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Black Pine Cultures

Glycerine Analysis of Beniseed

Highlights

Utilization of Maternal Health

Development of Depressed Trees

Discovering Thoughts, Inventing Future

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Development of Depressed Trees of Black Pine Cultures in the Region of Šumadija. (Serbia)

By Severin Šikanja
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Abstract- We analyzed all abiotic and phytocoenological and ecological factors, with special emphasis on edaphic and climatic conditions and the phytosociological factors, namely the ground flors as indicator of development and growth of black pine trees. The research was done in Šumadija in the area of Forest management of Kragujevac, covered mostly with the black pine. Thus, 5 permanent sample plots in the cultures of black pine raised:

The study analyzed the culture of black pine of 3o, 4o, 55-60. years of age. After the comparison, dminant and oppressed trees in the cultures were done, with valuable new data. Depressed tree can become dominant., which is abig news of Forest Science, yet possible only with proper care measures.

Keywords: *black pine, culture, šumadija, soil.*

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I. Introduction

Black pine cultures are spread in our country in various natural conditions, depending not only on geographical, orographic and climate factors, but also on geological base, terrain type and herbal communities (Jovanović S., 1988). Black pine cultures can be found on the soils like limestone, dolomite, serpentine, silica stone, which have high influence on their structure considering certain floristic elements, habitat and the stand solvency. (Arbez M., 1971). Therefore, black pine cultures are very important in forest theory and practice (Antić M., Jović N., Avdalović V., 1988). However, it should be mentioned that huge part of black pine cultures is located in other habitats, whose so-called ecological value is higher than black pine reqiores. In other words, black pine is in the terrain where all soil potential can't be completely used (Tomanić L., 1968).

The area of black pine cultures in Serbia occupies 65.200ha, which is huge amount, taking account only species. The total black pine wood volume consists of 3,099.385m^3, which represents a big potentials in ecological and economic sence. Current volume growth for 10 years raises to 1,435.154 m^3. All these facts deserve attention, and are also encouraging, but on the other hand, but burdened with the forest science findings (National forest inventory, 2012).

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II. Description and Methodology of the Research Area

The research area is the forest management area of Kragujevac. This area consists of forestry unit in Gornji Milanovac and the one in Kragujevac as well. Concrete measures on the black pine cultures were done in the area of Gruža-Lepenica-Jasenica forest, which belongs to the forestry unit of Kragujevac.

Gruža-Lepenica's forests spreads in the area of 2949 ha, of which 285 ha are forest cultures. This is almost 10 percent of all the cultures, mostly for black pine cultures.

a) Experimental fields establishment

Description of habitats: The research area is the altitude of 400-470 m, with the slopes gentle to moderately steep between 5 and 20 degrees, with western, and southwestern exposure. Forest cover is partially represented with unfavorable process of humification, poorly dead forest litter, the substrate of clay, ferruginuos and quartz sandstone, and serpentinite. Thus the following types of land are defined:

Eutric brown land, located in the first and third experimental field.

Ilimerised acid brown soil, located in another experimental field.

Finally, *eutric silicate land*, located in the fourth and fifth experimental field, being the least productive land.

Experimental fields forming has exceptional meaning, since the choice of experimental fields will affect the information from the terrain in every way. Experimental fields have the size of 25a (50mx50m). 5 sample plots were defined, a representative sample of the investigated area. The less experimental field, with the bigger factor –F is (to convert to hectares), so the possibility of making mistake becomes bigger. (Tokar F, 2005). On the other hand, if experimental field is too big, the less –F is, the possibility of making mistake is smaller. Yet, the experimental field is huge, with more measures which increases percentage of mistake. 25a of fields are the most appropriate, and F=4 the most compact, as shown well in practice (Durkaya *et all*. 2009) In experimental field selection the tape, theodolite and compass were used.

b) Data collection

Data collection included diameter measure, tree height measure and the length of tree top. All data are entered into the database.

i. *Diameter measurement*

Diameter measurement was done on every black pine tree within experimental fields, at the height of 1,3m. Diameter measures are very important because the volume accuracy depends on the accuracy measures and subsequenly, on height measures. (Kostadinov *at all* 2006).

Each tree has been measured the diameter from all sides and the mean value is calculated. Measurements were done by Vernier scale, with a particular attention to the correctness (large jaws had to be in parallel). After measuring each tree in the field and all the values summed and divided by the tree number, so the medium diameter -Ds-. This value is important for defining the mean value of basal area –G-, and the trees are sorted by their thickness level.

ii. *Height measurement*

Height measurement was also done for each black pine tree within all experimental fields. It was done by "Blume-Leis" altimeter. The use of the altimeter requires an extra worker to hold the ruler and the heights can be measured from the distance of 15, 20, 30 or 40 meters.

Similarly to the diameter, after measuring, all the values are summed and divided by tree number, so the mean height of the stand –Hs is calculated. Successively, the trees are classified into height levels in order to make the height curve. (Barčić *at all* 2010).

iii. *Volume determination*

Volume calculation was done in the following procedure. Firstly, the trees are classified by their thickness level, with the defined each thickness level, which are 5cm wide. When every volume level was calculated and all value levelsgathered, this led to the result of the value of concrete experimental field. It was later converted into hectares, which was also done to each measuring element. These values were tested by calculating volume of the medium tree stand (based on Ds and Hs) multiplied by tree numbers in the stand. (Touchan *at all* 2012)

iv. *Study the depressed, the residual black pine trees and their contribution to ecology*

Black pine trees, which are underdeveloped, depressed, could give their best in the development, growth and population growth and ecology of the studied areas. All such trees will be particularly marked in the field such as backward and depressed trees when free of the influence of dominant trees, when overdue, give the maximum. As known, the black pine can regenerate power gain yet.

III. The Results of Research

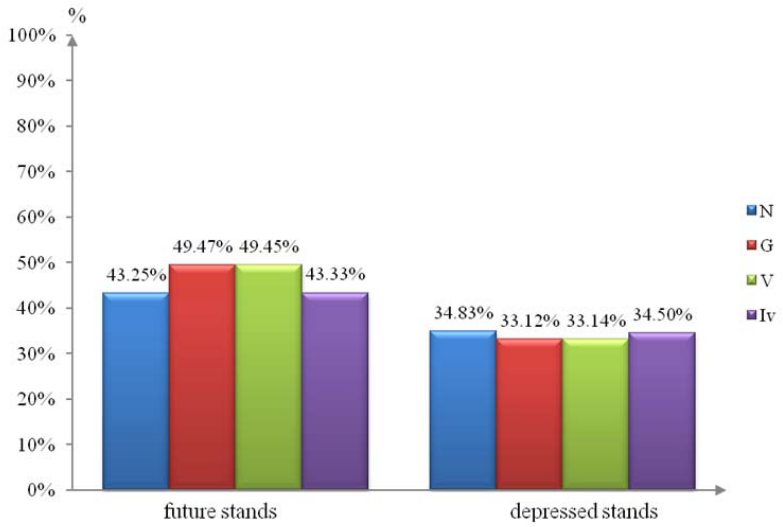
The two photos are good, dominant black pine trees and the trees that are,, bad, depressed, backward, but that could be regenerated by a special measure:

Figure no. 1: Depressed tree before release, a measure of care

This is new for forestry science. THIS IS THE END OF AN, THEORY OF DOMINANT TREES IN FORESTRY, long been believed that should favor the dominant trees, and cut, depressed trees. Cultures of black pine to deny. This will greatly change flow of forest science. Note, that this is only discovered the black pine. For other species has not been proven.

