oman Medical Journal. 2015, Vol. 30, No. 5: 331–335.
12. Telemu K, Razack L, Phares M and Bruno P Mmbando. Determinants of delay in care seeking

among children under five with fever in Dodoma region, central Tanzania: a cross-sectional study. Malaria Journal. 2014, 13: 348.
13. Taffa N, Chepngeno G: Determinants of health care seeking for childhood illnesses in Nairobi slums. Tropical Medicine and International Health 2005, 10(3): 240-245.
14. Alemayehu G., Kebede Deribe and Amare Deribew. Determinants of delay in malaria treatment seeking behaviour for under-five children in south-west Ethiopia. Malaria Journal 2010, 9: 320.
15. Ndyomugyenyi R, Magnussen P, Clarke S: Malaria treatment-seeking behavior and drug prescription practices in an area of low transmission in Uganda: implications for prevention and control. Transactions of the Royal Society of Tropical Medicine and Hygiene 2007, 101: 209-215.

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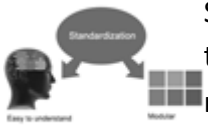

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- Main text: font size 10 with two justified columns.
- Two columns with equal column width of 3.38 and spacing of 0.2.
- First character must be three lines drop-capped.
- The paragraph before spacing of 1 pt and after of 0 pt.
- Line spacing of 1 pt.
- Large images must be in one column.
- The names of first main headings (Heading 1) must be in Roman font, capital letters, and font size of 10.
- The names of second main headings (Heading 2) must not include numbers and must be in italics with a font size of 10.

Structure and Format of Manuscript

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

A research paper must include:

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

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

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

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

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

Format Structure

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

All manuscripts submitted to Global Journals should include:

Title

The title page must carry an informative 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) where the work was carried out.

Author details

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

Abstract

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

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

Keywords

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

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

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

One should start brainstorming lists of potential keywords before even beginning searching. Think about the most important concepts related to research work. Ask, “What words would a source have to include to be truly valuable in a research paper?” Then consider synonyms for the important words.

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

Numerical Methods

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

Abbreviations

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

Formulas and equations

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

Tables, Figures, and Figure Legends

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

Figures

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

Preparation of Eletronic Figures for Publication

Although low-quality images are sufficient for review purposes, print publication requires high-quality images to prevent the final product being blurred or fuzzy. Submit (possibly by e-mail) EPS (line art) or TIFF (halftone/ photographs) files only. MS PowerPoint and Word Graphics are unsuitable for printed pictures. Avoid using pixel-oriented software. Scans (TIFF only) should have a resolution of at least 350 dpi (halftone) or 700 to 1100 dpi (line drawings). 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: Authors are advised 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. Also, you can email your editor to remove the color fee after acceptance of the paper.

Tips for writing a good quality Medical Research Paper

1. Choosing the topic: In most cases, the topic is selected by the interests of the author, but it can also be suggested by the guides. You can have several topics, and then judge which you are most comfortable with. This may be done by asking several questions of yourself, like "Will I be able to carry out a search in this area? Will I find all necessary resources to accomplish the search? Will I be able to find all information in this field area?" If the answer to this type of question is "yes," then you ought to choose that topic. In most cases, you may have to conduct surveys and visit several places. Also, you might have to do a lot of work to find all the rises and falls of the various data on that subject. Sometimes, detailed information plays a vital role, instead of short information. Evaluators are human: The first thing to remember is that evaluators are also human beings. They are not only meant for rejecting a paper. They are here to evaluate your paper. So present your best aspect.

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

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

4. Use of computer is recommended: As you are doing research in the field of medical research then this point is quite obvious. Use right software: Always use good quality software packages. If you are not capable of judging good software, then you can lose the quality of your paper unknowingly. There are various programs available to help you which you can get through the internet.

5. Use the internet for help: An excellent start for your paper is using Google. It is a wondrous search engine, where you can have your doubts resolved. You may also read some answers for the frequent question of how to write your research paper or find a model research paper. You can download books from the internet. If you have all the required books, place importance on reading, selecting, and analyzing the specified information. Then sketch out your research paper. Use big pictures: You may use encyclopedias like Wikipedia to get pictures with the best resolution. At Global Journals, you should strictly follow here.

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

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

8. Make every effort: Make every effort to mention what you are going to write in your paper. That means always have a good start. Try to mention everything in the introduction—what is the need for a particular research paper. Polish your work with good writing skills and always give an evaluator what he wants. Make backups: When you are going to do any important thing like making a research paper, you should always have backup copies of it either on your computer or on paper. This protects you from losing any portion of your important data.

9. Produce good diagrams of your own: Always try to include good charts or diagrams in your paper to improve quality. Using several unnecessary diagrams will degrade the quality of your paper by creating a hodgepodge. So always try to include diagrams which were made by you to improve the readability of your paper. Use of direct quotes: When you do research relevant to literature, history, or current affairs, then use of quotes becomes essential, but if the study is relevant to science, use of quotes is not preferable.

10. Use proper verb tense: Use proper verb tenses in your paper. Use past tense to present those events that have happened. Use present tense to indicate events that are going on. Use future tense to indicate events that will happen in the future. Use of wrong tenses will confuse the evaluator. Avoid sentences that are incomplete.

11. Pick a good study spot: Always try to pick a spot for your research which is quiet. Not every spot is good for studying.

12. Know what you know: Always try to know what you know by making objectives, otherwise you will be confused and unable to achieve your target.

