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exploration **5** of
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Highlights

Response of Groundwater

Components of ICDS scheme

A Tribe in Transition

Sentences of Contemporary



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Response of Groundwater to Basin Variables in The Upper Kaduna Catchment

By I. P. Ifabiyi

University of Ilorin, Nigeria.

Abstract - Groundwater component is an important contributor to total runoff within the Basement Complex rocks in Nigeria despite the dominance of regolith aquifer in the region. This paper examines the response of groundwater to basin variables in the Upper Kaduna Catchment, Nigeria. Data used in this study consists of hydro meteorological, geological and land use data. The hydrometeorological data were obtained from the Hydro Meteorological Department of The Kaduna State Water Board, Kaduna, Nigeria, while morphometric, land use and geological data were obtained from maps. Groundwater components were derived using semi-logarithmic hydrographic analysis. A total of 220 hydrographs were separated and 30 basin variables were also derived using various morphometric methods. Both descriptive and inferential methods were used in interpreting the data generated. The descriptive analyses include mean, standard deviation and graphs. The inferential methods used in this study are: moment product correlation, factor analysis, multiple regression and stepwise regression methods. Moment product correction was used to associate groundwater component and basin parameters, factor analysis was used to reduce the 30 basin variables into orthogonal factors; multiple regression was used to establish a relationship with basin variable and groundwater components, while stepwise regression was used to also establish a relationship and to also reduce the regression model to an orthogonal size. The 30 basin variables were reduced by factor analysis into 8 orthogonal variables (namely: length of mainstream, total rainfall, % younger granite, lemniscate ratio, savanna scrubland, % forest, basin scale, and % fadama) which altogether explained 84.3% of the variance. The results of the multiple regression showed that these 8 factors explained 86.0% of the groundwater pattern in the Upper Kaduna Catchment. The result of the stepwise regression further showed that only 3 factors (namely: total rainfall, percentage of forest and percentage area underlain by younger granite explained 76.4% of the variance in groundwater. Two groundwater models were also generated to describe groundwater response in the catchment. The study recommends the use of the orthogonal factors in watershed management and further stressed the need for further study.

Keywords : Groundwater, hydrograph, semi-logarithmic separation, total rainfall, geology, land use.

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I. P. Ifabiyi

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1. INTRODUCTION

Studies of base flow and groundwater component of stream hydrograph have been documented for more than 100 years ago outside the tropics (Boussineq, 1904; Maillet 1905, Horton, 1933; Hall, 1968; Nothan and Mchon, 1990; Tallaksan, 1995; Smakhtin,

2001, etc). Pointing to the role of groundwater component is the experimental study of DeZeeuw (1966) where he reported that the response of drain ditches is deep enough to cut the water table. He discovered in this experiment that groundwater is generated via deep percolation of rainwater which results in water oozing out as stream along channel. Indeed, Sklash and Falvolden (1979), Abdul and Gilham, (1984), Gilham (1984) have also confirmed the role of groundwater to total runoff.

Groundwater and base flow can be influenced by several activities such as stream regulation, direct pumping, artificial diversion of water into or out a basin, or part of basin transfer, direct discharges into stream for mine dewatering activities, seasonal return flow from drainage or irrigation areas, artificial drainage of the floodplain, typically for agriculture or urban development which can enhance rapid runoff and reduced delayed drainage, changes land use, such as clearing, reforestation or changed in crop type, which can significantly alter evapotranspiration rates. Others are groundwater extraction sufficient to lower the water table and decrease or reverse the hydraulic gradient towards the stream (Querna, 1997; Griffiths and Glausen, 1997; Smakhtin, 2001; Singh, 2001; Quian, 2003; Neal, et al 2004; Bredie and Hostetler, 2005; Scanlon, 2005). Tiangi, (2003) examined the importance of basin scale on groundwater, he discovered that small or average sub basin size produces higher peak discharge, larger base flow and total runoff for floods, while similar effects on annual runoff was not discernable. Flugel (1995) also reported that interflow is also a dominant flow processes to groundwater recharge and river runoff.

Indeed, several published works have pointed to the fact that groundwater has important contribution to total runoff (Christopherson, et al 1984; in Norway, Obradovic and Sklash 1986, in Canada, Hooper and Shoemaker 1986, in USA, bishop and Richard 1988 in Scotland). Also wells (1990) documented that 60% groundwater contribution to runoff. Others are Sklash and Falvolden (1969), Sklash, (1978), Dincer and (1970), Maitenance, et. al. (1979), Fritz, et al (1974).

Studies of groundwater within the basement complex in Africa have not been favoured in the past, in view of the misconception on water availability within crystalline geological formations. However, typical deep weathering profile comprising of indurated, mottled and pallid zones overlying weathered and un-weathered

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bedrock have been reported in Nigeria (Faniran, 1970; Faniran and Areola, 1978; Faniran and Ojo, 1990). For example, Faniran, (1968) and Thomas (1974) reported depth thicker than 30 meters in south western Nigeria. Investigations from geophysical survey coupled with the increasing large numbers of rural communities being supported by hand pumps showed that a reasonable quantity of groundwater is found in the basement complex rocks in South Africa. Faniran and Jeje (1984) equally reported a similar geophysical data in the Dan Mangu area of Jos, Nigeria.

In view of the ephemeral nature of surface water, groundwater abstraction is often the only realistic and affordable means of providing water supply for much of Africa need (Adelana and MacDonald, 2008). It is pertinent to note that there is shortage of data on groundwater as little attention is being paid to systematic gathering of information about groundwater resources. Hence, investment is poorly targeted, expert are not consulted before projects are executed. indeed, groundwater is not understood in this part of the world, despite its potentiality towards achieving the Millennium Development Goals (MDGs) in Nigeria. Cobbing and Davies (2006) have identified the benefits of scientific approach to sustainable development of groundwater in Africa. This present study will attempt to fill some of these gaps.

II. STUDY AREA

The Upper Kaduna Catchment (UKC) is located between latitudes $9^{\circ} 11'$ and longitude $6^{\circ}.0$ and $8^{\circ}.0$. Twenty river basins were selected for analysis within the catchment. The choice of the catchment is because of data availability and the fact that the study area is located within a drought prone area, where there is a seasonal water scarcity problem. It also has high rural population density with dispersed settlement pattern; the scattered nature of settlements has been a limitation to water resources development as surface water scheme will largely be unsuitable for such scattered dwellings. In addition some of the water projects of government have actually failed; hence, studies of water resources within the environment are crucial.

Rainfall in the catchment ranges between 1000mm around Ikara north East of Kaduna to 1500mm in Kagoro south of Kaduna. The higher rainfall in Kagoro is due to the orographic effects of the Jos Plateau. Vegetation in the southern part is classified as guinea savanna. Around Kaduna vegetation is largely *Isobertina* savanna, which is intensively grazed with locust bean tree as dominant specie. Below latitude 10° North rainfalls are higher due to the orographic effect of Jos Plateau, situation similar to rain forest is found around Kagoro. Three relief patterns dominated the UKC landscape these are: gentle undulating landscape around Galma and Karami plains where slope is about 1-20; dissected landscape which stands above the

plains where slope is greater than 5° especially to the south east. The drainage pattern is purely dendritic, with river Kaduna as the principal drainage line. Geology is mainly pre Cambrian Basement Complex comprising undifferentiated metamorphic and igneous rocks. Rocks are gneiss, migmatite, volcanic, quartzite, porphyritic biotite and granite rocks. Large expanse of weathered mantle is found. The soil is ferruginous in nature with compacted B-horizon, which is likely to promote higher overland flow.

The land use types are: intensively cultivated Sudan Savanna where groundnut formed a dominant crop found around Zaria, Saminaka and Ikara. There is also, rough Savanna landscape with extensive open grazing with some cultivation near Kaduna; and lastly, area of dry season farming around Kagoro. On the whole, all these land use types are likely to promote high surface runoff.

III. MATERIALS AND METHODS

a) Data Base and Data Generation

The runoff and climatic data used in this study covers an 11 year period (1979-1989) for which data are available. These data were obtained from the Hydrological Department of the Kaduna State Water Board, Kaduna.

The morphometric parameters were extracted from Nigerian topographical map series (1:50,000) series (Table 1). Many researchers (e.g. Okechukwu, 1973; Anyadike and Phil-Eze, 1989), have adopted 1:50,000 map series in various studies. The sheets used in this study are: 100-103, 123-126, 144-147 and 165-168 covering the UKC and published by Northern Nigeria Survey (1966). Physiographic attributes of land use and geology such as the percentage are under each geological and land use types were extracted from the 1:500,000 Geological and Land use Maps prepared for the Kaduna State Agricultural Development Project (KADP) by AERMAP of Florence, Italy, 1987. A total of 30 basin variables given in Table 2 were examined in this study. Twenty sub-basins were selected within the Upper Kaduna Catchment for this study (Figure 1).

Table 1 : Derivation of Basin Morphometric parameters

s/n	Morphometric variables	Procedure of derivation
1.	Length of mainstream	Length of principal drainage line in km(Smith,1956)
2.	Total stream length	Length of all the tributaries and principal drainage line in km (Smith,1950)
3.	Maximum relief	Differences between the highest and lowest points on a basin(Strahler,1952)
4.	Basin Length	Length of the basin along the most distant point(Schumn,1963)
5.	Basin area	Calculated via graphical method (Anderson,1957)
6.	Total segment of 1 st order stream	Sum of all 1 basins (Horton,1952)
7.	Total segment of 2 nd order streams	Sum of all second order stream (Horton,1952)
8.	Bifurcation ratio	Ratio of lower order to a higher order (Strahler,1964)
9.	Relief ratio	$R_h = H/L$, H=horizontal distance L=length of the basin along the principal drainage line (Schumn,1950)
10.	Drainage density	$(\sum L)/A$; $\sum L$; H=horizontal distance, L=length of the basin (Solokov,1969)
11.	Miller's circularity ratio	$CR = A/AC$; A=Area of the basin (Miller's,1953)
12.	Form factor	$F = A/L^2$; A=Area of the basin, L=Length of the basin along (Horton,1932)
13.	Lemniscate ratio	$K = L^2/4A$, L=length of the basin. A=basin area (Chorley, et al 1957)
14.	Total stream segments	$\sum L$ =sum of all the length (Horton,1932)
15.	Channel mean slope	$L_m = H/L$; H= change in slope, L=Length of the basin (Horton,1932)

Source : Selected references.

IV. HYDROGRAPH SEPARATION

Altogether, 220 hydrographs were computed for the 20 sub basins for the 11 year of study. The h groundwater hydrographs were computed using

graphical logarithmic method (Barnes, 1939; 1940; Linsley, 1982; Olu, 1995 and Smakhtin, 2001). A typical separated hydrograph of Kogun at Kagoro is presented in Fig 1.

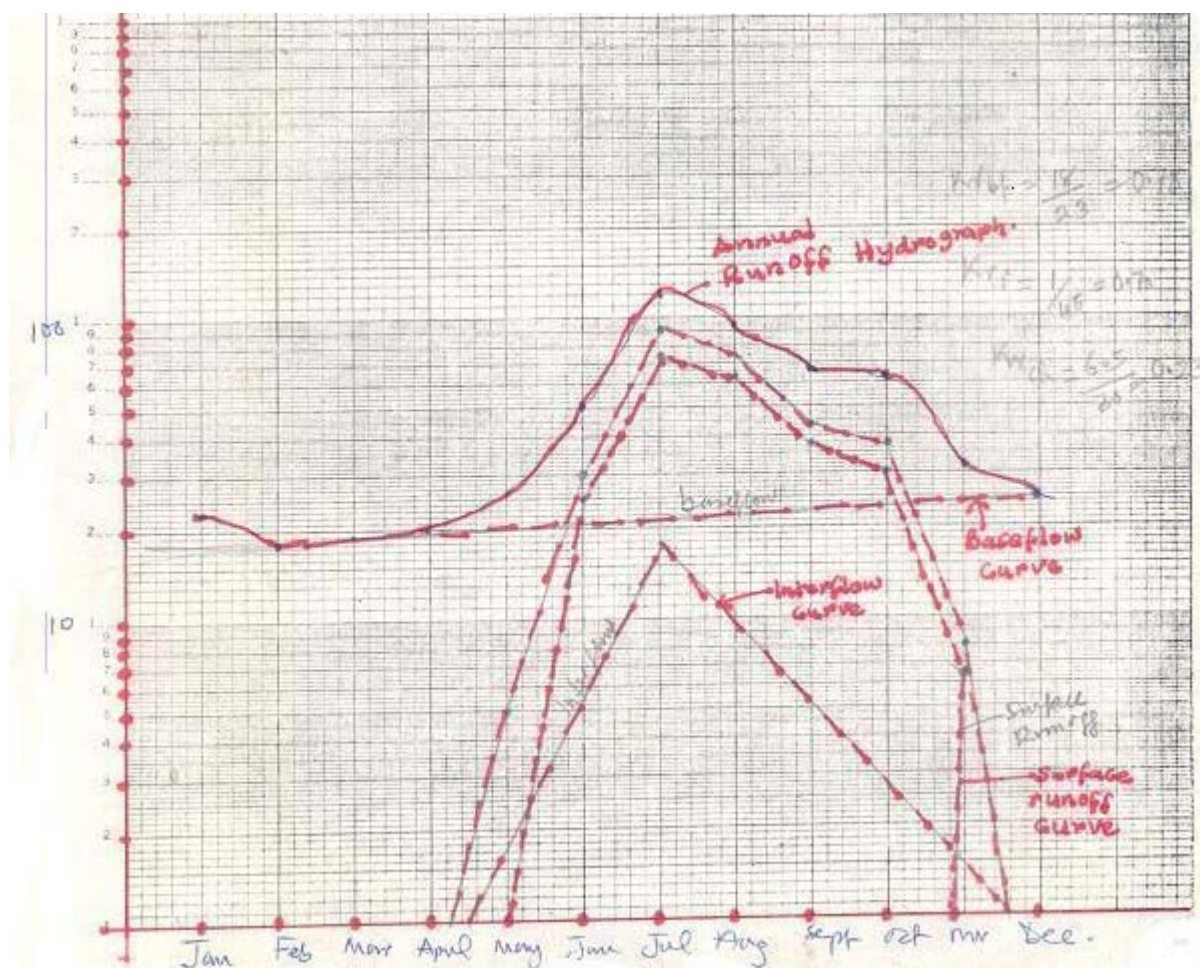


Fig.1 : A sample of separated hydrograph of Kogun at Kagoro (1989)

V. STATISTICAL METHOD

Correlation analysis was used to examine the types of associations existing among the thirty basin variables. Factor Analysis was adopted in other to overcome the problem of multicollinearity; hence, it was adopted to rewrite the 30 basins parameters to orthogonal factors.