Figure no. 2 : Depressed tree after the release of the shadows, after implementation of care

Depressed tree in cultures, in all cultures, and especially black pine, can make a major ecological contribution, release of the shadows, so-called dominant trees. Dominant trees are in the theories of silviculture during the 19th and early 20th century was the center of attention of breeders of forest, a depressed or backward tree thus fell into the second plan. Since the dominant trees gave its maximum in the woods, culture and science, it is time to liberate the depressed trees so that they c an give the maximum in the growth, yield and ecology. With an obvious example in the pictures, this would be a major reversal of Forest Science.

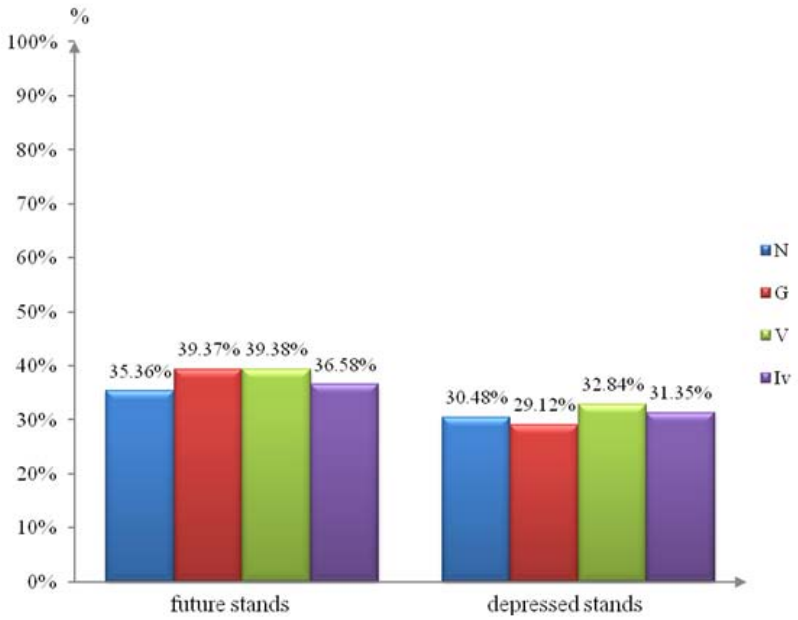


Histogram no.1.

dominant black pine tree, in the first experimental field.(left)
depressed black pine tree in the first experimental field. (right)

Explanations:

N ..... number of trees in %
G ..... basal area (the cross-trees) in %
V..... The volume of trees ....%
iV ... increment%

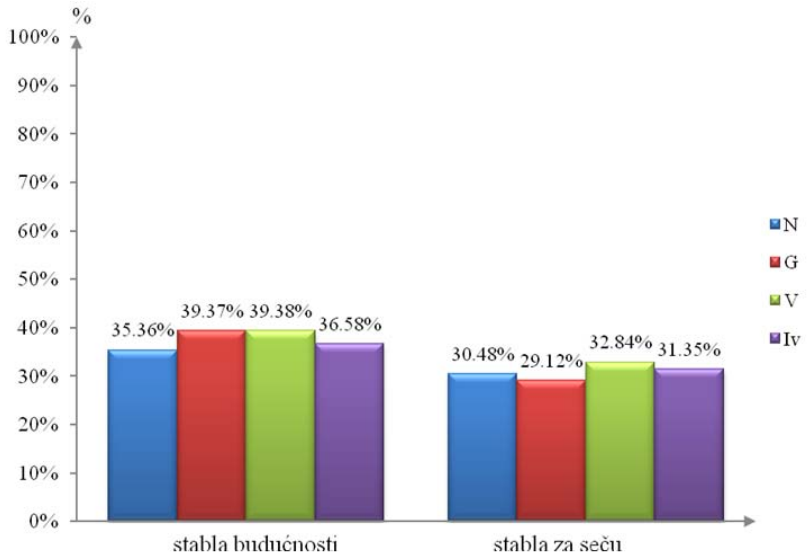


Histogram . no.2.

dominant tree black bra in another experimental field. (left)
depressed black pine tree in another experimental field.(right)

Explanations:

N ..... number of trees in %
G ..... basal area (the cross-trees) in %
V..... The volume of trees ....%
iV ... increment%

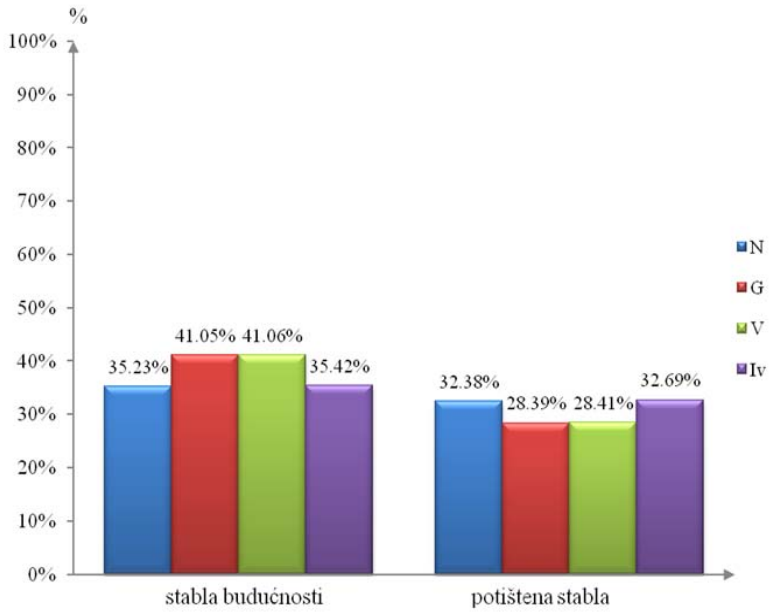


Histogram no.3.

Dominant black pine tree in the third, the experimental field.(left)
depressed black pine tree in the third experimental field.(right)

Explanations:

N ..... number of trees in %
G ..... basal area (the cross-trees) in %
V..... The volume of trees ....%
iV ... increment%

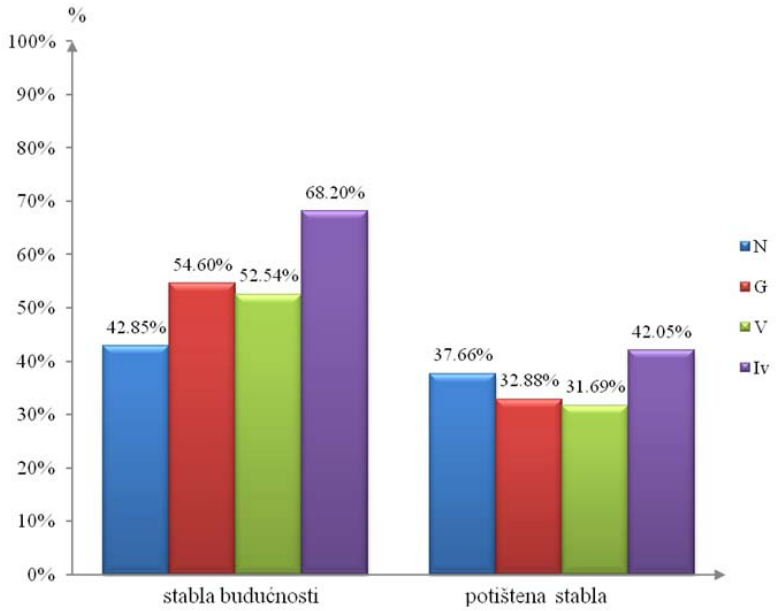


Histogram.no.4.

dominant black pine trees in the fourth experimental field.(left)
depressed black pine trees in the fourth experimental field (right)

Explanations:

N ..... number of trees in %
G ..... basal area (the cross-trees) in %
V..... The volume of trees ....%
iV ... increment%



Histogram .no.5.