13. Use good grammar: Always use good grammar and words that will have a positive impact on the evaluator; use of good vocabulary does not mean using tough words which the evaluator has to find in a dictionary. Do not fragment sentences. Eliminate one-word sentences. Do not ever use a big word when a smaller one would suffice.

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

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

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

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

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

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

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

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

21. Adding unnecessary information: Do not add unnecessary information like "I have used MS Excel to draw graphs." Irrelevant and inappropriate material is superfluous. Foreign terminology and phrases are not apropos. One should never take a broad view. Analogy is like feathers on a snake. Use words properly, regardless of how others use them. Remove quotations. Puns are for kids, not grunt readers. Never oversimplify: When adding material to your research paper, never go for oversimplification; this will definitely irritate the evaluator. Be specific. Never use rhythmic redundancies. Contractions shouldn't be used in a research paper. Comparisons are as terrible as clichés. Give up ampersands, abbreviations, and so on. Remove commas that are not necessary. Parenthetical words should be between brackets or commas. Understatement is always the best way to put forward earth-shaking thoughts. Give a detailed literary review.

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

23. Upon 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 for 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 of 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 criteria peer reviewers will use for grading the final paper.

Final points:

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

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

The discussion section:

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

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

General style:

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 avoid:

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

Title page:

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

Abstract: This summary should be two hundred words or less. It should clearly and briefly explain the key findings reported in the manuscript and must have precise statistics. It should not have acronyms or abbreviations. It should be logical in itself. Do not cite references at this point.

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

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. Use comprehensive sentences, and do not sacrifice readability for brevity; you can maintain it succinctly by phrasing sentences so that they provide more than a 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 limit the initial two items to no more than one line each.

Reason for writing the article—theory, overall issue, purpose.

- Fundamental goal.
- To-the-point depiction of the research.
- Consequences, including definite statistics—if the consequences are quantitative in nature, account for this; results of any numerical analysis should be reported. Significant conclusions or questions that emerge from the research.

Approach:

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

Introduction:

The introduction should "introduce" the manuscript. The reviewer should be presented with sufficient background information to be capable of comprehending and calculating the purpose of your study without having to refer to other works. The basis for the study should be offered. Give the most important references, but avoid making a comprehensive appraisal of the topic. Describe the problem visibly. If the problem is not acknowledged in a logical, reasonable way, the reviewer will give no attention to your results. Speak in common terms about techniques used to explain the problem, if needed, but do not present any particulars about the protocols here.

The following approach can create a valuable beginning:

- Explain the value (significance) of the study.
- Defend the model—why did you employ this particular system or method? What is its compensation? Remark upon its appropriateness from an abstract point of view as well as pointing out sensible reasons for using it.
- Present a justification. State your particular theory(-ies) or aim(s), and describe the logic that led you to choose them.
- Briefly explain the study's tentative purpose and how it meets 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 for every section. If you make the four points listed above, you will need at least four paragraphs. Present surrounding information only when it is necessary to support a situation. The reviewer does not desire to read everything you know about a topic. Shape the theory specifically—do not take a broad view.

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 soundly written procedures segment allows a capable scientist to replicate 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 to give the least amount of information that would permit another capable scientist to replicate 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 section, mention the specific item describing the way, but draw the basic principle while stating the situation. The purpose is to show all particular resources and broad procedures so that another person may use some or all of the methods in one more study or referee the scientific value of your work. It is not to be a step-by-step report of the whole thing you did, nor is a methods section a set of orders.

Materials:

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

Methods:

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

Approach:

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

Use standard style in this and every other part of the paper—avoid familiar lists, and use full sentences.

What to keep away from:

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

Results:

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

The page length of this segment is set by the sum and types of data to be reported. Use statistics and tables, if suitable, to present consequences most efficiently.

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

Content:

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

What to stay away from:

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

Approach:

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

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

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

Figures and tables:

If you put figures and tables at the end of some details, make certain that they are visibly distinguished from any attached appendix materials, such as raw facts. Whatever the position, each table must be titled, numbered one after the other, and include a heading. All figures and tables must be divided from the text.

Discussion:

The discussion is expected to be the trickiest segment to write. A lot of papers submitted to the journal are discarded based on problems with the discussion. There is no rule for how long an 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 implications of the study. The purpose here is to offer an understanding of your results and support all of your conclusions, using facts from your research and generally accepted information, if suitable. The implication of results should be fully 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 the prospect, and let it drop at that. Make a decision as to whether each premise is supported or discarded or if you cannot make a conclusion with assurance. Do not just dismiss a study or part of a study as "uncertain."

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

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

Approach:

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

Describe generally acknowledged facts and main beliefs in present tense.

The Administration Rules

Administration Rules to Be Strictly Followed before Submitting Your Research Paper to Global Journals Inc.

Please read the following rules and regulations carefully before submitting your research paper to Global Journals Inc. to avoid rejection.

Segment draft and final research paper: You have to strictly follow the template of a research paper, failing which your paper may get rejected. You are expected to write each part of the paper wholly on your own. The peer reviewers need to identify your own perspective of the concepts in your own terms. Please do not extract straight from any other source, and do not rephrase someone else's analysis. Do not allow anyone else to proofread your manuscript.

Written material: You may discuss this with your guides and key sources. Do not copy anyone else's paper, even if this is only imitation, otherwise it will be rejected on the grounds of plagiarism, which is illegal. Various methods to avoid plagiarism are strictly applied by us to every paper, and, if found guilty, you may be blacklisted, which could affect your career adversely. To guard yourself and others from possible illegal use, please do not permit anyone to use or even read your paper and file.

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

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.

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

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Global Journal of Medical Research

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