The multiple regression method was used to establish a relationship between total runoff and the

factor scores of the eight orthogonal factors derived from the result of factor analyses to predict runoff response to total runoff. In addition to the above, the linear regression model was also used to order the individual contribution of the 8 orthogonal factors to total runoff using the result of the stepwise multiple regression as input.

Table 2 : Basin Parameters

a. Morphometric variables	1. length of mainstream(km)
	2. total stream length(tsl)
	3. maximum relief (ts1)
	4. basin area (a)
	5. basin length (bl)
	6. total segment of 1 st order (tsl)
	7. total segment of 2 nd order basins (ts2)
	8. bifurcation ratio (rh)
	9. relief ratio (rh)
	10. drainage density (dd)
	11. circularity ratio (cr)
	12. form factor (Fa)
	13. lemniscate ratio (k)
	14. total stream segments (tss)
	15. basin order (bn)
b. Geological variables	16. percentage area of undifferentiated Basement Complex
	17. percentage area of volcanic rock (%vol)
	18. percentage area of porphyritic biotite (%pb)
	19. percentage area of undifferentiated granite (%ug)
	20. percentage area of younger granite (%yg)
	21. percentage area of quartzite (%qzt)
c. Land use variables	22. percentage area under forest (%for)
	23. percentage area under savannah (%sav)
	24. percentage area under fadama (%fad)
	25. percentage area under urban (%urb)
	26. percentage area under cultivation (%cut)
	27. percentage area under rock outcrop (%roc)
d. Hydrometeorological variables	28. dry season rainfall (dsr)
	29. wet season rainfall (wsr)
	30. total rainfall (tr)

Source : Authors computation

VI. RESULT AND DISCUSSION

a) *Multivariate relationship between groundwater and selected basin parameters.*

According to Table 3 out of the thirty variables in this study only four basin variables significantly correlated with groundwater flow. These are drainage density, percentage of the basin on rock outcrop, wet season runoff and total rainfall. All these have positive relationship with groundwater component implying that as these variables increases groundwater increases.

Table 3 : Moment product correlation between groundwater runoff and basin variables

S/N	Basin Variables	Correlation Coefficient
1	1.Length Of Mainstream(Km)	-0.07
2	2.Total Stream Length(Tsl)	-0.01
3	3. Maximum Relief (mrh)	-0.16
4	5. Basin Length (Bl)	-0.08
5	4.Basin Area (A)	-0.06
6	6. Total Segment Of 1 st Order (Tsl)	0.00
7	7.Total Segment Of 2 nd Order Basins (Ts2)	-0.02
8	8. Bifurcation Ratio (Rh)	-0.03
9	9. Relief Ratio (Rh)	-0.04
10	10. Drainage Density (Dd)	0.46*
11	11. Circularity Ratio (Cr)	-0.15
12	12.Form Factor (Fa)	-0.19
13	13. Leminiscate Ratio (K)	0.07
14	14.Total Stream Segments (Tss)	-0.17
15	15. Basin Order (Bn)	-0.09
16	16. Percentage Area of Undifferentiated Basement Complex	-0.29
17	17. Percentage Area Of Volcanic Rock (%Vol)	0.24
18	18. Percentage Area Of Porphyritic Biotite (%Pb)	-0.11
19	19. Percentage Area Of Undifferentiated Granite (%Ug)	-0.02
20	20. Percentage Area Of Younger Granite (%Yg)	0.48*
21	21. Percentage Area Of Quartzite (%Qzt)	-0.21
22	22. Percentage Area Under Forest (%For)	0.35
23	23. Percentage Area Under Savannah (%Sav)	0.11
24	24. Percentage Area Under <i>Fadama</i> (%Fad)	0.07
25	25. Percentage Area Under Urban (%Urb)	0.13
26	26. Percentage Area Under Cultivation (%Cut)	-0.02
27	27. Percentage Area Under Rock Outcrop (%Roc)	-0.38
28	28. Dry Season Rainfall ((Dsr)	0.68*
29	29. Wet Season Rainfall (Wsr)	0.31
30	30. Total Rainfall (Tr)	0.68*

Source: Authors computation

Note: values between 0.42 and 0.52 are significant at 95%; Values >0.52 are significant at 99%

Of all the fifteen variables drainage density is the only one that is significantly correlated with groundwater. This is expected because high drainage density quite suggests higher groundwater level, suggesting that spring lines are common in the UKC. The strong association between percentage of the basin on rock outcrops and groundwater is expected because areas of major rock outcrops coincide with spring lines, particularly areas of younger granite rocks which doubles as the edge of the Jos plateau system but also forms the headwaters of river Kaduna the ring complex of UKC. The strong positive relationship between total rainfall and wet season rainfall and groundwater is also expected since these two hydro metrological variables are the major sources of groundwater recharge in the UKC.

b) Factors controlling groundwater runoff

The results obtained above were further subjected to factor analysis method; in other to overcome multi co-linearity problems; eight factors emerged with a total explanation of 84.27% of the variance (Table 4).

- I. Factor I is tagged basin length of mainstream. This factor has the highest contribution to groundwater component. 9 other areal variables equally loaded positively high on this factor. This factor is **an index of basin magnitude**.
- II. Factor II (total rainfall) contributes 14.6% explanation. It is referred to as total rainfall. Only 2 variables loaded highly on this factor. These are wet season rainfall is equally highly loaded in the factor this is expected since these rainfall indices are mainly responsible for groundwater recharge on the UKC. This factor is **an index of basin rainfall**.
- III. Factor III (undifferentiated basement complex) this factor contributed 10.4% to the variance. Four factors loaded highly on this factor: relief ratio, % rock outcrop, % younger granite, and % undifferentiated basement complex which has the highest loading. This factor is **an index of basin geology**.
- IV. Factor IV (circularity ratio) contributed 9.4 % to the explanation of the variance. It has strong loadings on the three shape attributes namely: circularity ratio, form factor and lemniscates ratio. It is **an index of basin shape**.

- V. Factor V (percentage of the basin on savanna scrubland. Savannah scrubland covers about 80% of the total Land use of the UKC. The percentage area of undifferentiated granite is also a dominant rock of the basement complex family. This factor explains 7.12% of the variance. It is **an index of water repellence**.
- VI. Factor VI (percentage of the basin on forest). This factor contributed 6.81% explanation. Two variables strongly load on this factor (percentage on forest and percentage area on quartzite) this pattern of loading suggest high water seepage. Hence, this factor is **an index of water ingress**.

- VII. Factor VII (basin slope). This factor contributed 6.4% to the explanation. It has high loadings on 3 variables namely: namely basin relief, bifurcation relief, and basin scale. It is **an index of basin scale**.
- VIII. Factor VIII (percentage of the basin on *fadama*). *Fadama* refers to wetlands which are normally found in the flood plains. This factor contributed 5.92% explanation to the variance. The percentage area cultivated is equally highly loaded on this factor. This is expected because extensive *fadama* land in the study area, are extensively cultivated for dry season farming. This factor is **an index of basin agriculture**.

Table 4 : Factor scores, eigen values and percentages contributions of basin variables

S. no.	Basin variable	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7	Factor 8
1	lm	0.96*	-0.02	0.02	-0.20	0.04	0.04	0.03	0.04
2	tsl	0.95*	0.07	0.10	0.06	0.12	0.25	-0.01	0.03
3	mrh	0.46	-0.31	0.35	-0.07	-0.10	-0.41	0.53	-0.02
4	bl	0.90*	-0.08	0.04	-0.37	0.01	0.03	0.00	0.06
5	A	0.96*	0.02	0.02	0.00	0.12	0.15	-0.09	0.06
6	ts1	0.92*	0.06	-0.04	0.10	0.13	0.30	0.06	0.08
7	ts2	0.90*	0.03	-0.02	0.12	0.16	0.34	0.04	0.02
8	br	-0.15	0.21	-0.36	-0.13	-0.08	0.01	0.35	-0.35
9	rh	-0.02	-0.17	0.65	-0.01	-0.15	-0.11	-0.05	-0.06
10	dd	0.00	-0.15	-0.20	0.40	-0.18	-0.24	0.28	-0.23
11	cr	-0.08	-0.14	0.18	0.91*	0.01	0.18	-0.19	0.04
12	fa	-0.02	-0.15	-0.01	0.89*	0.21	0.18	-0.10	0.21
13	K	0.10	-0.01	-0.09	0.91*	-0.01	0.13	0.01	-0.06
14	tss	0.79*	-0.19	-0.06	0.20	0.18	0.17	0.32	-0.08
15	bn	0.48	-0.07	0.14	-0.20	0.02	0.03	0.71*	-0.18
16	%cut	-0.08	-0.37	-0.39	0.14	-0.11	-0.03	-0.06	-0.75*
17	%sav	0.09	0.12	-0.10	0.06	0.90*	0.04	-0.02	-0.12
18	%for	0.34	-0.03	-0.14	-0.06	0.06	0.79*	0.07	-0.04
19	%urb	0.75*	0.23	-0.11	-0.09	-0.08	-0.24	-0.09	0.09
20	%roc	-0.04	0.37	0.74	0.09	-0.03	-0.10	0.16	0.13
21	%fad	-0.01	0.06	-0.24	0.11	-0.06	-0.02	-0.06	0.91*
22	%vol	-0.27	0.59	0.30	-0.04	-0.19	0.10	0.45	0.15
23	%yg	0.11	-0.06	0.89*	0.08	-0.13	-0.02	-0.14	-0.11
24	%ug	0.22	-0.11	-0.09	0.01	0.89*	0.21	0.04	0.17
25	%pb	0.75	0.17	-0.04	-0.09	-0.11	-0.34	-0.02	-0.09
26	%qzt	0.35	-0.06	0.02	0.41	0.36	0.72*	-0.03	0.05
27	%ubc	-0.07	-0.35	-0.80*	-0.06	-0.19	-0.13	-0.23	-0.08
28	wsr	0.23	0.92*	-0.05	-0.12	-0.07	-0.03	0.09	0.16
29	dsr	-0.34	0.47	-0.10	-0.14	0.17	0.15	0.70*	0.12
30	tr	0.18	0.94*	-0.06	-0.13	-0.05	-0.01	0.08	0.16
GW _p		-0.06	0.81	0.25	-0.09	0.28	-0.07	0.13	-0.17
Factor Defining Variable	Length of mainstream	Total rainfall	Younger granite	Lemniscates ratio	% savanna	% forest	Basin order	% fadama	
Factor Description	Index of basin magnitude	Index of basin rainfall	Index of basin geology	Index of basin shape	Index of water repellence	Index of porosity	Index of basin scale	Index of basin agric.	
Total Eigen Value		7.88	1.53	3.21	2.92	2.21	2.11	1.99	1.81
% Variance		25.13	11.59	10.35	9.12	7.12	6.81	6.11	5.92
% Cumulative Variance		25.13	10.02	50.37	59.78	66.9	73.71	80.12	86.01

Source: Authors computation

c) Relationship between groundwater and runoff factors.

The result of the regression analysis eight response factors contributed 84.3% to the response of groundwater. This is presented in Table 5.

Table 5 : Multiple Regression Model Summary of Groundwater and Basin Variables

Variable	Regression coefficient	Standard error	t-test	Sig level	R ² %
Intercept	32.681		30.36	.000	
1. Length Of Mainstream	-.563		-.51	.620	
2. Total Rainfall	-3.491		-3.16	.009	
3. % Younger Granite	-3.363		3.04	.011	
4. Lemniscates ratio	-1.359		.244		84.3
5. %Savanna Scrubland	6.504		5.67	.000	
6. % Forest	.797		.72	.486	
7. Basin Scale	.0067		.06	.952	
8. % Fadama	2.003		1.81	0.97	

Source : Author's computation

This relationship can be described in equation 3

$$GWR_0 = 32.681 - 0.56lm - 0.3.491tr + 3.363\%yg - 1.359k + 6.504\%sav + 0.797\%for + .07\%bn + 2.003\%fad \dots \dots \dots (eq. 1)$$

(R²=84.3%; SE=4.81)

Further analysis using stepwise regression method showed that only three basinfactors are most important in the explanation of groundwater response in the UKC. This is presented in Table 6. These factors are

total rainfall (49%), percentage forest (14.2%) and % granite (12.2%). These factors contributed 76.4%. This is presented in equation 2.

Table 6 : Stepwise regression model summary of groundwater and basin variables

Variable	Regression coefficient	Standard error	t-test	Sig level	R ² Explained	R ² Cumulative Explained
Intercept	32.681	1.96	29.8	.00	-	-
1. Total Rainfall	6.504	1.13	5.76	.00	49	49
2. Percentage Forest	-3.49	1.13	-3.14	.007	14.2	63.2
3. % Younger granite	2.982	1.13	2.98	.009	12.2	76.4

Source : Authors computation

VII. DISCUSSION OF RESULT

Length of mainstream is an areal index of the basin. Basin length is indicative of basin size. Large basins will have long mainstreams. Further, large basins will have high base flow contribution to runoff hydrograph, all things working well (Ward, 1990). The dominance of total rainfall in groundwater response in the study is expected, in view of the fact that both dry season rainfall and wet season rainfall are the most significant mode of groundwater recharge in the Kaduna catchment. More importantly, Ledger, (1964; 1969) also underscored the dominance of rainfall events to runoff response with examples from parts of West Africa. In Nigeria, Ogunkoya, (1984) reported that dry season rainfall has a strong impact on basin response to runoff in a south-western Nigerian study. Also, Todd (1980), Ward (1980), and Querer, (1997) established strong

relationships between rainfall and groundwater recharge. The nature of basin geology in the UKC is also indicative of the pattern of response to basin parameters. Two major geological types are most common: these are undifferentiated basement complex rocks and younger granite rocks. In many parts of the UKC these 2 main rocks have formed rock outcrops, which has in turn become springs and head water for many streams, examples are Kagoro hill, Assob falls, Kufena Hill, and the ring complex massif surrounding the Jos plateau. This suggests that basement complex rocks, younger granite, and rock outcrops play significant role in the nature of groundwater response. Ogunkoya, et al (1984), Adejuwon, et. al. (1983) and Anyadike and Phil-Eze (1989) have all reported the role of basin geology in runoff response studies in Nigeria. Basin shape in the Upper Kaduna catchment range from elongated to circular. The shape of the basin will determine the response of groundwater. The elongated

basins generally have high groundwater response. This is expected in view of the fact that elongated basins are normally large basins and therefore they tend to release more base flow, since they are matured and have eroded into their saprolite to the water table, hence they yield more base flow into the runoff hydrograph.

The impact of forest on groundwater has been pointed out. For example groundwater recharge has been found to be related to land use and land cover (Sanion, 2005; Querer, 1997, Garcia, et al. 1995). Dry season rainfall remain the major recharge term in the six month of dry season ; hence it is crucial to the response of base flow otherwise known as dry weather flow. A similar relationship was reported for southwest Nigeria by Ogunkoya, et.al. (1984).

a) Spatial pattern of groundwater response.