Dominant black pine tree in the fifth experimental field.(left)
depressed black pine tree in the fifth experimental field. (right)

Explanations:

N ..... number of trees in %
G ..... basal area (the cross-trees) in %
V..... The volume of trees ....%
iV ... increment%

a) Ecology of Black Pine

The cultures of black pine were established in the past on the researched territory, since half of the last century. Of course we have a culture that have been established in later, 196o's, 1970's and even 1990's of the last century. Typical and common to all cultures of black pine is that they require the necessary measures of care. In future more cultures of black pine are plannedin almost all habitats, being an excellent filter for the atmosphere and with the inceasingly polluted air. After the application of measures to tend the culture of black pine, they are expected to develop, grow and give a significant ecological importance.

IV. Discusion

Care measures in the cultures of black pine are expected to be implemented as early as possible, 10 to 20 year time(Stojanović Lj., 2008)

a) Process of tending for the first experimental field

Recommended low thinning – medium strength with thinning intensity of 5-8 years. The action strength by tree number is N-33%, by basal area G-30,36%, by volume V-30,42% and by current volume growth Iv-31,7%.

b) Process of tending for the second experimental field

Recommended high thinning- with the best tree selection for the future tress, as foundation of future development and growth- with thinning intensity of 8-10 years. The action strength by tree number is N-34,83%, by basal area G-33,12%, by volume V-33,14% and by current volume growth 41,66%.

c) Process of tending for the third experimental field

Recommended selective thinning moderate strength with selection of tress of future, and with thinning intensity of 5-8 years.

d) Process of tending for the fourth experimental field

Recommended stronger selective thinning with selection of certain trees of future numbers, with thinning intensity of 8-10 years. The action strength by tree numbers is N-32.38%, by basal area G- 28,39%, by volume V-28,41% and by current volume growth Iv-36,25 %.

e) Process of tending for the fifth experimental field

Recommended stronger thinning, in order to remove every low quality phenotype, with thinning intensity of 5-8 years. The action strength by tree numbers is N- 37, 66%, by basal area G-32,88%, by volume V-31,69%, and by current volume growth Iv-31,84%.

V. Conclusion

Black pine, precisely black pine cultures in this area, have shown justification of black pine infiltration into better habitats. Not only the height, but the diameter is much bigger in better habitats within the cultures of the same age. Mean diameter of pine cultures of 55 year-of-age in better habitat is Dg-31,4cm, while mean diameter of other pine cultures of the same age in worse habitat and soil is Dg-29,80cm. The same is with younger pine cultures. In the first experimental field in better habitat Dg is 16,5cm, aged 30 years and the other pine culture of the same age in worse habitat Dg is 16cm. The structure of the study stands there by diameter and height levels typical bell-shaped curve means a high-aged stands with volume increase which has declined in the last five years in all five experimental fields, especially in older cultures. There is a difference in volume especially in younger cultures as a consequence of the overall impact of habitat land. The negative impact on the development of the black pine have delayed the measures, and before applying adequate measures of care-thinning, in order to avoid even greater stagnation in the rise and development of the black pine.

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Glycerine Analysis of Beniseed *(Sesanum Indicum)* Oil, Biodiesel and Blends

By E.I. Bello & A. Mammon
The Federal University of Technology, Nigeria

Abstract- Beninseed oil was extracted using soxhlet extraction method and transesterified to biodiesel using sodium methylate. The oil and its biodiesel were characterized according to American Society for Test and Materials (ASTM) protocols; the fatty acid profile was determined by gas chromatography analysis method, the glycerine content was measured to estimate the completeness of the reaction while the mineral contents were measured by atomic absorption spectrophotometer. The results obtained shows that the properties are within the ASTM limits and similar to those of diesel fuel which led to the conclusion that is can be used as alternative fuel for diesel engines. Of particular interest is the cetane index of 50, which is higher than that of diesel which will allow it to be used neat in diesel engine except that the viscosity of 32 mm2/s is too high for direct use in diesel engine. The oil is 83.948% unsaturated and consists mainly of 35.075% oleic acid and 45.78% linoleic acids.

Keywords: *beniseed oil, biodiesel, characterization, mineral contents, fatty acid profile.*

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Keywords: beniseed oil, biodiesel, characterization, mineral contents, fatty acid profile.

I. Introduction

Beniseed (Sesamum Indicum) belongs to the family of Pedaliaceae. It is widely grown in the North Central States of Nigeria and it is the 6th largest producer and the 5th largest exporter in the world (FAO, 1992). It has different varieties, the notable ones being white, yellow and black. The seeds are spherical, 2.5 - 3 mm diameter depending on the variety and has an oil yield of 42- 54% and protein 22 % (Hui, 1996; Bedigian, et al., 1985). It can be consumed fresh, dried or fried after dehulling. It can also be blended with sugar and usually have a milky flavor. It is also used as a paste in some local soups (Fariku et al., 2007). The oil is one of the most sought after because it contains unsaturated fatty acids and the colour vary from crystal clear to yellowish brown depending on the variety. It has excellent taste, very stability due to the presence of antioxidants such as sesamolin, Sesamine, and sesamol. It is odourless after refining and the characteristics are similar to olive oil (Weiss, 2000). It has several industrial applications that includes for the production of margarine, confections, canned sardine, corned beef, soap making and ink. (Sangha et.al, 2004, Sudhir et al., 1996; Betiku et al., 2012; Mohammed and Hamza, 2008; Njoku et al., 2009).

The oil is essentially a triglyceride and therefore, a possible feedstock for biodiesel production. Biodiesel is a form of mono alky ester of oil obtained from vegetable oil or animal fats (Knothe, 2005; Mittelbach et al., 2004; Srivastava, 2000). It is chemically simple, consisting of between six and nine fatty acid esters in the mixture. It is highly biodegradable, has agricultural source and renewable. It has inherent lubricating properties and wets the surface. The flash point is much higher than that of diesel and produces less harmful exhaust emissions. It is produced by the method of transesterification, which is the process of converting vegetable oil to esters using alcohol in the presence of a catalyst to chemically breakdown the molecules of the vegetable oil, remove glycerol from the triglycerides and replace them with radicals from the alcohol used. The reaction transforms the branched molecular structure of vegetable oil into a straight chain but smaller molecular structure, which is identical to but much longer than that of diesel fuel (Meher et al., 2006) and result in the formation of mono alkyl esters (Knothe, 2005; Mittelbach et al., 1985; Srivastava and Prasad, 2000).

Vegetable oils and animal fats are triglycerides made by living plants from fatty acids and glycerol. A triglyceride is a mixture of different glyceride esters of fatty acids in which each glycerol molecules has attached to it three molecules of long chain monocarboxyl (free fatty) acids as shown in Fig.1. Fatty acids consists of a long chain of carbon atoms with a carboxylic acid group at one end and are essential for energy storage in lipids while glycerol is a trihydric alcohol (containing three-OH hydroxyl group) that can combine with 1, 2 or 3 fatty acids to form monoglyceride, diglyceride and triglyceride respectively.

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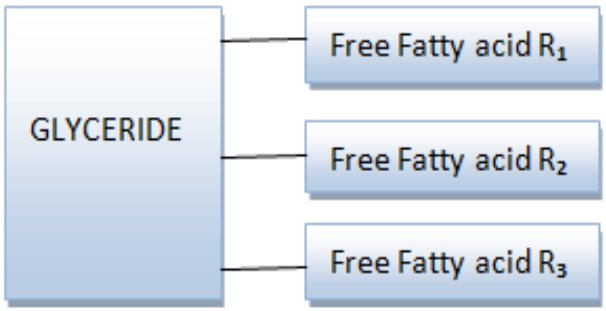

Fig.1 : Triglyceride Schematic

Transesterification is not a straight forward reaction as it occurs in a series of three reversible steps during, in which the triglyceride that consists of three fatty acid molecules attached to a glycerol backbone is first converted to diglyceride that contains two fatty acids and then to monoglyceride which contains only one molecule of fatty acid methyl ester (FAME). During the process, the reactions may not be complete and the triglycerides in the oil may still contain 3, 2 or 1 glycerol molecule(s) that have not been released. Such glyceride are said to be bounded glycerol. The sequence of deglyceriding is shown in Equations 1-3. (Schwab et al., 1997; Freedman et al., 1986; Ferella et al., 2009; Schuchardt et al., 1998).

$$\text{Triglyceride} + CH_3OH \leftrightarrow \text{Diglyceride} + \text{FAME} \quad (1)$$

$$\text{Diglyceride} + CH_3OH \leftrightarrow \text{Monoglyceride} + \text{FAME} \quad (2)$$

$$\text{Monoglyceride} + CH_3OH \leftrightarrow \text{Glycerol} + \text{FAME} \quad (3)$$

MGE is the most stable intermediate compound (Ma and Hanna, 1999) and the most important determinant of the completeness of the reaction.

The glycerol is bounded if it has not been freed from the fatty acids.

$$\text{Total glycerol} = \text{bounded glycerol} + \text{free glycerol} \quad (4)$$

As a result of incomplete reactions, small amounts of monoglyceride, diglyceride and triglyceride will remain in the biodiesel even after washing along with other impurities. They can affect the properties of the biodiesel if not limited.

For example, fatty acids are very volatile while the glycerol they are attached to has high boiling point and is more viscous. This suppresses the volatility of triglycerides, which increases the viscosity of plant oils to within the range 45 - 32 mm^2/s.

If the glycerol level in a fuel is high, because of it high viscosity, some of its contents will settle out in the fuel tank to form very viscous mixture, which can attract solid particles, increase the viscosity of the fuel and may cause blockage of filter and consequently restrict fuel flow. Such fuels are prone to coking and may thus cause the formation of deposits on injector nozzle, piston and valves that can affect fuel economy.

The concentration of each compound depends on the completion of the transesterification process. Total glycerol affects storage stability which is a measure of how well the quality of the fuel will be maintained in storage when in contact with air or water.

II. Materials and Methods

a) Oil extraction

The oil was extracted in a soxhlet extractor using n-hexane as solvent. It gave an oil yield of 48 %. This method is superior to the traditional method of oil extraction that involves grinding to flour and treating with hot water to cream out the oil. This method is slow, the yield is low and the oil produced has unpleasant odour and bitter taste (NCIR, 2002; UNIFEM, 1987; Igbo et al., 2005).

b) Fatty Acid Profile

The fatty acid profile and glyceride contents of the samples were determined using the HP 6890 Gas Chromatography analyzer equipped with a Flame Ionization Detector (FID) and HP INNOwax column (30 m x 0.25 cm x 0.20 μm film thicknesses). The carrier gas was nitrogen and the initial temperature of the oven was set at 60° C. The procedure was as reported by Bello and Otu (2012) in which the first ramping was at 10° C/m for 20 minutes and maintained for 4 minutes. The second ramping was at 15° C/min for 4 minutes and maintained for 10 minutes. The detector temperature was 320°C while hydrogen and compressed air pressures were 22 and 35 psi respectively.

c) Characterization

The oil. B100, B20 and B10 were characterized according to ASTM protocols for biodiesel.

III. Results and Discussion

The experiment was designed to monitor the concentrations of TGE, DGE and MGE in the oil, and B100 when the fatty acid profiles are being determined.

a) Concentration of TGE, DGE and MGE oil

The variation of TGE, DGE and MGE in the oil is shown in Fig.1. The oil as expected has a large concentration of TGE. DGE and MGE are intermediate compounds and are in very low concentration because no transesterification reaction that would have produced them had taken place. The highest concentration of TGE monitored was 20 000 x 10-3 mg/100g. The oil is fairly stable and contains 0.513% free glycerin.

b) Concentration of TGE, DGE and MGE in B100

Concentration of TGE, DGE and MGE in B100 is shown in Figure 2. It contains very low concentration of DGE and TGE that remained after the transesterification process. The low concentration of these compounds attests to the completeness of the transesterification reaction. The highest concentration was 0.012 mg/100g.

c) Concentration of TGE, DGE and MGE in B20

B20 contains TGE, DGE and MGE. The dorminat ones are DGE and TGE. The highest concentration is 0.007 mg/100g of DGE. As shown in Figure 3.

d) Concentration of TGE, DGE and MGE in B10

As can be seen in figure 4,TGE, DGE and MGE are present in the fuel but DGE has the highest concentration of 0.005 mg/100g. The composition of B10 and B20 are not very different.

e) Variation of TGE concentration

The variation of TGE in the 4 samples is shown in Fig. 5. The concentration is highest in the oil and only very little concentration in the other samples. The highest concentration in the oil is 20 000 x 10-3 mg/100g. The concentration decreased with time because it is an intermediate compound and peaked after 18 minutes.

f) Concentration of MGE

MGE concentration varies as shown in figure 6. It has the highest concentration in the oil of 70 x 10-3 mg/100g. The concentration of other samples is very low.

In general, triglyceride is dominant in the oil and reduced after transesterification due to removal of the fatty acids for conversion to biodiesel. Diglyceride and monoglyceride which are intermediate compounds are only present in the oil in significant amount. They are unstable compounds and easily react with air to form solid compounds in the form of sediments and gum, which can disrupt the effectiveness of fuel filters, fuel pump and injection systems. It can also cause abrasive substances to be embedded in them that can increase engine wear.

g) Physico-chemical properties of Oil and B100

The result of the characterization is shown in table 2.

Table 2 : Properties of Beniseed Oil and B100

Property	Oil	B100
Flash point (ºC)	218	165
Kinematic Viscosity (mm^2/s at 40ºC)	32.00	4.02
Lower heating value (MJ/kg)	38.20	39.90
Cetane number	50.88	58.80
Iodine value (g/100g)	108	88.20
Peroxide value (meq/kg)	0.49	0.54
Oxidation index (hrs)	18	12
Free fatty acid (%)	0.75	0.12
Acid value (mgKOH/g)	0.50	0.27
Saponification value (mgKOH/g)	190	135.6
Free Glyceride (%)	0.513	0.038

Flash points are higher than the 55oC of diesel and the oil has a flash point of 218oC which is primarily TGE.

The oil, because it is a TGE has a kinematic viscosity of 32 mm2/s and reduced to within the limits for biodiesel after transesterification and blending.

The heating values for the oil are within the range for common vegetable oils of 38 - 42 MJ/kg.

The cetane number of 50.88 for the oil is above that of diesel fuel making it a suitable fuel for diesel engine even without transesterification.

The iodine value of the oil of 108.00 makes it a semi – drying oil suitable for the production of surface coatings, decorative paints, varnishes, printing inks etc. The value for the biodiesel of 80 will not allow for high formation of carbon deposits in the engine.