The impacts of the runoff underlying factors differ from one basin to the other (Table 7; Fig 2(a-h)).

Factor I (basin size) dominate the explanation of groundwater in Galma at Ribako and Gubunchi, Assob at Assob, Karami at Kauru. These basins are all large in all. The impact is least in Jamana at Soba. Total rainfall dominates explanation in Assob at Assob the wettest basin, Kogun at Kagoro these are wet basin they receive the highest rainfall. This factor is of least dominant in Kahugu at Ikara a basin with the least rainfall. Factor III (%UBC) has its strongest influence in Galma at Gubunchi and Assob and of least impact in Tubo at Kaduna. Factor IV which is tagged circularity ratio dominate in Kogun at Ugwan Rimi, and least in Galma at Kuzuntu. Factor (% savanna dominated in Shaho at Kachia, and Chalwe at Zango Kataf. percentage of forest dominated Chalwe at Zango Kataf. dry season rainfall is strong in Dorogoin at Kwoi, Kogun at Kagoro, Kogun at Ugwan Rimi (See : table 7). Factor 8 is dominant in Kachia at Kachia and Tubo at Lagos road it is least in Soba at Zango Kataf.

Table 7 : Factor scores depicting spatial pattern of basin variables

Sub Basins	Factor I	Factor II	Factor III	Factor IV	Factor V	Factor VI	Factor VII	Factor VIII
	Length of mainstream	Total rainfall	% younger granite	Leminiscate ratio	% savanna	% forest	Basin order	% fadama
1. Galma at Ribako	2.87	0.79	-0.84	-0.16	-1.66	0.09	0.41	-0.59
2. Karami at Saminaka	-0.22	-0.91	0	-0.41	-0.01	0.99	0.52	-0.2
3. Jamana at Soba	-0.79	-0.91	-0.84	0.46	-0.32	-0.42	1.03	0.36
4. Kogun at Kagoro	-0.54	0.92	-0.44	0.71	0.12	0.37	1.05	0.52
5. Kogun at Ugwan Rimi	-0.66	0.75	0.74	1.28	-1.13	0.44	-1.28	-0.43
6. Shika at Kano Road	-0.41	-0.7	0.51	-1.26	0.09	-0.87	0.79	0.37
7. Shaho at Kachia	-0.34	0.12	0.03	1.47	1.46	-1.80	0.07	-2.65
8. Kachia at Kachia	0.05	-0.04	-1.35	0.75	1.21	0.22	-0.52	2.18
9. Tubo at Kaduna Road	2.14	-0.81	2.72	1.24	1.16	-0.22	0.09	1.17
10. Galma at Gubunchi	0.60	-0.51	-1.33	-0.56	0.67	-1.49	-2.13	-1.20
11. Kwassau at Zonkwa	-0.53	0.86	-0.54	0.19	0.55	0.51	0.32	0.85
12. Chalwe at Zango Kataf	-0.2	-0.96	0.16	-0.8	1.46	2.46	-0.23	-1.64
13. Gurara at Galan	-0.24	0.42	-1.06	0.57	0.41	0.09	0.13	0.32
14. Assob at Assob	0.75	2.78	1.62	-1.49	-1.41	-0.14	-0.16	0.04
15. Dorogoin at Kwoi	-0.78	-0.02	0.38	0.61	0.42	-1.20	1.43	-0.09
16. Galma at Kuzuntu	-0.14	-0.4	0.16	-2.34	0.20	-1.32	-0.39	0.66
17. Kogun at Jagindi	-0.04	0.88	-0.19	0.34	-1.47	1.08	-0.33	0.07
18. Kahugu at Ikara	-0.57	-1.29	0.43	-0.21	-0.47	0.58	0.85	0.03
19. Kudan at Hunkuyi	-0.70	-1.29	0.65	0.19	-2.01	0.09	-1.77	0.06
20. Karami at Kauru	1.29	0.29	-0.81	-0.87	-0.31	0.43	0.99	-0.81

Source : Authors computation.

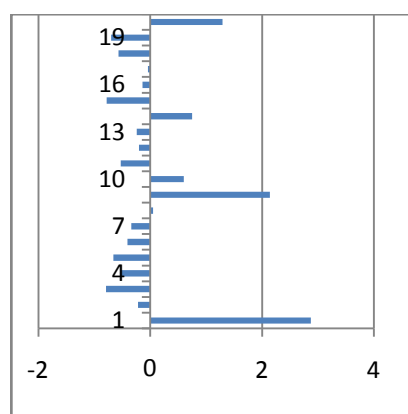


Fig.2 (a) Length of mainstream

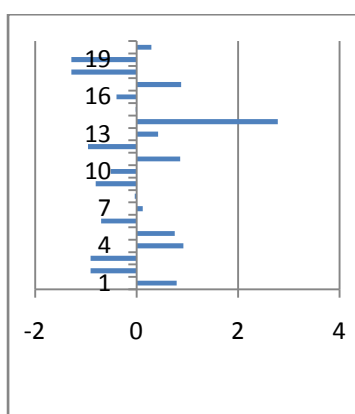


Fig. 2 (b): Total Rainfall

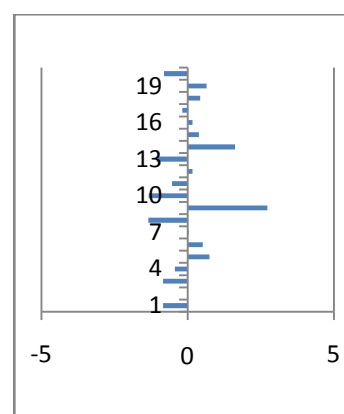


Fig.2 (c) % younger granite

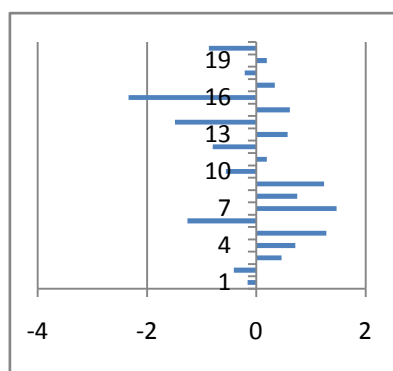


Fig. 2(d): Leminiscate ratio

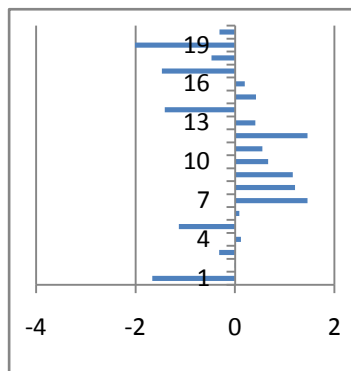


Fig. 2(e) % Savanna

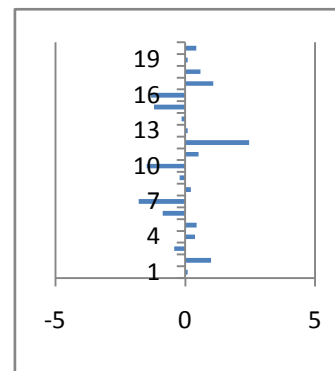


Fig. 2 (f): % Forest

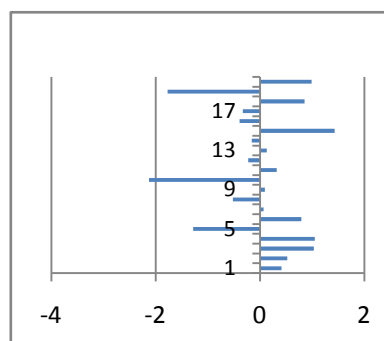


Fig. 2 (g) : Basin scale

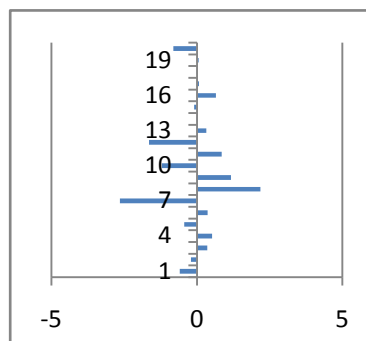


Fig.2 (h): % Fadama

Key for sub basins

1. Galma at Ribako	11. Kwassauat Zonkwa
2. Karami at Saminaka	12. Chalwe at Zango Kataf
3. Jamana at Soba	13. Gurara at Gatan
4. Kogun at Kagoro	14. Assob at Assob
5. Kogun at Ugwan Rimi	15. Dorogoin at Dorogoin
6. Shika at Kano Rd.	16. Galma at Kuzuntu
7. Shaho at Kachia	17. Kogun at Jagindi
8. Kachia at Kachia	18. Kahugu at Ikara
9. Tubo at Lagos Rd.	19. Kudan at Hunkuyi
10. Galma at Gubunchi	20. Karami at Kauru

Fig. 2 : (a-h) Spatial patterns of loadings of basin factor scores of groundwater components in the Upper Kaduna Catchment

VIII. CONCLUSION

The results of the 220 separated hydrographs showed that Groundwater is major contributor to total runoff hydrograph in the basement complex; this is because deep regolith aquifers have been discovered in many parts of the basement complex sometimes as basin of decomposition. Despite the relevance of groundwater to rural water supply in the basement complex rocks few works are available on the response of groundwater to basin parameters particularly in northern Nigeria. The 30 drainage basins variables considered in this study were reduced to only eight defining factors with a total explanation of 84.3% explanation. This implies the other 22 variables explained 15.7%. This confirms that there is high level of redundancy in the equation. Implying that groundwater in the UKC is largely by these factors. Further analysis by stepwise regression analysis showed that only three of these eight factors, namely: total rainfall, percentage of forest and dry season rain fall were most relevant, as they explained 76.4% of the variance. However, a lot still has to be done in the understanding of the response patterns of groundwater to basin variable in Nigeria.

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Assessment of Preschool Education Component of ICDS Scheme in Jammu District

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University of Jammu.

Abstract - Non formal Preschool education is an important component of Integrated Child Development Services scheme currently operational in more than 6506 projects in India. The present research paper is based on an investigation of this component in ICDS centres of Jammu district of Jammu and Kashmir state. A random sample of 60 Anganwadi centres (AWCs) was selected for this study. Using observation and interview schedule, the infrastructural facilities available and the conduct of preschool education activities were evaluated. The results indicate lack of adequate facilities in terms of space (both indoor and outdoor), quality of accommodation, drinking water and toilet facilities, furniture and fixtures and teaching learning material in AWCs. Preschool education activities were being planned and conducted by the AWWs on a routine basis but the activities were mostly repetitive and lacked novelty. Non availability of adequate infrastructure was found to be an active deterrent in conduct of activities. It is thus suggested that better infrastructural facilities be made available to bring about qualitative change in the ICDS programme.

Keywords : ICDS, Anganwadi centres, Anganwad workers, Infrastructure, Preschool Education.

GJHSS Classification : FOR Code: 130105, 130102, 130199, 130303



Strictly as per the compliance and regulations of:



Assessment of Preschool Education Component of ICDS Scheme in Jammu District

Rajni Dhingra^a, Ilesha Sharma^a

Abstract - Non formal Preschool education is an important component of Integrated Child Development Services scheme currently operational in more than 6506 projects in India. The present research paper is based on an investigation of this component in ICDS centres of Jammu district of Jammu and Kashmir state. A random sample of 60 Anganwadi centres (AWCs) was selected for this study. Using observation and interview schedule, the infrastructural facilities available and the conduct of preschool education activities were evaluated. The results indicate lack of adequate facilities in terms of space (both indoor and outdoor), quality of accommodation, drinking water and toilet facilities, furniture and fixtures and teaching learning material in AWCs. Preschool education activities were being planned and conducted by the AWWs on a routine basis but the activities were mostly repetitive and lacked novelty. Non availability of adequate infrastructure was found to be an active deterrent in conduct of activities. It is thus suggested that better infrastructural facilities be made available to bring about qualitative change in the ICDS programme.

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1. INTRODUCTION

Integrated Child Development Services (ICDS) scheme is the only flagship scheme in India at present that aims at providing services to preschool children in an integrated manner so as to ensure optimum growth and development. ICDS programme has covered many milestones since its inception in 1975, which has now reached to 13,56,027 centres nationwide (Consolidated Report of ICDS scheme state Government as on 13.12.2009). Over the last three decades, ICDS has demonstrated its effectiveness. Consequently the Govt of India has renewed its commitment to making the programme universally available in order to ensure full coverage for all Indian children and set "universalization of ICDS with quality" as a core objective in 11th five year plan (Eleventh five year plan, 2007 -2012). ICDS with its multisectoral approach provides its services under three broad headings which are nutrition, health and preschool education. Non - formal preschool education is a very crucial component of the package of services envisaged under ICDS scheme as it seeks to lay foundation for adequate physical, psychological, cognitive and social development of the child.

Good preschool education increases cognitive abilities, school achievements, improves classroom behaviour and decreases grade repetition among children (Barnett, 2004). Preschool education through ICDS focuses on the holistic development of the child. The objectives of preschool education under ICDS scheme (www.wcdorissa.gov.in./download/final-2.0-f.pdf) are as below:

- 1) To provide a stimulating environment for intellectual, linguistic, social emotional and physical development of child.
- 2) To prepare the child for primary grades.
- 3) To lay the foundation for the development of reading, writing and numeric skills.
- 4) To encourage interaction with environment and creative problem solving among children.
- 5) To stress on providing firsthand experience to children which would ensure development of skills related to the process of learning.
- 6) To promote self control and thereby discipline in children.

a) Importance of Infrastructure:

The productivity of an organisation depends upon infrastructure and job performance of employees. Infrastructure is the basic physical and organised structure that facilitates the delivery of services and also improves the quality of a programme. The development and expansion of infrastructure is an essential prerequisite for the prosperity of any programme. It has been perceived that link between infrastructure and development is not a once for all effort. It is a continuous process and progress in development has to be preceded, accompanied and followed by development in infrastructure (National Institute of Public Cooperation and Child Development, 2006). A good building, outdoor and indoor space, adequate equipments, drinking water facilities and toilet facilities constitute the basic infrastructure of an Anganwadi centre (AWC) required for the effective delivery of services. Various surveys have been conducted by NCAER in 1992, 1996 and 2004 to assess the availability of infrastructure in ICDS centres. The rapid facility survey conducted by same organisation in 2004 found that only 46% AWCs were running in pucca buildings and around 10% were running in open air. More than 40% Anganwadi centres across the country are neither housed in ICDS buildings nor in rented buildings. According to the evaluation conducted by NIPCCD 2005-06 (cited in the report of All India Federation of AWW and helpers, 2009) about 49% of the

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Anganwadi had inadequate space for outdoor and indoor activities and 50% had no separate space for storage. It was further reported that 37% of AWC had no materials or aids for providing education. Fifty percent had no space either for storing material or for children to sit inside or play outside. There is a deficiency of teaching learning material in the AWCs. The teaching aids mostly used by Anganwadi worker (AWW) for providing preschool education (PSE) are charts which are given by Social Welfare Department (Arora et al., 2006). Lack or non-availability of teaching aids or preschool kits is a serious constraint for organising and conducting preschool sessions successfully (CAG, 2005 cited in a report of Institute for financial management and resources in 2009-10 on ICDS). The activities organised at AWCs are prayer, free conversation, teaching alphabets, recitation of poems and songs and motor skills such as running and jumping etc. AWWs instruct children in activities delivered to promote social, physical and intellectual growth needed for preschool children. But the quality of preschool services was found to be average due to the non-availability of teaching learning material (TLM). The indigenous materials made by the workers and helpers were used scarcely (Bhadwal 2009). Because of this scarcity, AWWs were having fears regarding loosing/spoiling the material and insufficient material also frequently led to quarrel amongst the children. The AWWs opt to keep TLM securely in a cupboard or out of the reach of children (Message, n.d.).