Peroxide value measures the content of hydroperoxides in the oil and its low value indicates high resistance to oxidation. The value of 0.49 for the oil is low as should lead to long shelf life for the oil.

The oil is the most stable because of the TGE content and has an oxidation index of 18 hours while the B100 has a lower value of 12 hours. (Arisoy, 2008)

The low acid value (0.5 mg KOH/g oil) of the seed oil showed that it is not only edible but could also have a long shelf life. It can also be converted to biodiesel directly without pretreatment.

The high saponification value of 190.00 mg of KOH/g for the oil confirms it suitability as feedstock for the manufacture of soap and detergents.

The free glycerol contents of the oil and B100 are 0.513, 0.038% respectively. The free glycerol decreased after transesterification. The total glycerol after transesterification is below the ASTM D 6751 and EN 14214 maximum limits. Total glycerol affects storage stability which is a measure of how well the quality of the fuel will be maintained in storage when in contact with air or water.

h) Fatty Acid Profile

The fatty acid profile of Beniseed oil and B100 is shown in table 3.

Table 3 : Fatty Acid Profile of Beniseed oil and B100 (% wt)

Fatty Acid	Form	Oil	B100	Change(%)
Palmitic	C16:0	8.83	8.690	1.5
Palmitoleic	C16:1	0.056	0.0319	43.2
Stearic	C18.0	6.236	6.418	6.4
Oleic	C18:1	38.07	37.770	-0.79
Linoleic	C18:2	45.76	46.526	1.6
Linolenic	C18:3	0.062	0.0335	-45
Arachidic	C20:0	0.067	0.0360	-46.2
Behenic	C22:0	0.911	0.495	-45.7
Saturation	-	16.043	15.639	-2.5
Unsaturation	-	83.948	84.461	- 0.06

The oil is 83.948% unsaturated and does not contain any triple bond, which is responsible for the excellent shelf life. It contains mostly the oleic series of fatty acids of which oleic acid constitutes 38.07%. For industrial scale production, it will be necessary to pretreat the oil to convert some of the fatty acids to esters so that it will not inhibit biodiesel yield during transesterification.

IV. Conclusions

The banished oil and biodiesel have good fuel properties and can be blended with diesel fuel in any proportion. It has a cetane index of 57 which is one of the highest for vegetable oils. The oil is 83% saturated and has an iodine value of 108. From the results obtained, it can be used as alternative fuel for diesel engines. The complexness of the transesterification was confirmed by the low concentration of DGE and TGE.

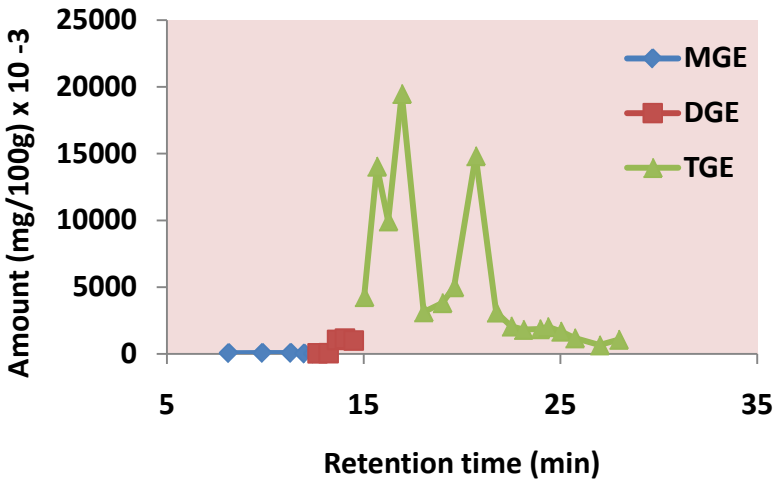

Fig. 1 : Glycerine analysis of Beniseed oil

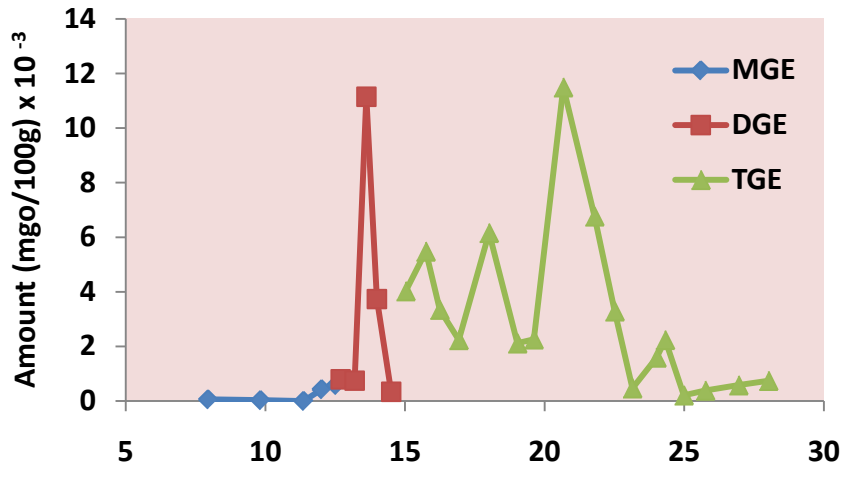

Fig. 2 : Glycerine analysis of Beniseed B100.

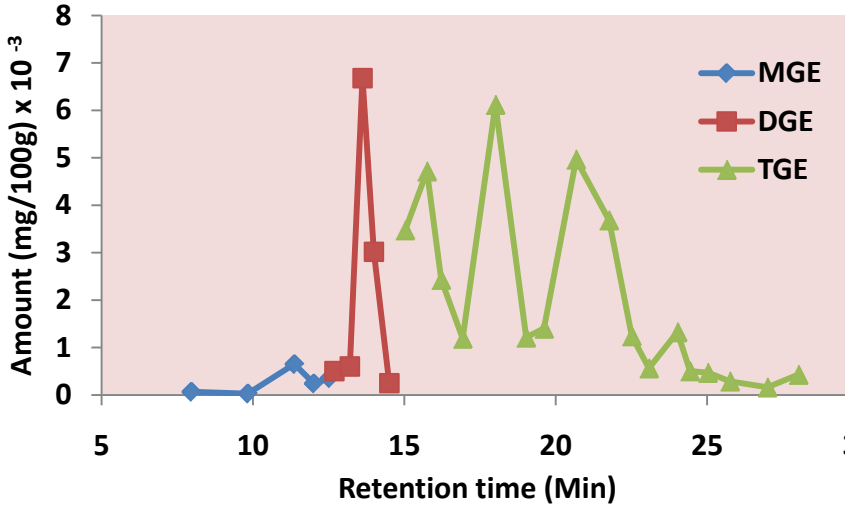

Fig.3 : Glycerine analysis for Beniseed B20

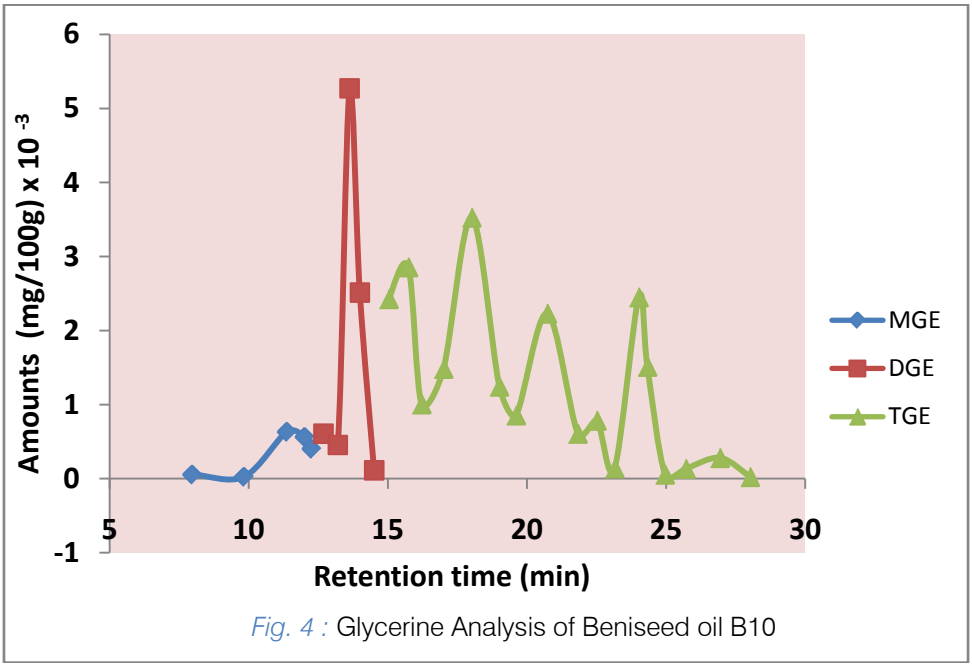

Fig. 4 : Glycerine Analysis of Beniseed oil B10

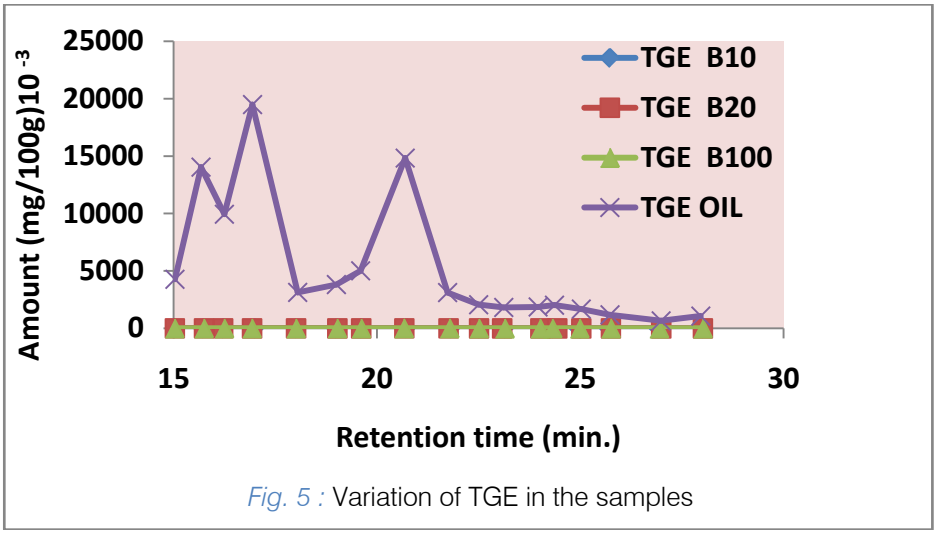

Fig. 5 : Variation of TGE in the samples

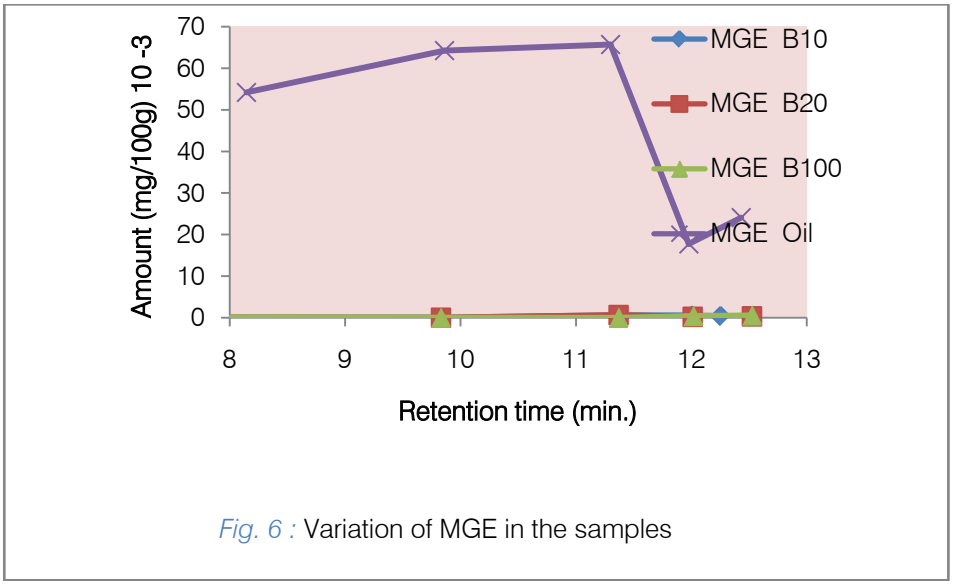

Fig. 6 : Variation of MGE in the samples

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Factors Influencing Pregnant Women's Utilization of Maternal Health Care Services for Delivery in Ogun State, Nigeria

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Abstract- The study assessed the factors influencing the utilization of Maternal Healthcare Centers (MHC) for delivery among pregnant women attending ante-natal care in Ikenne, Ogun state, Nigeria. A total of 96 respondents were selected from 5 MHC for the study using the multistage sampling procedure. All the women were monitored till delivery. Furthermore, 48 (50%) of the respondents were randomly chosen and exposed to motivational telephone calls for 6 weeks preceding delivery dates. Structured questionnaire was used to gather data which were analyzed using descriptive statistics and logistic regression. All analyses were measured at $p \leq 0.05$ level of significance. Results showed that most of the women were between 30 and 34 years old, had up to secondary education, recorded parity of 1-2 while timing of first visit was between 20 and 24 weeks of gestation and number of Ante-natal visits were $\geq$ 4. Monthly income was generally less than N16,000 (~$80). Some 52% of the women gave fair rating for the services received from the healthcare workers and 58% used the MHC for delivery. However, 84% of those who received telephone calls used MHC for delivery while 59% of those who did not received telephone calls used MHC for delivery.

Keywords: *maternal healthcare, pregnant women, telephone follow-up, nigeria.*

GJSFR-E Classification : *FOR Code : 321299*

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C. O. Agbede [α], G. N. D. Aja [σ] & P.S Owolabi [ρ]

Abstract- The study assessed the factors influencing the utilization of Maternal Healthcare Centers (MHC) for delivery among pregnant women attending ante-natal care in Ikenne, Ogun state, Nigeria. A total of 96 respondents were selected from 5 MHC for the study using the multistage sampling procedure. All the women were monitored till delivery. Furthermore, 48 (50%) of the respondents were randomly chosen and exposed to motivational telephone calls for 6 weeks preceding delivery dates. Structured questionnaire was used to gather data which were analyzed using descriptive statistics and logistic regression. All analyses were measured at p≤0.05 level of significance. Results showed that most of the women were between 30 and 34 years old, had up to secondary education, recorded parity of 1-2 while timing of first visit was between 20 and 24 weeks of gestation and number of Ante-natal visits were≥ 4. Monthly income was generally less than ₦16,000 (~$80). Some 52% of the women gave fair rating for the services received from the healthcare workers and 58% used the MHC for delivery. However, 84% of those who received telephone calls used MHC for delivery while 59% of those who did not received telephone calls used MHC for delivery. The regression result affirmed the significant impact of corroborative telephone-call motivation of respondents towards utilization of MHC. Similarly, respondents' literacy level, their satisfaction rating for of healthcare workers at the MHC, their monthly income and family (especially husband) influence positively influenced utilization of MHC for delivery. The study recommends mobile phone use for addressing health delivery bottle necks and motivating MHC utilization. Furthermore, careful considerations should be given to subsidizing maternal healthcare cost, conducting periodic appraisal of the quality of ANC education delivery and family ties when formulating policies or initiating programmes targeting maternal healthcare and utilization of MHC services.