The above review of literature indicates the lack of availability and use of adequate infrastructural facilities in ICDS centres for meeting the objectives of preschool education component of the programme. These studies have drawn from surveys conducted in different states of India. The review pointed to the dearth of available data on this aspect in the northern most state of India, Jammu and Kashmir. There is a need to undertake evaluation studies in this area which give insight into assessing the effectiveness of the programme, so as to suggest improvement in the delivery of the services.

The present study was undertaken with the following specific objectives:

- 1) Assess the infrastructural facilities available at sample AWCs for preschool education activities.
- 2) Evaluate the conduct of preschool education activities in selected AWCs.

b) Context of the study :

The present research has been conducted in Jammu and Kashmir (J&K) State of India. J&K is a state located in the northern part of India. It comprises three provinces i.e. Jammu, Kashmir and Ladakh. There were 140 ICDS projects with 28577 AWCs which were operational in all the provinces in the year 2009, as per data provided by NIPCCD in Consolidated Report, 2009. Jammu province consists of ten districts from which

Jammu district has been selected for the study. There are ten ICDS projects (Table. 1) in Jammu district from which four ICDS projects were selected purposively. Among them, two blocks were purely urban (Jammu and Gandhinagar) and rest two were rural (Kotbalwal and Satwari). The beneficiaries of ICDS Scheme belong to the low socio-economic strata. Both local and non local population were the beneficiaries in the ICDS centres covered.

II. RESEARCH METHODOLOGY

The unit of study adopted for research was the AWC. The respondents for the study comprised AWWs from AWCs of four blocks of Jammu district of J&K state. The blocks from where sample was drawn were Jammu, Gandhinagar, Satwari and Kotbalwal.

Table 1 : Block wise distribution of AWCs in Jammu District

S.No.	ICDS Blocks	AWCs Operational	AWC selected (10% of AWC)*
1	Jammu	203	20
2	Gandhi Nagar	85	9
3	Satwari	109	11
4	Khour	196	20
5	Bishnah	187	18
6	Akhnoor	172	17
7	Kot Balwal	193	19
8	Marh	177	18
9	R.S. Pura	296	30
10	Dansal	143	14

(* rounded off nearest decimal place)

Source : Social Welfare Department J&K state, 2008

A list of AWCs was obtained from social welfare Department, Government of J&K state. Out of total, 60 AWCs were selected by taking 10% of the total operational AWCs of each block. For selecting sample random sampling (lottery method) technique was applied.

a) Research tools :

An observation schedule devised by NIPCCD was used for assessing the infrastructural facilities including space, building structure, sanitation facilities and physical assets available. Non-participant observations were conducted in the AWC for a period of 2 hours for 70 days to assess the procedure of imparting preschool education in the AWWs. A self devised interview schedule was used to collect information related to the type of activities executed by for overall development of preschoolers, utilization of TLM while executing activities and mode of teaching used in AWCs. The schedule was administered on AWWs of selected centres.

b) Procedure of data collection :

Before the finalization of tools, pretesting of the tools was done on 10 AWCs to assess the reliability and validity of tools. The data was collected by visiting the

AWC. Initially, rapport was established with the Anganwadi workers. The average time taken for data collection in one Anganwadi centre was about 3 hours. The data was collected between February- June, 2010.

III. RESULTS AND DISCUSSION

The results of the present research have been organised under three major categories: Infrastructural facilities available, Types of activities conducted and Mode of conduct.

Table 2 : Profile of sample Anganwadi workers.

Categories	N=60	%
a) Age of AWWs		
21-30yrs	6	10.00
31-40yrs	23	38.33
41-50yrs	21	35.00
51-60yrs	10	16.66
b) Qualification of AWWs		
Matric	28	46.66
Higher secondary	16	26.66
Graduate	12	20.00
Post graduate	4	6.66
c) Training status of AWWs		
Trained	50	83.33
Untrained	10	16.66

In the present study, out of total 60 AWWs included as respondents, 73.33% were in the age group of 31 to 50 years. Regarding their educational status most of the Anganwadi worker were Matric and 26.66% were graduates and above. Majority(83.33%) of AWWs got their orientation training at the time of recruitment and rest were untrained. The untrained respondents reported having been attached with some trained already functioning AWWs to learn the mechanism of functioning of AWCs.

Table 3 : Physical surroundings of AWCs

Categories	N=60	%
Surrounding		
Uncovered drains	12	20.00
Heaps of garbage	7	11.66
Cattle shed/Animal shelter	-	-
Slush and stagnant water	10	16.66
AWC's Setup		
Clean	60	100
orderly	20	33.33
Attractive	12	20.00

The ecological surroundings play an important role in development of children. There is a direct link between health and learning as is also reflected in a popular saying that healthy mind lives in healthy body. In AWC children spend 3 hours of a day for informal learning. AWCs therefore should be clean and stimulating in order to promote the learning abilities. Observation related to surrounding and setup of sample AWCs (Table. 3) revealed that 20% of sampled Anganwadis centres were surrounded with uncovered drains and stagnant water which stunk badly. As far as internal setup was concerned, all AWCs were broomed and mopped regularly. Only 33.33% AWCs had

arranged all equipment like utensils, food items orderly so as to use maximum indoor space available for conducting preschool activities. 20% AWCs were properly whitewashed and all teaching learning aids including charts, poster and indigenous toys were displayed.

Table 4 : Amenities at Anganwadi Centres

Categories	N=60	%
a) Building structure		
Old & dilapidated	-	-
Fairly functional	39	65.00
New & good	21	35.00
b) Toilet facilities		
Not available	39	65.00
Not satisfactory	15	25.00
Usable & satisfactory	6	10.00
c) Indoor space available		
Non existent	15	25.00
Inadequate	45	75.00
Adequate	-	-
d) Outdoor space available		
Non existent	39	65.00
Inadequate	19	31.66
Adequate	2	3.33

Anganwadi centre is the focal point under ICDS scheme from where different services as envisaged in the programme flow to the beneficiaries. To facilitate optimal utilization of the services, AWCs should be provided with necessary infrastructure. The present study found that most (65%) of the AWCs had fairly functional buildings with only one room facility with no provision of ventilation and lighting. Availability of toilets in sampled AWCs (65%) was also deficient. There were no separate cooking and storage facilities. All activities were carried out in same room which appeared to lead to inadequacy of indoor space for carrying out PSE activities. Similar findings were obtained in the study conducted by Qadiri and Manhas (2009) in Srinagar district of J&K state. It was also pointed out that 65% of AWCs had no outdoor space for performing PSE activities. These findings are also supported by the evaluative study conducted in 2009 in J&K by population Research Centre, University of Kashmir.

Table 5 : Physical Assets present in Anganwadi centres

Assets (as per NIPCCD inventory)	Availability		Sufficient		Utilization	
	N=60	%	N=60	%	N=60	%
Durries	38	63.33	10	6.00	38	63.33
Chairs & tables for staff	58	96.66	58	96.66	58	96.66
Blackboard	31	51.66	16	26.66	6	10
Charts	60	100	100	100		
Blocks/counting frames	-	-	-	-	60	100
Picture books	-	-	-	-	-	-
Preschool kits	-	-	-	-	-	-
Toilet accessories	-	-	-	-	-	-
First aid box	-	-	-	-	-	-
Toys	-	-	-	-	-	-
Teaching aids made by AWW & helper	57	95	-	-	40	66.66

Table 7 : Activities conducted in AWCs

Activity	Number of AWCs conducting activities (out of 60)	%
Painting/drawing	25	41.66
Group/free discussion	60	100
Indoor activities	60	100
Outdoor activities	21	35
Story telling/poems	60	100
Paper activities	15	25
Role play	20	33.33
Puppets	-	-
Block building	-	-
Field trip/ nature walk	30	50
Science activities	5	8.33
Water activities	17	28.33
Any other	52	86.66

The above table reveals the activities being conducted in AWCs for performing PSE activities. It was observed that free group discussion, indoor activities like storytelling, reciting poems and songs were conducted daily by all the sampled AWCs which enhanced the language and learning skills of children. For enhancing physical development of children, AWW engaged children in doing activities like jumping, yoga, poems with actions only due to the unavailability of adequate space and basic facilities. Similar findings had been found in a survey (2006) that unavailability of accommodation and TLM inhibit the AWW to indulge the children in various PSE activities. Out of the total, only 35% AWWs conduct outdoor activities like running, free play, throwing ball etc. by utilizing the space which was available. For introducing children to the environment and surroundings, 50% of AWW took children to nearby park or temple. The other activities conducted in AWC for PSE were writing alphabets, numbers, colours names etc. Children brought their own books, copies and pencils for performing these activities.

IV. CONCLUSION

Anganwadi centre is the focal point for delivery of ICDS services, one of the largest programmes in India for welfare of children. There is a direct relationship between the availability of infrastructure in the AWCs and the quality of services provided. The results of the present study have revealed inadequate infrastructure and teaching learning material in the sampled AWCs and it was found that this acted as a deterrent for conduct of preschool education activities. Similar results have been reported by many researchers across the country (Anuradha and Kamala,2003; Sinha,2008; Qaidri and Manhas,2009; Population Research Centre,2009; Vijayanti,2010; Dixit et al, 2010; and Bashir,2011). The comparative data has been presented in Table.8.

For efficient and effective functioning, the AWC needs a minimum level of basic infrastructure and equipments number, adequacy and utilization. Majority (63.3%) of the AWCs had provision of durries and utilized it for children, but the texture of durries was rough which made children uncomfortable. For AWW, only one chair and table was provided. It was also seen that there was non availability of counting frames, picture books, toilet accessories, preschool kits, first aid box and toys. For imparting PSE, different charts including alphabets, numbers, birds, animals etc. were provided but not utilized by the AWW as it was not hanged according to the eye level of children. Moreover, the text on charts was small and difficult for children to read and they were also not allowed to touch and explore the charts themselves.

Due to the insufficient availability of teaching aids, AWWs and helpers prepare TLM themselves by using indigenous material. The aids made by them were clay toys, stuffed toys like vegetables, fruits birds etc. but it was not utilized by the worker as the material was limited according to the number of children.

Table 6 : Methodology used for conducting preschool activities

Categories	N=60	%
a) Language used		
Local	-	-
Hindi	60	100
Any other	-	-
b) Teaching mode		
Formal	-	-
Non formal	60	100
c) Time duration		
Upto 1 hour	7	11.66
1-2 hours	53	88.33
2-3 hours	-	-
d) Planning of activities		
Yes	60	100
No	-	-
Any other	-	-

All the AWCs had planned time schedule for conducting activities (Table 6) as per the instruction provided in the scheme document but lacked in execution mainly because of the non-availability of space and teaching aids. The teaching mode used by all the AWWs was non formal method by using play way approach and Hindi language as medium of instruction for preschool activities. Local language (Dogri) was not used and repetition of activities was observed in daily activity schedule. The duration of time for conducting PSE activities by majority (88.33%) of AWWs was between 1 to 2 hours.

Table 8 : Comparison between results of present and previous studies

Name, year and Place	Previous Studies	Present study
Somaiah and Vijaya-lakshmi, 2007 (Karnataka)	Preschool is the weakest compo-nent in the ICDS programme. The preschool activity which was is to be conducted at least for two hours a day was rarely seen in the AWCs visited.	Duration of PSE activities found in majority (88.33%) of AWCs was 2 hours.
Population Research Centre, 2009 (Jammu and Kashmir state)	It was found that quality of space and location was compromised. It was also observed that 28% percent of AWCs were housed in Pucca buildings, 45% in semi Pucca houses and rest in Katcha houses. No separate storage space, Kitchen and space for indoor and outdoor activities, hence compromising the scope of growth for children.	The findings revealed that there was no separate space for storage, kitchen etc. Each and every activity of AWCs were conducted in single room.
Qadri and Manhas, 2009 (Srinagar, J&K)	The findings indicate that AWCs were housed in rented buildings with one room facility. Most of the AWCs were without toilets. PSE imparted in AWCs was inadequate	Present findings were also similar as it also reveals that all AWCs were housed in rented building and PSE component of ICDS was dull and not challenging due to the inadequacy of TLM and space.
Dixit. et al, 2010 (Madhya Pradesh)	The AWCs had problems of inadequate space, lack of cooking facilities, toilets and majority of them operated from rented buildings. There was a shortage of PSE kits and PSE activities were not given much importance under the scheme.	Present study revealed also similar problems as lack of basic facilities hinder the quality of preschool education component.
Kumar and Pal, 2010 (Uttarakhand)	Lack of appropriate sanitary facilities revealed. It was found that 23.35 selected AWCs were having toilets and 76.06% of AWCs were without toilets.	Similar results were found 65%. AWCs were deficient in toilet facilities.
Bashir, 2011 (Srinagar, J&K)	There is no space for the children to play. Most of the children registered with the centre don't come regularly due to absence of basic facilities.	Similar findings were found in the present study. Only 3% AWCs had adequate outdoor space for playing.

The result of the previous as well as the present study indicate that AWCs are lacking in basic facilities like infrastructure, space etc. which acted as a deterrent for the conduct of preschool education component of ICDS. The major facilities which were found of be lacking were:

1. Indoor and outdoor space for conduct of preschool activities.
2. Toilet facility.
3. Teaching learning material.

In the current five year plan, allocation of resources under ICDS has been increased substantially to not just expand coverage but to ensure availability of adequate infrastructure. For the proper functioning of an ICDS centre, it should be housed in a building with a kitchen, have baby friendly toilet, drinking water facilities and with adequate space for children to play (Eleventh five year plan, 2007-2012). In view of this recommendation, it can be stated that the Anganwadi centres studied in Jammu district grossly lacked in the above mentioned facilities. Jammu and Kashmir State is one of the special states in India since it is covered under Article 370 of the constitution and has its own set of provisions for governance. In view of this and also keeping in mind the fact that state has been affected by armed conflict since over two decades, the present

results based on study of conditions in a local setting suggest that drastic measures need to be put in place to bring about wholesome changes in the provision of basic infrastructural facilities for the ICDS programme. In addition to that, J&K state is one of the states that has seen downfall in sex ratio trends in the recent census survey (From 914 in 2001 to 859 in 2011) which is a cause for great national concern. ICDS programme can play a major role in reversing this trend provided the programme gets adequate attention and better infrastructural facilities.

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Indigenous Knowledge and Health Seeking Behavior Among Kattunayakan: A Tribe in Transition

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Abstract - "This study aimed to document the INDIGENOUS KNOWLEDGE AND HEALTH SEEKING BEHAVIOR of kattunayakan of south & north arcot district, Tamilnadu focusing on their utilization of medicinal plants and associated indigenous knowledge. Five villages were selected out of 65 villages, the participant observation method used for collecting data. Different parts of different Plant are used to treat different ailments ranging from diseases. In an average, the diverse patterns of use of different medicinal plant parts show the considerable indigenous knowledge of kattunayakans."

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V. Amuthavalluvan^α, Dr. Jesurathnam Devarapalli^Ω

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I. INTRODUCTION

Human beings in general and tribals in particular depend upon nature for their primary needs as they are born and brought up in forest. Their life long and trans generational interaction with nature was encapsulated with indigenous knowledge system which serves their mundane needs as well as crises situations of life including health. In India majority of tribes still rely upon their own indigenous health seeking practices in the event of disease and this indigenous knowledge commonly referred to as the strength or value of their society.

The early Human beings were the simple hunters and gatherers and depended upon nature for food, shelter and medicine. This gave a chance to study about the local plants and their effects in different situations. In India majority of tribal population still depend on the indigenous treatment. In every tribal group a particular family or individual is identified with the knowledge of ethno botanical recipes and as well function as magico-religious practitioner. These medicinal practices acquired and accumulated from generation to generation. This is commonly referred as the strength or value of the society (Samira Dasgupta: 2006) (S.Rajan:2007). But in the recent past, the ideology of this strength and value are gradually weakening due to so many different social contacts from outside, the kattunayakan are still observing those traditional practices to some extent. The present paper

deals with understanding the indigenous knowledge of health seeking behavior of kattunayakan related to their local environmental. Their health care practices have been merged with their daily life. The aim of this paper is to document the health seeking behavior of kattunayakan because they are fast vanishing.

Three South and North Arcot districts, namely Vellore, Thiruvannamalai, Villupuram have been covered for this study. Totally 61 settlements were visited, and five of them namely Panapakkam, Seshadrinagar, Kalasapakkam, Mugaiyur, Sitheripattu have been selected for the study.

The tribe is highly reserved and so the collection of information is a very difficult task. Hence the halt at the long time duration gave a pavement to score more data about their health seeking behavior. Systematic anthropological field explorations have been carried out with the help of elderly kattunayakan, medicine men (*Vaitheir*) who have knowledge of plants and remedies. Discussions with women have been held in various settlements to collect maximum information of health seeking behavior.

II. HEALTH SEEKING BEHAVIOR

Health seeking behavior in relation to illness behavior refers to those activities commenced by individuals in response to a symptom experience (Keith: 2004:829-63). This symptom experience known as knowledge of illness causes and symptoms, Knowledge is generally reviewed in order to see how far community knowledge concurs to Ethno medical concepts (Susanna-Muela:2004:3). People reported knowledge, which derived from Ethno medical concepts, is usually termed 'beliefs'. This behavior among different populations, particularly in the tribal communities, is a complex outcome of many factors operating at an individual, family and community level (Lurie: 1995:539-46), including their Eco-social profile, their past experiences with the health services, influences at the community level, availability of alternative health care providers, including indigenous practitioners and last but not the least their perceptions regarding efficiency (Jain: 2006:140). Belief systems prevalent in the communities, i.e. how people

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conceptualize the etiology of a health problem and how symptoms are perceived is an important factor in deciding the first step of treatment seeking (Keith:2004: 829-63). Likewise, the perception of treating the individual biological changes with the knowledge of local ecological adaptation is termed as the natural way of living (Fikret Berkes: 1991). So the kattunayakan community still is following such a methodology.

III. METHOD OF DETECTING PREGNANCY

- The woman begins to sleep a lot.
- She begins to dislike the smell of cooking especially grams.
- She begins to vomit a lot.
- The lower abdomen begins to swell.
- The urine became more viscous.

a) Methods of counting the pregnant period

- They count the months by a bar code on the wall.
- They also use leaves for this purpose.
- Apart from this they put a *Sozhi* or *pebbles* in a small pot, for a month and then count them.
- They also begin to calculate the month from the period without menstruation by adding a knot for each month in a rope in the corner of the house.
- They calculate the possible date of fertilization the day after the husband left home.
- They also remember the date by marking land marks like festivals new moon day or full moon day and deduce the fertilization date before or after these important dates.

b) Husband caring wife during pregnancy

- ❖ The husband begins to grow beard, showing his affection to his wife.
- ❖ He also helps her cooking, bathing and feeding her with food.
- ❖ He also follows the instructions and medication given to him and follows which is given by *Kenche* (local medical women-Thai).
- ❖ He also abstains himself having sex with her first few months.

c) Food during the pregnancy period

Kezhvaraghu - (Elesinecorocana), Thennai {Thinai-Setariaitalica} Rice, with this they prepare *Puttu* for pregnant women.

d) Food taboos

Black grapes and naval fruit are restricted because it causes *Sevapu* disease to child. Vegetables like Ash gourd, pumpkin, guva fruit, onion, cabbage, *seethapuli* and other grain-foods, raw rice, roasted rice and powdered tubers aspired. It affects

the growth of the child. *Eeasal* must not be taken because this are causes *Sevapu* disease to the child.

e) Sex & pregnancy

Sexual intercourse to be prevented for the first to 3rd or 4th month, sexual intercourse is continued from 5th to 9th month. The reason they say is it could result in normal child birth, they also believe sexual intercourse provides pleasure and relieves from anxiety. Sex during pregnancy is carried out cautiously that the body weight is not fully transfer to the female partner. Due to their drinking habit the husband forced his wife for sex in their drunken state. The women when drunk also oblige the husband. The first child birth takes place in the bride's house. The other child births will happen in the husband's house.

f) Role of the husband (father) during child birth

The father note down the time and date of the child birth, he also note down how many days after and before new moon day and full moon day. He also buys the necessary materials required for the child birth and provides food and salary for the people who help during the child birth. Finally he intimates the message to his relatives then the first child birth brides mothers house, the mother is not allow to the during the child birth. Other female members like her own sisters and her husband sisters, mother-in-law, elder women and *kenchey* are allowed.

g) Role of midwife after Child birth

After the child birth the mother is made to stand up and her belly is tightly wrapped with cloth, this prevents the accumulation of air inside the womb. When the child is born its nipple is squeezed to remove the first milk and washed. This is done to prevent the over growth of the nipple and abnormal breast for female.

h) Colostrums (Seemball)

The nipple of the mother's breast is cleaned and the baby is fed with the *Seemball*, it is highly nutrition. The baby don't drink the mother's milk due to some digestion problems, it results in clotting of milk inside the mothers breast. This causes huge pain in her breast and discomfort in her body, even slight disturbance causes by help from the husband and who suck the nipple slowly and spit on a green plant.

i) Removal of the first excretion

When the child takes a long time for defecation then it is done artificially. So they apply castor-oil at and around the anus of the baby then the *kenchy* of the grandma insert the finger in the anus and remove the feces by use of the left hand finger.

j) Removal of amniotic fluid

The child while in uterus will ingest amniotic fluid around it. When the child comes out of the womb, it is not desirable to health. The hay of the little millet is burned and the *Kodikalli*-(*Sarcosdema intermedium*) plant is shown in the flame of little millet hay. Now the *Kodikalli* is squeezed and the juice is fed to the baby through *thepaladai*, after drinking the plant juice they vomited the amniotic fluid in the baby stomach this makes the baby active and drink more milk.

k) Treatment for delay child birth

The juice prepared from the leaf extract *Murungai* (*Moringa oleifera*), which is added with *soombu*, and roasted *Seeragam* {*Seeragam-Cuminum cimini*} which is then heated and prepare a *Kashayam* this is induce the Child birth. Castor oil is applied from navel to lower belly this also induce the Child birth.

Types of abortion methods

- A mixer of black *Seeragam* (cumin) and jaggery.
- The leaf twigs of the date palm are eaten.
- Eating of papaya ripe fruits and papaya fruit.
- Eating of sesame seeds with jaggery.
- Infanticide is not practiced on sexual bias, female infanticide is not selectively practiced.

l) Food habits of child

Normally the child is fed with milk six to seven times at the day. After the fifth month they start to give the porridge, in the same time they also give the boiled *kezhangu* and fruits.

m) Alternative food for the baby

Kezhvaragu-(*Elesine corocana*) porridge prepared without sugar and given to the baby through the *sanghu* or *paladai*, then they give the boiled rice water with salt also given to the baby. The solid food other than the mother's milk is given after the sixth month; like idly, Rice, Grams. They should be smashed fully and then given to the baby.

n) Food Restrictions on the nursing mother

Fish, Grams, Pulses, Mango and Greens are disallowed. Banana, ground nut, coco nut, corn, millet, *Adhirasam* and jaggery must be prevented. *Adhirasam* and mango fruit causes irritation of the anus. Millet causes *ouppoosam* for child.

o) Breast feeding

The head side should be up and leg portion should be lower. They give milk while weaving the basket, and even while they are selling the basket roaming in the street. They also give milk whenever the child cries irrespective of the weather.

p) To increase the lactation

Garlic is added in the food in large amount. Non-vegetarian foods are prepared. They are rabbits, squirrels, *Madayan*, *vaka*, *nari*, *kaadi*, *kowthare*, and *myna*.

q) To decrease the lactation

The *thuvare dhal* is immersed water in one hour and then made a paste then the paste is applied over the breast this decreases the lactation. The jasmine flower tied around a cloth at the breast this also decrease the milk.

r) Cure for Nipple Pain

Leaves of *meghendi* (*maruthane*) and turmeric are made into a paste and applied over nipple; *Kadukkai*-(*Terminalia chebula*) is made into a paste and applied over the breast.

s) Sex after pregnancy

Sexes advocated (avoided) at least after three months of child birth, because they find the differently in calculating the date of insemination. The first child also gets sick, Became very weak. It may begin to vomits, have Dysentery and develop other illnesses. As a medication in the cause a *Pungam kai*-(*Pongamia pinnata*) tied around the tread trough a hole of the seed and then tied around the waist of the baby.

t) Thickening of semen

The flower of *moringa* is mildly roasted with ghee, boiled with milk and drunk which thickens the semen. The *maruthani*-(*lawsonia inermis*) paste with lemon juice is placed on *padai* in genitals for few hours and bath is taken remove the scars. The *magandi* is applied over *ven-padai* for cure.

u) Ealumburiki kassam

The leaves of *Kanchankorai*-(*Ocimum canum*) ten grams nutmeg one gram is ground to powder and is taken with hot water. The leaf juice of *thuthuvali* is heated with ghee and a teaspoon is taken twice a day. *Thuthi* flower is made into paste taken with sugar amounting to half a teaspoon. Panchanga sooranam of neem is taken with one gm of ghee, honey, milk or butter for 90 days.

v) Cold Affected Lungs

Adathoda and *manapagu* juice about 10ml is taken thrice a day with hot water. Leaf juice of *kanjankorai* about 30 days with milk is given for infants. 5 ml of *Thoothuvelai* heated with ghee is taken twice a day. The leaf juice of *Thazhuthazhai* is sucked through the nose which gradually reduces the symptoms of cold. The leaves of *Leppia* with ginger, *pudina*, *coriandrum*, *murunga* is made into paste and taken with rice and ghee. The dried *Sundai* and amla with dried

ginger, *methi*, *carumcarvi*, shell of ponegavate, seeds of mango, *karivembujiera* are made into powder and two teaspoons are taken twice a day.

IV. DIARRHOEA

The leaf juice of *Adathoda* is taken with buffalo's milk. The leaf juice of tamarind is boiled and it is taken with milk (30ml). Flowers of *asoka* tree, mango seed is taken in equal amounts and taken with milk. *Murunga* leaves with *chilly* is fried in ghee and then added with old tamarind fruit and salt made into a paste and eaten with rice. The leaf twigs of *noval* and mango are taken in equal proportions and made into paste. It is then consumed with curd. The seeds of mango fruit are roasted, powdered and about 5 gms are added with buttermilk for consumption. The leaves of *Lippia* with nutmeg, *Seeragam* is heated with ghee and taken to a void bloody diarrhea. The young fruits of *vilvam* is grounded and given with curd for infants. Onion is fried with ghee and consumed. *Nathai Soori* seeds are powdered and added with sugar crystal and taken thrice a day. *Maasikai* is roasted, powdered and about 1 gm of powder is taken with honey.

a) Removal of Stomach Worms

The root of *Uttamani* is powdered and 2-4 grams are taken with milk. The problem related to digestion, diarrhea and worm infestation in stomach of children are solved. The leaf juice of Erukku and honey in ratio of 3:10 is taken to get rid of worms. Taking a slice of papaya daily also helps in getting rid of worms. Sundai with boiled milk also get rid of worms. Leaf juice of bitter gourd (30ml) kills the worms in stomach. 10 gms of boiled garlic is consumed to get rid of worms.

b) Blood with Urine

A decoction is prepared with 50 gms of flower buds boiled in 500ml of water and it is consumed twice a day solves the problem. Roots of Ponnankanni is ground to paste and added with curd. The butter extracted from this curd is taken in morning for 3 days.

c) Karappan

The juice of *Aaduthinnapalai* and *samoolam* is boiled withgingili oil and applied over the infected area. The leaves of *Uthamani* is fried in neem oil and gently applied over the infected area. *Poovarasam* flower is dried and mixed with coconut oil and applied over infected areas. Latex of papaya is mixed with *padikaram* and applied over infected area. Consuming leaf juice (15ml) of *Karujempai* cures *karappan* physiologically. Applying leaves of *piramathandu* is made into paste and applied over infected areas.

d) Muscle Strain

Vaathamadakki leaf is heated in castor oil and gently applied over the affected area.

e) Sleeplessness

Scenting *thiruneetm pachilai* and sleeping with *mehndi* flowers near bed act as sleep inducers.

f) Increasing Lactation

The leaves of castor or *kattamanakku* are placed over the breasts increase lactation. The leaves are boiled and immersed in a cloth which is gently applied over breast. Later the leaves are tied over breast which increase lactation. Illuppai leaf is tied around breasts which also increase lactation.

g) Kaal Aani

Amman pacharisi latex is applied over *kaal aani* and root barks of *mehandi* is powdered and applied over *aani* in foot. Turmeric (2 pieces), *mehandi* leaf (10gm), *vasambu* (1 piece), camphor (5 gm) are powdered and applied for 10 days on *kaal aani*.

h) Itches and Itching Wound

Leaf extract of *kanjaankorai*, *thumbai* and *punail* flower extract, *keezhanelli* extract with salt, *adathoda* and *samula* extract heated with gingili oil, any one of these are applied over the body and taken bath. This cures itches & scabies.

i) Removal of Unwanted Hair

Applying turmeric at night and washing it in the morning. Feathers of peacock are charred and mixed with coconut oil and applied over unwanted hair.

j) Saitrupun

Arueampul- (*Cynodon doctylon*) with turmeric is mixed and grounded to paste

j) Burns

Venthayam (methi) in paste form is applied over the wounds to ease pain. The banana fruit juice is applied over fire wounds for cure. The young leaves are tied around wounds to enable faster cure.

k) Nachukatru

Neem with turmeric in paste form is applied for 10 days around the infected place. The lemon fruit is lightly cut and inserted into the finger for cure. *Silanthi nayagam* leaf extract is applied to the nail and it breaks the wound to release blood and pus and cure the wound. *Kiranthi nayagam* leaf extract is applied over wounds.

l) Kakkuvan

Inflorescence of *tulsi*, *thippili*, *vasambu* in equal proportions are powdered, mixed with sugar and *intaken* with a spoon of honey. Kathiri leaf juice is mixed with rice

m) Fits

Vasambu asafetida, *thirikadugum*, skin of *kadukkai*, *athividayam*, black salt in equal proportions are powdered and a teaspoon is consumed twice a day.

n) Menstrual bleeding

The bark of trees such as *Arasamaram*-(*Ficus religiosa*), *Alia maram*-(*Ficus benghalensis*), *Atthi maram*-(*Ficus glomerata*), *Marutham maram*-(*Terminalia arjuna*), and *Thennam palai* (*Thennai-Cocos nucifera*) are boiled in a vessel containing two liters of water. It is boiled until the water gets reduced to one liter forming tick decoction. The people suffering from menstrual bleeding are made to drink this decoction for three days.