Keywords: maternal healthcare, pregnant women, telephone follow-up, nigeria.

I. Introduction

Utilization of Maternal Healthcare Services (MHS) is associated with improved maternal and neonatal health outcome (Babalola and Fatusi, 2009) and reduction in maternal deaths (UNICEF, 2003). Ante-Natal Care (ANC) is expected to provide pregnant women with necessary information and risks and to enhance their utilization of MHS (Iyaniwura and Yussuf, 2009). About 75% of all maternal deaths are those associated directly and indirectly with some sort of complications during delivery and the week immediately after (Choudhry, 2005). It is therefore crucial that pregnant women should be attended to by skilled attendants (trained doctors, midwives, trained nurses or trained community health officers) (FMOH, 2009).

In developed countries an estimate of 97% pregnant women receive ANC and 99% use skilled obstetric services at delivery while in developing countries 63% and 53% of women use ANC and skilled obstetric care respectively (Agbede et al., 2015). This implies that sometimes women who received ANC from skilled personnel still end up patronizing unskilled obstetric services at delivery. In Nigeria and many other developing countries, pregnant women view the event of child birth with apprehension of possible pain and death unlike the situation in most developed countries (Ekele, Bello, Adamu, 2007). The trust in the healthcare facility to reduce this fear is low and some will even prefer to use the tradition birth attendants for delivery (Agbede et al., 2015). Proportion of deliveries attended to by skilled health personnel in Nigeria declined from 43% in 1990 to 38.9% in 2008 (MDGs, 2010). Although it rose to 53.6% in the year 2012, the trend is currently on the decline despite the interventions put in place (Agbede, 2015).

The study of Agbede (2013) showed that the rate of utilization of MHS in the Public Healthcare Centers (PHC) around Ikenne in Ogun state, Nigeria, has been consistently below 50%. Personal attributes of the pregnant women and level of professionalism displayed by the birth attendants are common correlates of utilization of MHS posited by past studies (Iyaniwura and Yusuf, 2009; Agbede et al., 2015). Therefore, increasing utilization of MHS for delivery require special skills and attitudinal changes from both the providers and the clients.

Two recent international initiatives recommended the use mobile phones as additional instrument in healthcare delivery and a means to boost utilization of MHS for delivery (International Telecommunication Union [ITU] 2009). The Millennium Development Goal 8 also highlighted the need to make use of new technologies available, especially those related to information and communication to improve healthcare delivery. Since the fastest growing new

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technology worldwide is the mobile phone, the need to research into the influence its intervention on enhancing the use of PHC centers for delivery is pertinent and of current importance.

According to Erhunwmunsee (2012), there are over eight million telephone subscribers in Nigeria. Thus, the mobile technology can be utilized for education, intervention and follow-up as obtained in other parts of the world (Lund et al., 2009; Mechael, 2005; Samai and Sengeh, 1997; Musoke 1999; Matthews and Walley 2005; Lungu and Ratsma 2007; Fournier et al., 2009; Svoronos et al., 2010).

In Nigeria, Isola (2011) observed that the use of mobile telephone by pregnant women to communicate with their health rangers improved patronage of trained midwives and qualified personnel thus supporting the potential of its ability to enhance utilization of MHS especially when it is purposefully used to reinforce ANC education as detailed in this study. Thus, this paper (an extract from a study) assessed the factors influencing pregnant women's utilization of Maternal Healthcare Services (MHS) for delivery in Ikenne, Ogun state, Nigeria while hypothesizing the women's personal attributes and use of mobile phone reinforcement of ANC education as determinants.

II. Methodology

This study was carried out in Ikenne Local Government Area (LGA) in Ogun state, Nigeria. This LGA is semi-urban comprising of five towns- namely, Ikenne-Remo (the LGA headquarter), Ilishan-Remo, Iperu-Remo, Ogere-Remo and Irolu-Remo. Population of women of reproductive age in the study area was 27, 713 (Nigeria Demographic and Health Survey, 2009). However, the target population included women who were pregnant and in the third trimester of pregnancy (28-40 weeks of pregnancy). The MHS available within the LGA include Babcock University Teaching Hospital at Ilishan, State General Hospital at Ikenne, State Hospital at Iperu, Community Hospital at Ilishan and ten (10) Primary Health Care (PHC) Centres in Wards situated in the five towns. There are also eight registered Private Hospitals/Clinics, some Traditional Birth Attendants (TBA) and Religious Healthcare Centres (RHC) within the Local Government Area.

a) Sampling technique and Data collection

The multistage sampling technique was used to select 96 respondents from among the pregnant women attending antenatal in 5 (randomly selected) of the identified PHC in the study area as specified above. All the women were monitored from first registration for ANC till delivery to determine actual place of delivery. Furthermore, 48 (50%) of the respondents were randomly chosen, across the selected MHC, and exposed to motivational telephone calls for 6 weeks preceding actual delivery dates. Structured questionnaire designed in line with the study objectives was used to gather data from the respondents. Reliability analysis was applied to test the internal consistency of the questionnaire. Result of the analysis showed that the instrument was reliable with average Cronbach's alpha value of 0.82 (Graham and Gisi, 2008; Muhamad, 2010).

b) Method of data analysis

Descriptive statistics and the logit regression model were employed in analyzing data collected in the study. Frequency tables were used to present results for the descriptive analysis while the logit regression model was used to analyze the factors which influenced respondents' utilization of maternal healthcare services for delivery. All statistical analysis were done using the statistical package for social science (SPSS version 17) and set at $P \leq 0.05$ levels of significances. Ethical clearance was obtained from the Ethical Review Committee, Babcock University and consent forms were filled by all participants.

In the regression analysis, the dependent variable was the utilization or non-utilization of the maternal healthcare services by the respondents for delivery. This was coded as '1' representing utilization and '0' representing non-utilization (dummy variable). The independent variables were the respondents' personal attributes (demographic and income variables), exposure to previous intervention program or seminars emphasizing merits of utilization of healthcare services especially for delivery, number of previous births, previous experience with birth complications, proximity to healthcare center, satisfaction rating for healthcare workers, family influence and telephone reinforcement motivating utilization of healthcare services.

III. Results and Discussion

a) Respondents' personal attributes

Respondents' personal attributes analyzed included age, marital status, educational attainment, income, satisfaction rating for healthcare workers, parity and ANC visits. Results as presented in Table 1 showed that most of the respondents were between 30 and 34 years old (46%) and mostly married (98%). Most of respondents had relatively good level of education with majority having secondary education and above (81%). The nexus between education and response to innovations for behavioral change has been detailed in previous studies (Babalola et al., 2013; Omeonu et al., 2014). Thus education is expected to influence utilization of maternal healthcare services. Most of the women earned below ₦16,000 (<$81) (74%) which is clearly below the national minimum wage of ₦18,000. This implies that although, most of these women may depend on their husbands for household financial sustenance, poverty level is likely high among the

women. This may pose a challenge to the women's' ability to make effective demand for necessary healthcare services.