V. CONCLUSION

Documentation of health seeking behavior of kattunayakan gives us a glimpse of their rich indigenous knowledge in protecting their health by both preventive and curative measures which are culturally nurtured and environmentally supported. They follow their own distinct ways of predicting and diagnosing the health conditions and trying to meet the demand in a very casual way that would not differentiate much from day to day activities. Much curiosity is exhibited in the matters of child birth and sexuality as pointed out by Levy and Fallers (1959: 647-51) that reproduction and sexuality were two primary or essential activities of any human beings life.

Kattunayakans use a variety of plant products like leaves, barks, roots, fruits etc in different combination to cure various diseases. They use two or more remedies for the same disease indicating that one is superior to the other. As the local environment is subjected to degradation the non-availability of certain species also force them to find an alternative. It is also observed that almost every grownup individual try on their own for any kind of ailment in initial stages. However in the changing situation kattunayakan are gradually accepting modern health care systems subjected to their economic conditions.

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A Study on Role of Mother's Education for the Psycho-Social and Cognitive Development in Children

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Keywords : *Early Head Start, Mental Development Index, Peabody Picture Vocabulary Test.*

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Abstract - The present evaluation of Early Head Start concerns the effects of household income and mother's education on child cognitive development. A secondary data analysis is performed on the Early Head Start Research and Evaluation study public use file, in which cognitive development is measured using the Bayley Mental Development Index and the Peabody Picture Vocabulary Test. Household income is measured as a percentage of the federal poverty level, with households earning up to 100 percent of the poverty level annually considered low income. Mother's education is determined by possession of a high school diploma. Results of multiple and simultaneous linear regressions are presented. Early Head Start is found to positively affect cognitive development among children whose mothers have earned a high school diploma, while its effectiveness for low income households is less significant. Implications for early childhood interventions are discussed, as well as areas for future research.

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I. INTRODUCTION

When we speak of early child development we speak broadly of both cognitive and social/behavioral development in the first three years of life. We are concerned presently with cognitive development, which is characterized primarily by the development of language and pattern recognition (Whitehurst & Lonigan, 1998). The extent to which these cognitive abilities are expressed at an early age has implications for cognitive development throughout elementary school and beyond. Children with more advanced cognitive functioning relative to their peers prior to elementary school go on to perform better in school (Blachman, 1984; Blatchford & Plewis, 1990). Importantly, research suggests cognitive development is not achieved at the same rate or to the same extent equally among all children. Numerous studies (Duncan et al, 1994; Entwisle & Alexander, 1995; Korenman et al, 1995; Blau, 1999; Fazio et al, 1996; To et al, 2004; Phipps & Lethbridge 2006) have indicated that household income, or the income earned by the child's primary caretaker, is one

of, if not the most significant determinant in a child's cognitive development. Children in poverty or low income households exhibit poorer cognitive functioning prior to and during the first few years of elementary school, as compared to children from higher income households (Blatchford & Plewis, 1990; Entwisle & Alexander, 1995; Fazio et al, 1996; Brooks-Gunn & Duncan, 1997; To et al, 2004). A similar correlation exists between parents' education and cognitive development in children (Sharp et al, 1979; Evans et al 2000; Bacharach & Baumeister, 1998). This, again, has implications for later achievement in school. Consequently, the purpose of our evaluation is to consider both the effect of Early Head Start (EHS) participation on cognitive development among children from low income households, and also the effect of EHS participation on cognitive development with respect to mother's education.

II. BACKGROUND

Interventions to improve cognitive functioning in children younger than three years of age such as EHS are necessarily two-generational. That is, the interventions involve both the mother and child. EHS developers observed that the program effect was weak among existing interventions that served families and very young children, but the program models themselves varied considerably in terms of the following: 1) the duration and intensity of services; 2) the timing of services; 3) their status as home- or center-based (or both); 4) the duration and intensity of the parenting component; 5) the extent of reliance on case management; and 6) the nature of self-sufficiency components (i.e. adult education and job training) (U.S. Department of Health and Human Services, 2001).

EHS was created in 1995. The intervention model involves intensive services that begin before the child is born through the first three years of the child's life. Services include child development and parenting services -- during home visits or in program centers; case management; group parenting activities; child care and center-based developmental services; health services including immunization and dentistry for children and mental health services for parents; and employment services (U.S. Department of Health and Human Services, 2001).

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Because EHS services, like traditional Head Start, are only available to households that meet its income guidelines, participants are over-representative of low income households. As it concerns cognitive development, the sample demographics are advantageous to pinpointing the effectiveness of EHS because, as mentioned, children from low income households show lower measurements of cognitive development than do children from households with higher incomes.

Furthermore, to the extent EHS improves cognitive development among children from low income, low educated households it represents an effective poverty-fighting program. With this in mind, our present evaluation is interested in answering the following questions: 1) what is the effect of EHS participation on the cognitive development of children from low income households? 2) What is the effect of EHS participation on cognitive development with respect to mother's education?

The Administration of Children, Youth, and Families (ACYF) of the U.S. Department of Health and Human Services (HHS) conducted its own evaluation of EHS, the Early Head Start Research and Evaluation (EHSRE) study. This evaluation was much broader in scope than is ours; we utilize a secondary data analysis of the EHSRE data set to answer our research questions, and focus attention more specifically on income and education. We hypothesize that EHS participation will significantly affect cognitive development among children in low income and/or low educated households.

III. METHODOLOGY

The EHSRE evaluation method was as follows. An experimental design was used to measure the effectiveness of EHS. Beginning in 1995, seventeen sites were selected across the United States, and 2,997 participants were recruited then randomly assigned either to receive EHS services (1,503 participants) or to a comparison group (1,474 participants) that did not receive EHS services. This controlled for the variables of greatest concern to our research interests, namely household income and mother's education. Indeed, 2,451 participants were within 100 percent of the federal poverty level, which in 1995 was \$15,569 per year for a household of four (U.S. Census, 2010). Of these, 1,248 were in the treatment group while 1,203 were in the comparison group. Similarly, of the 1,023 participants who had received their high school diploma 534 were in the treatment group and 489 were in the comparison group. The evaluation itself occurred from 1996 to 2001.

Because participants were recruited when they were prenatal, the baseline measurement of cognitive development was taken at fourteen months after birth. In the EHSRE study cognitive development was measured using the Bayley Mental Development

Index (MDI; Bayley, 1993) at fourteen, twenty-four, and thirty-six month intervals after birth. The Peabody Picture Vocabulary Test (PPVT; Dunn & Dunn, 1997) was also used at thirty-six months.

R	X	O ₁	X	O ₂	X	O ₃
R		O ₁		O ₂		O ₃

In terms of design, the EHSRE study was as follows:

The value of the Bayley MDI and PPVT for our purposes is that they are normative on age-adjusted scales, and were administered by the EHSRE evaluation team on the children themselves. As measures of cognitive development, the instruments have been evaluated for their validity and reliability and have been found to be comparable to similar measures (Campbell et al, 2001; Miller & Lee, 1993; Costello & Ali, 1971; Harris et al, 2005). The PPVT measures listening comprehension of spoken words in Standard English for children and adults from age 2 1/2 and over. During the assessment the child is presented with four pictures and asked to point to the picture that matches the word spoken by the interviewer. As mentioned, the Bayley MDI is normed so that a value of 100 represents the age-adjusted mean, with a standard deviation of 15. An adjusted mean value below 85 thus indicates delayed performance. The same scoring is used for the PPVT. We employ a multiple linear regression to measure the significance of EHS participation among children from low income households. Accordingly, the Bayley MDI and PPVT serve as dependent variables, while the effect of baseline knowledge (in the case of the MDI) and EHS participation are held constant. Household income as an independent variable is included up to 100 percent of the federal poverty level. The same method is used to measure the effect of EHS participation among children from low educated households, with possession of a high school diploma serving as the independent variable.

$$Y_i = \beta_0 + \beta_1 T_i + \beta_2 X_{li} + \varepsilon_i$$

Because income and education are often correlated (Burchinal et al, 1997; Bradley & Corwyn, 2002; Bacharach & Burmeister, 1998), we also employ a simultaneous linear regression, in which income and education are held constant along with baseline knowledge and program participation.

IV. RESULTS

To begin with, the overall program effect on cognitive development at thirty-six months was not significant (see Table 1), absent either household income or mother's education. This holds true when we perform the regression holding household income constant. We see in Table 1 that the program effect at thirty-six months was not significant ($p < 0.05$) for

children of low income households. The significance seen at baseline and at twenty-four months does not carry over. In this respect it is helpful there are two measures of cognitive development to draw from; Table 2 suggests the effect of EHS participation was significant ($p<0.05$) on cognitive development at thirty-six months on the PPVT. If one were to use the results from Table 2 alone he might conclude the program effect was more significant than it really is. say, children from within the program group whose mothers had earned a high school diploma scored 4.08 points higher on the Bayley MDI than similar children in the comparison group and 4.68 points, higher on the PPVT respectively.

In terms of correlation between income and education, there remains an observable program effect. Even while controlling for income, we can see a very significant ($p<0.001$) program effect in Table 3 and in Table 4 among children whose mothers have earned a high school diploma. Again, this means that within the program group children whose mothers had earned a high school diploma yet remained low income scored 3.30 points higher on the Bayley MDI and 4.78 points higher on the PPVT than similar children in the comparison group. The program effect on household income is less significant when controlling for education.

Table 1: Results of linear regressions for the following variables on the Bayley MDI, holding program assignment and baseline knowledge constant

	Baseline (14 Months)		24 Months		36 Months	
	Coefficient	P	Coefficient	p	Coefficient	P
Program	0.159	0.757	1.49	0.025*	1.21	0.07
Poverty	0.555	0.046*	0.99	0.006**	0.35	0.325
HS Diploma	1.400	0.014*	4.33	0.000***	4.08	0.000***

* $p<0.05$; ** $p<0.01$; *** $p<0.001$

Table 2: Results of linear regressions for the following variables on the PPVT at 36

	Coefficient	p
Program	1.26	0.12
Poverty	1.03	0.02*

* $p<0.05$; *** $p<0.001$

Table 3: Results of a simultaneous linear regression for the following variables on the Bayley MDI, holding program assignment and baseline knowledge constant

	Baseline (14 Months)		24 Months		36 Months	
	Coefficient	p	Coefficient	p	Coefficient	p
Program	0.22	0.73	1.45	0.068	0.41	0.59
Poverty	0.66	0.03*	1.19	0.002**	0.29	0.43
HS Diploma	1.49	0.02*	3.49	0.000***	3.30	0.000***

* $p<0.05$; * $p<0.01$; *** $p<0.001$

Table 4: Results of a simultaneous linear regression for the following variables on the PPVT at 36 months, holding program assignment constant

	Coefficient	p
Program	0.53	0.59
Poverty	0.58	0.22
HS Diploma	4.78	0.000***

*** $p<0.001$

V. DISCUSSION

Since low income children are particularly vulnerable to delays in cognitive development (Blatchford & Plewis, 1990; Entwisle & Alexander, 1995; Fazio et al, 1996; Brooks-Gunn & Duncan, 1997; To et al, 2004), it is very important that early intervention programs attend to the specific challenges of serving low income households in their program models. What our results suggest is that Early Head Start is an effective intervention for improving cognitive development among low income children. It is even more effective when the child's mother has earned a high school diploma. This is not altogether surprising, and it leaves us unable to answer one of our research questions, which concerns whether the program is effective for children whose mothers have not earned a diploma.

In any case, our results confirm the importance of education on child cognitive development found elsewhere (Duncan et al, 1994; Entwisle & Alexander, 1995; Korenman et al, 1995; Blau, 1999; Fazio et al, 1996; To et al, 2004; Phipps & Lethbridge 2006; Evans et al 2000; Sharp et al, 2005; Bacharach & Baumeister, 1998).

Further evaluation of Early Head Start should consider the ways in which education operates to improve cognitive development in early childhood. Such evaluations might also consider which program interventions are most effective in terms of cognitive development: home-based, center-based, or a combination of the two. There are limitations to our results that should be taken into consideration. First, there is a significant amount of missing information from the EHSRE data set. Of the 2,977 participants, 898 did not indicate whether or not they had earned their high school diploma. Furthermore, 1,197 results were missing on the twenty-four-month measure of the MDI; 1,319 from the thirty-six-month measure; and 1,553 from the PPVT. Information from these participants could significantly change the results of our analysis. Finally, because the intervention began while some participants were prenatal the baseline measure of cognitive development may not represent a true baseline.

VI. CONCLUSION

If the mothers educated, she can bring up children's much better. Being aware of the events and thoughts prevailing in the world, she can help to broaden the horizon can her children's. Early Head Start has a very positive effect on cognitive development among children whose mothers have earned a high school diploma.

The influence of an educated mother in the child is greater and her education is most important because she is the first teacher of her child. Effect on children from low income households is less significant. To the extent possible, interventions like EHS should consider opportunities for participants to further their education.

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Structural - Functional Classification cum Analysis of The Complete Sentences of Contemporary Nigerian Advertisement Messages

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Abstract - Many of the contemporary Nigerian advertisements copy messages are simply phrases and sentence fragments while many others are syntactically and semantically complete sentences. The complete sentences of contemporary Nigerian advertisement messages are usually of different structural and functional classifications. This paper therefore attempts a structural-functional classification cum analysis of one hundred and fifty (150) complete-sentence advertisement messages identified among some selected three-hundred (300) advertisement messages of products, services, ideas or organisations i.e. 50% of the total. Seventy-six (76) of the complete-sentence advertisement messages i.e. 50.7% of the total are simple sentences of different functional classifications. Forty four (44) of the complete-sentence advertisement messages i.e. 29.3% are compound sentences of different functional classifications. The remaining thirty (30) complete-sentence advertisement messages i.e. 20% are complex sentences. None of the one hundred and fifty (150) complete-sentence advertisement messages is a compound- complex sentence.

Keywords : *Complete Sentences, Advertisement Messages, Classification cum Analysis*

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Abstract - Many of the contemporary Nigerian advertisements copy messages are simply phrases and sentence fragments while many others are syntactically and semantically complete sentences. The complete sentences of contemporary Nigerian advertisement messages are usually of different structural and functional classifications. This paper therefore attempts a structural-functional classification cum analysis of one hundred and fifty (150) complete-sentence advertisement messages identified among some selected three-hundred (300) advertisement messages of products, services, ideas or organisations i.e. 50% of the total. Seventy-six (76) of the complete-sentence advertisement messages i.e. 50.7% of the total are simple sentences of different functional classifications. Forty four (44) of the complete-sentence advertisement messages i.e. 29.3% are compound sentences of different functional classifications. The remaining thirty (30) complete-sentence advertisement messages i.e. 20% are complex sentences. None of the one hundred and fifty (150) complete-sentence advertisement messages is a compound-complex sentence.

Keywords : Complete Sentences, Advertisement Messages, Classification cum Analysis

I. INTRODUCTION

A sentence according to Downing & Locke (2006:272) is grammatically the highest linguistic string made up of one independent or super-ordinate clause with a subject and a predicate or two or more closely related clauses. Omer & Sayidina (2005:162) describe the English sentence as the highest independent structure on the syntactic rank of the language which orthographically begins with a capital letter and ends with a full stop (otherwise called a period), a question mark or an exclamation mark and which semantically communicates a meaningful idea or complete thought. Finch (2005: 109) also identifies the traditional definition(s) of sentences as grammatically complete and semantically independent units of language capable of standing on their own. In the light of the basic semantic, orthographic and syntactic requirements of a sentence mentioned in the three be deduced as an expression which represents the

largest unit of a language that is grammatically worded/constructed, having a subject and a predicate, expressing a complete thought / idea, starting with a capital letter and ending with a full stop/period, a question mark or an exclamation mark.

A complete sentence according Millward (1983: 96) is that made up of basic grammatical constituents or components like the subject and finite verb and which is not preceded by any word making it dependent on some other group of words. To Finch (2005: 110) a complete sentence is a major sentence that has at least a clause and consists of elements like subject, predicator, direct object, indirect object subject complement, object complement and adverbial usually combined in various ways. A complete sentence is therefore different from a sentence fragment or fragmentary sentence which is a group of words punctuated as a sentence but which is not actually a fully formed sentence. Such an incomplete /fragmentary sentence leaves out parts of its structure as understood or assumed (Nigel, 1990:392) and this constitutes a serious error/problem in writing because it also leaves readers with a number of unresolved questions in their minds.

Advertisement simply refers to a carefully and uniquely constructed spoken or written form of marketing communication intended to disseminate vital messages or information about some newly introduced or existing products, services and ideas of given organisations so as to captivate the attention of their target audience, arouse their interest and ultimately make them demand/ buy the organisations' products, services or ideas (Robin, 2010, MacRury, 2009 & O'Guinn, Allan & Semenik, 2009). In a similar vein, Bearden, Ingram and La Forge (2001:393) define advertisement as marketing communication that is persuasive, non-personal paid for by an identified sponsor and disseminated through mass channels of communication to promote the adoption of goods, services, persons and ideas. Okanlawon and Oluga (2008:45) however, point out the fact that advertisements usually have specially worded verbal messages, spoken or written, in addition to the visual messages and these can be complete-sentence

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advertisement messages or phrasal/ fragmentary advertisement messages.

A complete sentence of a advertisement message can be classified structurally and functionally. The structural classification is all about determination of sentence types based on the grammatical construction of sentences that is, in terms of their forms, formation, constituents' combination or clausal relationship. The functional classification is the determination of sentence types based on their grammatical functions that is, in terms of the uses of sentences or what they are used for, what the sentences do or what they are used to do. Based on the structural classification of sentences we have the simple sentence, compound sentence, complex sentence and compound – complex sentence. Based on the functional classification of sentences, four main types of sentences can also be identified which are the declarative sentences, interrogatives sentence, imperative sentence and exclamatory sentence. It is however important to point out the fact that the two major classifications of complete sentences of advertisement messages are sometimes interwoven. This is because a sentence that is structurally simple, compound, or complex can also be functionally declarative, interrogative, imperative or exclamatory.

II. METHODOLOGY OF THE STUDY

The study carefully selects three hundred (300) contemporary advertisement messages of products services, ideas and organisations. These are mainly printed/written advertisement messages of posters, hand bills, bill boards, news papers and magazines covering the advertisements of products like cars, food drinks , drugs, mobile phones etc services like telecommunications, banking, pension fund administration/ management etc and organisations like the National Population Commission (NPC) and Federal Road Safety Commission (FRSC). Some products, services or organisations have more than just one complete-sentence advertisement message selected especially those with variety of advertisements but none has more than three advertisement messages among those classified/analysed which are usually differentiated with the numbers being ascribed them. Only one hundred and fifty (150) out of the total three hundred (300) advertisement messages selected that is 50% are the complete-sentence advertisement messages classified and analysed for the purpose of this study. The rest are either phrases or sentence fragments used as advertisement messages of given products, services, ideas or organisations.

III. ANALYSIS OF FINDINGS

The study adopts a two-in-one approach to the classification cum analysis of the one hundred and fifty (150) complete-sentence advertisement messages of products, services, ideas or organisations identified among the whole three hundred (300) carefully selected

advertisement messages. This is because the structural classification/analysis of the various complete-sentence advertisement messages is first done to show the ones that are simple sentences, compound sentences and complex sentences. The functional classification of the various complete-sentence advertisement messages under each of those three main structural types of sentences is then done to show if these sentences are declarative, interrogative, imperative or exclamatory. A simple percentage analysis of the various complete sentences of these classifications will be done with a view to establishing the rate of occurrence of each of the various forms of the complete-sentence advertisement messages of products, services, ideas or organisations.

IV. SIMPLE SENTENCE ADVERTISEMENT COPY MESSAGES

A simple sentence according to Bolaji & Alabi (1994:97) is a sentence that contains just a single major clause otherwise called a main, independent or super ordinate clause having one subject and predicate/predicator but which may or may not have a complement, an object or adverb/ad adjunct. There are seventy-six (76) simple-sentence advertisement messages out of the one hundred and fifty complete-sentence advertisement messages which represent 50.7%. It is important to point out the fact that these sentences, though similar in terms of their structural construction are slightly different in terms of their functions. We therefore, have the declarative, imperative, interrogative and exclamatory simple-sentence advertisement messages.

a) *Declarative Simple-Sentence Advertisement Messages*

These simply refer to the simple-sentence advertisement messages that are in form of statements or assertions and therefore usually give information stating with a capital letter and ending with a full stop otherwise called a period. Out of the seventy-six (76) simple-sentence advertisement messages identified there are forty-one (41) i.e. 54% that constitute the declarative simple-sentence advertisement messages as illustrated below:

1. Honda-We have evolved a new mathematical Calculation.
2. Samsung-I will be the next hero.
3. Cherry Wood Furniture- Good things come in pairs.
4. Money Gram¹ - The power is in your hands.
5. PermaNent- it is back to school time.
6. First Inland- The doors to endless possibilities is here.
7. Money Gram² - your money arrives in minutes.
8. Omatek - It is a compact world.
9. Spring Bank - We crack nuts.
10. Sony Ericsson - I love choice.
11. Arco Petrochemical - We add value to the oil and gas sector.
12. Spring Capital- We create sustainable wealth.
13. Fidelity Bank - We are shooting up all over.
14. Hyundai Sonata-The sonata moves you miles ahead.

15. Starcomms -Our family just keeps getting bigger.
16. Arco Petrochemical-We provide world class vessels.
17. Intercontinental Microfinance-Now anyone can apply for a loan.
18. Etisalat¹ - The choice is yours.
19. Air Comfort Chairs-sometimes success is pain in the back.
20. Intercontinental Bank-Settling overseas expenses is now easy.
21. MTN -Hope comes alive on stage.
22. Virgin Nigeria - Change is here.
23. Triple Delight - The better comes to fruition.
24. NLPC Pension - Your future can benefit from our present. Administration
25. Magen Bio Cement - Every builder has his secret.
26. Aptech Computer Education - We change lives globally.
27. Pfizer Oncology - Tomours are not rumours.
28. Omatek Persona - It is a learning world. Computers
29. Chams City - The tradition of innovation continued.
30. Macmillian - Reading makes a man.
31. Pfizer Oncology² - Pfizer supports the mobilisation hearts minds and resources against cancer .
32. MNT Project Fame¹ - The battle begins.
33. Hyundai Tucson - There will always be times and palaces for Tucson.
34. Crusader Group¹- Figures speak dodder than words.
35. Arm Pension¹ - Tomorrow is working good.
36. FRSC /Nigerian - Life is good. Breweries²
37. Crusader Group² - You can buy right on the floor of the Nigerian stock exchange.
38. Pirelli - Power is nothing without control.
39. African Petroleum - It is a brand new day at African petroleum.
40. Skye Visa Card - I can pay everywhere in the world with my Skye Bank visa card.
41. Intercontinental Edu- Now school payment would not be problem. Support

b) Imperative Simple-Sentence Messages Advertisement

These are simple-sentence advertisement messages which are used to command, direct or instruct hence, such imperative simple sentences are otherwise called instructive simple sentences which usually start with capital letters and end with full stops or exclamation marks. Out of the seventy-six (76) simple-sentence advertisement messages identified there are twenty-two (22) i.e. 29% that constitute the imperative simple-sentence advertisement messages as shown below:

42. Supper Card - Run with the finest
43. MTN2 - Reach more people for less.
44. Intel - Multiply your possibilities.
45. Computer Ware House -Take the information tech tripod advantage
46. First Call Group-Be your own boss in three (3) years.
47. Intercontinental Microfinance - Join the banking revolution
48. Bic - Feel the smooth difference.

49. Zain - Experience true life.
50. Solar Glow - Let the sun work for you.
51. Sovereign Trust Insurance - Let's unlock your potentials
52. Aska Power Generator - Power your future.
53. Honda Dream 100& - choose the Kings of the road. CGL 125
54. Multilink Recharge Win - Join the winning family.
55. Aquitaine - Find your energy.
56. STP Performance - protect your engine from bad fuel and diesel.
57. Nissan Xtrail1- Rule your time.
58. Peugeot 307 Saloon -Test your adrenalin.
59. Audi - Discover the Audi in you.
60. Cornerstone Insurance - Get the right cover for your building
61. Beco Petroleum Products - Experience counts.
62. Glo Rechargeable Bulb - Enjoy light at night without NEPA or Generator.
63. Leadway Personal Annuity - Share the benefit of a lifetime. Plan (LPAP)

c) Exclamatory Simple-Sentence Advertisement Messages

These refer simple-sentence advertisement messages that express strong feelings of surprise, shock, pain, joy or excitement starting with a capital letter but ending with an exclamation mark. We have the basic and the non-basic exclamatory simple-sentence advertisement messages. The basic exclamatory simple sentences are introduced by "what" and "how" as in "what a wonderful goal that was" and "How beautiful she is now". The non-basic exclamatory simple-sentence advertisement messages are other forms of simple sentences introduced to express strong feelings which also end with exclamation marks but which do not start with "what" or "how". Nine (9) of such exclamatory simple sentences have been identified among the seventy-six (76) simple sentences advertisement messages which represent 12%. Such sentences which can ordinarily be declarative or imperative without the exclamation marks are follows:

64. A.P Public Offer - Another opportunity is have!
65. Starcomms 2 - Sleek is style!
66. Binatone Iron- Even clothes deserves a tender touch!
67. Ease On Flavour Milk Drink - It's the zero hour!
68. Nokia 5000- Share in the Nokia triple excitement!
69. First Bank Big Splash-Make a big difference in your life!
70. Etisalat² - Get free air time for life!
71. Alpha Mobile Phones-Check this out!
72. Glo Rock 'N' Rule - Let's rock da city!

d) Interrogative Simple-Sentence Advertisement Messages

The interrogative simple-sentence advertisement messages are non-basic simple sentences used to ask for information starting with capital letters and ending with question marks. The

interrogative simple-sentence advertisement messages can be 'wh' interrogative sentences i.e. those starting with "what", "when", "which", "where", "why" and "how" as in (73) to (75) below or the "yes or no" interrogative simple sentences which usually start with auxiliary verbs serving as operators like 'are' 'is', 'do' 'has' etc as in example (76) below:

73. Dangote Spaghetti - How can I resist you?
74. Tura Soap - What's up girl?
75. Vono Foam - Who is your sleeping partner tonight?
76. Super Loaf - Has it any equality?

e) Compound Sentence Advertisement Copy Messages

Compound sentences according to Aremo (2004: 374) are sentences formed by joining or linking two or more basic or non-basic simple sentences with the aid of coordinating conjunctions or coordinators like "and" "but" and "or" depending on the relationship between the combined or coordinated simple sentences. It is in the light of this that Finch (2005: 111) describes the compound sentences as coordinated sentences whose second elements can be reduced as those of the first sentences clarify those reduced. There are forty-four (44) compound-sentence advertisement messages out of the one hundred and fifty (150) complete sentences advertisement messages which represent 29%. The compound sentences just as the simple sentences can also be of different structural classifications hence, we equally have declarative, imperative and exclamatory compound sentences. These sentences are also properly linked by semi-colons and by other punctuation marks like commas and colons especially in advertisement messages.

f) Declarative Compound-Sentence Advertisement Messages

A declarative compound-sentence advertisement message is one whose coordinated main clauses make statements, assertions or give information about products, services or ideas advertised. This, just as a declarative simple-sentence advertisement message, also starts with a capital letter and ends with a full stop otherwise called a period. There are fourteen (14) declarative compound-sentence advertisement messages among the total forty-four (44) compound-sentence advertisement messages identified which represent 32% and these are shown below:

77. Sosoliso Airline - We go further, we stay closer.
78. Afrinvest - You've heard about our work but We've never been formally introduced.
79. Honda Pilot -We only have one future and it is made of our dreams.
80. L.G. - Life is good; life is everything.
81. Spring Capital - We do not seek to re-invent the wheel but to innovatively reply it.
82. Pension Alliance Ltd -It is now possible to retire and live a confusion free life thereafter.
83. Pfizer Oncology³ - We care: we are part of the cure.

84. Spark Power Generator - We Just don't talk about it, we general It.
85. Ki^ Motors - Cars are alike but Ki^ has a car just for you.
86. Key Soap - It is harder and lasts longer.
87. Panda - The pain is gone, the simile is back.
88. First Inland Bank - You call it relationship banking; we call it First Inland approach.
89. Bournvita - Every child deserves nourishment, every child deserves Bournvita
90. CBCL Loaning Plc - They lend it but we give it, you plan it but we find it.

g) Imperative Compound - Sentence Advertisement Messages

Imperative compound-sentence advertisement messages are complete- sentence advertisement messages which give directives, commands or instructions in respect of goods/ products, services or ideas being advertised. These imperative compound-sentence advertisement messages usually start with capital letters and end with full stops and sometimes exclamation marks. There are twenty-three (23) imperative compound-sentence advertisement messages i.e. 52% of the forty-four (44) compound-sentence advertisement messages identified as shown below:

91. Bank PHB - Be you, be free, be intelligent.
92. Delta Soap - Be clean, be protected, be happy.
93. Dana Air - Come (and) fly with me.
94. Visafone - Come and talk to us.
95. Mikano¹ - Visit our state of the art show room and experience perfection.
96. Zoom Mobile - Walk into any zoom mobile shop and have our internet air card free.
97. Germaine Auto centre - Take advantage of the Germaine express service and join the growing family of satisfied customers.
98. Nokia 1200/MTN - Make it a Nokia 1200 and get an MTN Sims card with free airtime.
99. Chevrolet Optra - Be seduced, take control.
100. Samsung - See Europe's starts on big screen and win big.
101. Diamond Bank - Save and win. Saving Xtra
102. GIFIC - Resign your appointment and keep an appointment with us.
103. Starboard - Keep a board and raise your stars.
104. Morning Fresh - Wash more, save more.
105. Zubes - Don't worry, be active.
106. Sunsilk Hair Relaxer - Be yourself, be beautiful.
107. Luna Milk - Grow and win.
108. Sandex Paint - Protect it and forget it with sandex.
109. Philips - See everything, experience everything.
110. Ovaltine - Be smart, choose Ovaltine.
111. Nunu Milk - Go (and) get it.
112. NPC - Stay in your usual place of residence and be Counted.
113. Vita Foam - Get comfort, get vitality.

h) Exclamatory/ Interrogative Compound Sentence Advertisement Messages

There are just two (2) examples of the exclamatory compound-sentence advertisement messages and only one (1) interrogative compound-sentence advertisement message identified among the total forty-four (44) compound-sentence advertisement messages. The exclamatory compound-sentence advertisement messages are properly linked or coordinated main clauses which end with an exclamation mark while the interrogative compound sentence asks a question and therefore ends with a question mark. The two (2) exclamatory compound sentences represent 5% while the only one (1) interrogative compound sentence represents 2% of the total compound-sentence advertisement messages identified. It is important to point out/ note that this interrogative compound- sentence is distinct in that it is a tag question which usually makes a statement before asking the question. It is not the same as the 'wh' or 'yes or no' questions/interrogative sentences. The two exclamatory (equally imperative) and one interrogative compound-sentence advertisement messages are shown below:

- 114. MTN Treasure Hunt - Win big and live large!
- 115. FRSC/ Nigeria Breweries² - Don't drink and drive!
- 116. Tura Beauty soap - She is beautiful, isn't she?

These refer to some compound sentence advertisement messages whose two or more coordinated main clauses are not of the same structural or functional classification hence, can not fit into the ones already discussed/ analysed. There are four (4) of such mixed - structure compound - sentence advertisement messages which represent 9% of the total compound-sentence advertisement messages identified. The first has an imperative sentence and a declarative sentence linked by a comma. The second has an imperative sentence and a declarative sentence linked by the coordinator 'and'. The third has a declarative sentence and an imperative sentence linked by a comma. The fourth has an imperative sentence and a declarative sentence linked by a comma. Below are the mixed structure compound sentence advertisement messages:

- 117. Stanbic IBTC Bank - Roll out drums, we have our winners.
- 118. Virgin Airline - Make them come on board and you are the Man.
- 119. Central Bank of Nigeria - Naira is our identity, respect it.
- 120. Tom Tom - Lend a hand, one unit of tom-tom can save a life.

i) Complex Sentence Advertisement Copy Messages

A complex sentence according to Oseni (1998:175) has a main clause and two or more subordinate clauses hence, a complex sentence, to him, is formed through the process of subordination. The main clause of the complex sentence is otherwise called

the major, super ordinate or independent clause because it can stand on its own. The minor clause introduced by subordinators like 'because', 'if', 'although', 'until', 'unless', etc is otherwise called the subordinate or dependent clause because it can not stand on its own to express a complete thought or idea. Thirty (30) out of the total one hundred and fifty (150) complete-sentence advertisement messages which represent 20% are complex-sentence advertisement messages. Below are the first sixteen (16) complex-sentence advertisement messages:

- 121. DHL - No one knows Europe like we do.
- 122. Supertex Wax - You are sure to look your best.
- 123. First Alliance - You can go to sleep because we make money work day and night for good retirement.
- 124. JVC Camcorder - Capture every moment as it happens.
- 125. Wema Bank - Be on the right cause when it comes to giving Credit.
- 126. UBA - We aspire to leadership by serving.
- 127. FRSC /Nigeria Breweries³ - The warm embrace of loved ones awaits you only when you arrive safely.
- 128. Pension Alliance - It is now possible to retire and live a confusion free life thereafter.
- 129. Nest Oil - Breaking all boundaries is easy when you know how.
- 130. Power Horse - You do not need wings if you back the right horse.
- 131. Stanbic IBTC Bank² - You can tell by the response of your customer if you are truly making the difference.
- 132. Bank PHB Education Loan - You don't have to sacrifice everything to enjoy education home or abroad.
- 133. FBN Securities Ltd - A new elephant joins the family as premium securities takes on the family name.
- 134. Totoya Genuine Parts - Your car will breakdown if you use fake parts.
- 135. Multilinks Telecom - Everybody is a winner when you get to play.
- 136. Arm Investment - Money attracts money when in good Company.
- 137. Expat Care Health- Get the medical attention you need when you need it.

The above sixteen (16) complex-sentence advertisement messages are structurally similar in that their super ordinate or independent clauses precede clauses precede their subordinate or independent clauses. The following complex-sentence advertisement messages are unlike the ones shown above in that their dependent clauses precede their independent clauses as illustrated below:

- 138. Intercontinental - When you are happy, we are happy.
- 139. Sun Newspapers - When there is sun, there is always a Star.
- 140. Globacom - Wherever you go, glo(w) with pride.
- 141. First Securities Discount House When we analyse market people listen.
- 142. Tetrastini Promo - Every time you eat, you win.

143. Arm Pensions - If you don't know, you should find out
144. J.K Michaels - To be the best, it pays to learn from the best.
145. Etisalat³ - Because there is only one you, reserve a number that is special.
146. Mikano² - Using our latest steel technology, we provide solution to your cutting, bending, punching, and designing of various classes of steel.
147. Caverton Offshore Grp. - When you operate upstream you need the right back-up.
148. MTN Project Fame2 - To be a hit, you must feel the heat.
149. Nissan Xtrail - When the road becomes less travelled only the rugged moves on.
150. Allied Soft - If you can make a difference in our clients' lives, we will make a difference in yours.

V. CONCLUSION

The structural-functional classification cum analysis of the complete- sentence advertisement messages identified among the carefully selected advertisement messages shows clearly that about half of the complete-sentence advertisement messages are simple sentences. This is because seventy-six (76) out of the whole one hundred and fifty (150) complete-sentence advertisement messages i.e. 51% are the simple-sentence advertisement messages. This is not surprising considering the fact that simplicity and conciseness are basic principles of advertisement message communication usually achieved via the use of short simple sentences.

The compound-sentence advertisement messages are next to the simple sentence-advertisement messages in terms of number. They are forty-four (44) altogether i.e. 29% of the entire one hundred and fifty (150) complete-sentence advertisement messages identified and analysed. Many of these compound- sentence advertisement messages also do not negate the principles of advertisement message simplicity and conciseness as they are as short as many of the simple- sentence advertisement messages. For example, "Go get it" of (111), "Grow and win" of (117) and "Save and win" of (101) are three word compound-sentence advertisement messages while "come fly with me" of (93), "Wash more, save more" of (107), "Don't worry, be active" of (150) and "Be smart, choose ovaltine" of (110) are four-word compound-sentence advertisement messages.

There are a number of the complex-sentence advertisement messages among the complete-sentence advertisement messages identified/ analysed as there are thirty (30) out of the one hundred and fifty (150) complete-sentence advertisement messages i.e. 20% that are complex sentences this is because these sentence are only structurally described as complex sentences because of the fact they have a combination

of the independent/ super ordinate and dependent/ subordinate clauses. But in actual fact those used as advertisement messages classified/analysed are not semantically complex as they communicate easy-to-comprehend messages/ information about the advertised products, services, ideas or organisations using straight-forward language/ expressions. Some of such expression are "money attracts money when in good company" of (136) "Capture every moment as it happen" of (124) and "No one knows Europe like we do" of (121).

There is however, no single compound-complex sentence advertisement message among the one hundred and fifty (150) complete-sentence advertisement messages identified and analysed. This, in addition to the simple, compound and complex sentences make the four main structural types of sentences. The compound-complex sentence as the name suggests usually has features of both the compound and complex sentences. It can therefore be longer than others and may inhibit advertisement message simplicity and conciseness. This may be the reason why no single compound-complex-sentence advertisement message is found among the one hundred and fifty (150) complete-sentence advertisement messages identified and analysed. However, it is not impossible to form compound-complex -sentence advertisement messages that are not too long just as the three/four-word- compound-complex-sentence advertisement messages cited above. For example, we have concise compound-complex sentences or expressions like "(I) work and study to excel" and "(I) rest and exercise to live long".

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

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

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

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



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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

31. Adding unnecessary information: Do not add unnecessary information, like, I have used MS Excel to draw graph. Do not add irrelevant and inappropriate material. These all will create superfluous. Foreign terminology and phrases are not apropos. One should NEVER take a broad view. Analogy in script is like feathers on a snake. Not at all use a large word when a very small one would be



sufficient. Use words properly, regardless of how others use them. Remove quotations. Puns are for kids, not grunt readers. Amplification is a billion times of inferior quality than sarcasm.

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

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

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

INFORMAL GUIDELINES OF RESEARCH PAPER WRITING

Key points to remember:

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

Final Points:

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

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

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

General style:

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

To make a paper clear

· Adhere to recommended page limits

Mistakes to evade

- Insertion a title at the foot of a page with the subsequent text on the next page

- Separating a table/chart or figure - impound each figure/table to a single page
- Submitting a manuscript with pages out of sequence

In every sections of your document

- Use standard writing style including articles ("a", "the," etc.)
- Keep on paying attention on the research topic of the paper
- Use paragraphs to split each significant point (excluding for the abstract)
- Align the primary line of each section
- Present your points in sound order
- Use present tense to report well accepted
- Use past tense to describe specific results
- Shun familiar wording, don't address the reviewer directly, and don't use slang, slang language, or superlatives
- Shun use of extra pictures - include only those figures essential to presenting results

Title Page:

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

Abstract:

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

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

Write your summary when your paper is completed because how can you write the summary of anything which is not yet written? Wealth of terminology is very essential in abstract. Yet, use comprehensive sentences and do not let go readability for briefness. You can maintain it succinct by phrasing sentences so that they provide more than lone rationale. The author can at this moment go straight to



shortening the outcome. Sum up the study, with the subsequent elements in any summary. Try to maintain the initial two items to no more than one ruling each.

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

Approach:

- Single section, and succinct
- As a outline of job done, it is always written in past tense
- A conceptual should situate on its own, and not submit to any other part of the paper such as a form or table
- Center on shortening results - bound background information to a verdict or two, if completely necessary
- What you account in an conceptual must be regular with what you reported in the manuscript
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- Explain the value (significance) of the study
- Shield the model - why did you employ this particular system or method? What is its compensation? You strength remark on its appropriateness from a abstract point of vision as well as point out sensible reasons for using it.
- Present a justification. Status your particular theory (es) or aim(s), and describe the logic that led you to choose them.
- Very for a short time explain the tentative propose and how it skilled the declared objectives.

Approach:

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- Sort out your thoughts; manufacture one key point with every section. If you make the four points listed above, you will need a least of four paragraphs.
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This part is supposed to be the easiest to carve if you have good skills. A sound written Procedures segment allows a capable scientist to replacement your results. Present precise information about your supplies. The suppliers and clarity of reagents can be helpful bits of information. Present methods in sequential order but linked methodologies can be grouped as a segment. Be concise when relating the protocols. Attempt for the least amount of information that would permit another capable scientist to spare your outcome but be cautious that vital information is integrated. The use of subheadings is suggested and ought to be synchronized with the results section. When a technique is used that has been well described in another object, mention the specific item describing a way but draw the basic



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Materials:

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

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

Approach:

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

What to keep away from

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

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

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

Content

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

What to stay away from

- Do not discuss or infer your outcome, report surroundings information, or try to explain anything.
- Not at all, take in raw data or intermediate calculations in a research manuscript.



- Do not present the similar data more than once.
- Manuscript should complement any figures or tables, not duplicate the identical information.
- Never confuse figures with tables - there is a difference.

Approach

- As forever, use past tense when you submit to your results, and put the whole thing in a reasonable order.
- Put figures and tables, appropriately numbered, in order at the end of the report
- If you desire, you may place your figures and tables properly within the text of your results part.

Figures and tables

- If you put figures and tables at the end of the details, make certain that they are visibly distinguished from any attach appendix materials, such as raw facts
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- Make a decision if each premise is supported, discarded, or if you cannot make a conclusion with assurance. Do not just dismiss a study or part of a study as "uncertain."
- Research papers are not acknowledged if the work is imperfect. Draw what conclusions you can based upon the results that you have, and take care of the study as a finished work
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- Give details all of your remarks as much as possible, focus on mechanisms.
- Make a decision if the tentative design sufficiently addressed the theory, and whether or not it was correctly restricted.
- Try to present substitute explanations if sensible alternatives be present.
- One research will not counter an overall question, so maintain the large picture in mind, where do you go next? The best studies unlock new avenues of study. What questions remain?
- Recommendations for detailed papers will offer supplementary suggestions.

Approach:

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

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



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