Further results in Table 1 showed that the majority of the respondents (56%) had 1-2 children, thus they are expected to have certain knowledge about pregnancy management and probably formed opinions about where to deliver their babies since they have had children before. Results of antenatal care (ANC) showed that most of the women (70%) had their first visit to the healthcare center between 20th and 24th weeks of pregnancy. However, the majority of the respondents (63%) visited the healthcare facility up to 4 times during ANC. This is expected to positively influence utilization of the healthcare facility for delivery; unfortunately only 29 percent rated the service provided by the healthcare workers as good and this may negatively impact utilization.

Table 1 : Demographic information of respondents

Variables	Control (n= 96) Freq	%
Age		
19-24yrs	31	32.3
25-29yrs	21	21.8
30-34yrs	30	45.5
35-39yrs	8	8.33
≥40	6	6.25
Marital status		
Married	94	97.9
Education		
Below Secondary	18	18.8
Secondary and above	78	81.3
Husbands' Education		
Below Secondary	16	16.7
Secondary and above	82	85.4
**Income level (₦)*		
≤15,000	52	54.2
16,000-30,000	19	19.8
31,000-45,000	9	9.38
>45,000	16	16.7
Parity		
None	9	9.38
1-2	54	56.3
3 and above	33	34.4
Timing of ANC first visit		
8-16 weeks	12	12.5
20-24 weeks	67	69.8
28 weeks +	17	17.7
No. of ANC visits		
1 ANC visit	9	9.38
2 ANC visit	22	25.9
3ANC visit	5	5.21
4 and above	60	62.5
Satisfaction rating for HC workers		
poor	18	18.4
fair	50	52.3
good	28	29.3

* $1 is approximately ₦199

Source: Computed from field Survey (2014)

Table 2 : Distribution of respondents by decided actual place of delivery

Place of delivery	Selected MHC					
	Irolu (n = 10)	Ilishan (n= 10)	Ikenne (n= 28)	Ogere (n= 28)	Iperu (n= 20)	Total (n= 96)
MHC	2 (20%)	6 (60%)	12 (43%)	24 (85%)	12 (60%)	56 (58%)
Private Hosp	2 (20%)	2 (20%)	2 (7%)	3 (11%)	4 (20%)	13 (14%)
Church	6 (60%)	2(20%)	8 (29%)	1 (4%)	1 (5%)	18 (19%)
TBA	0 (0%)	0 (0%)	6 (21%)	0 (0%)	1 (5%)	7 (7%)
Home	0 (0%)	0 (0%)	0 (0%)	0 (0%)	2 (10%)	2 (2%)

Source: Computed from field survey (2014)

b) Respondents' actual place of delivery

Results in Table 2 shows that the majority of the respondents (58%) use the MHC for the delivery of their babies. Aggregating the data for MHC and private hospital, 72% of the respondents utilized skilled health attendants for delivery while 28% of the respondents still patronized unskilled birth attendants such as the Traditional Birth Attendants (TBA), church or religious centre and delivery at home (attended to by family or friend).

c) Impact of telephone follow-up and determinants of utilization of MHC

The result of the assessment of the impact of the telephone follow-up on use of MHC for delivery is presented in Figure 1. Fifty percent of the women (48 women) were followed-up by weekly mobile phone communications. Results showed that telephone follow-up led to an apparently increase in the use of MHC and decrease in the use of other facilities. Disaggregating utilization of MHC by telephone follow-up showed that 84% of those who received telephone calls used MHC for delivery while 59% of those who did not received telephone calls used MHC for delivery.

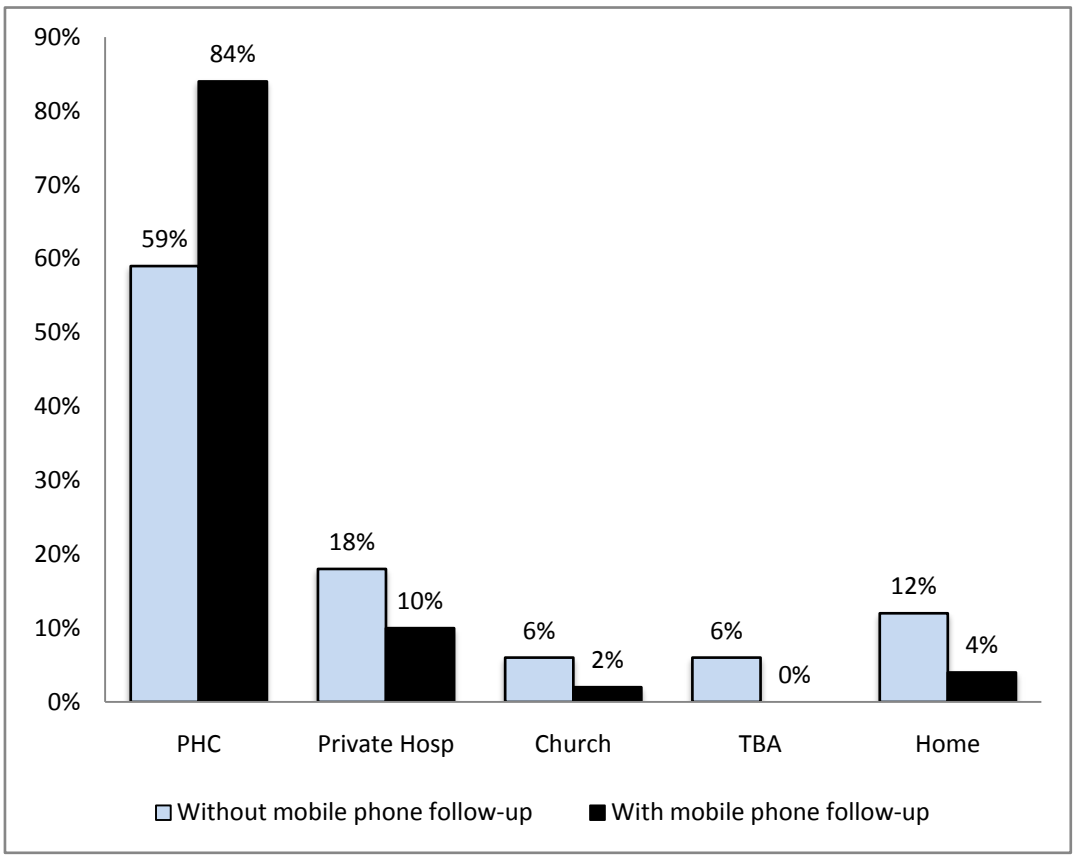

Fig. 1 : 'With' and 'without' mobile phone follow-up

The logistic regression analysis was conducted to determine the factors which significantly influence respondents' utilization of the healthcare facility for delivery and the results presented in Table 3. The analysis was done after mobile phone follow-up.

Results showed that respondents' participation exposure to telephone calls (reiterating knowledge received during ANC and motivating use of skilled birth attendants) significantly (at $p = 0.009$) increased the utilization of MHC for delivery. This result is consistent with the reports of Lund et al. (2009); Samai and Sengeh (1997); Musoke (1999); Matthews and Walley (2005); Lungu and Ratsma (2007). Other factors which positively and significantly increased respondents' utilization of MHC services included respondents' literacy level ($p = 0.006$), respondents' satisfaction rating for of healthcare workers at the MHC ($p = 0.003$), respondents' monthly income ($p = 0.042$) and family (especially husband) influence ($p = 0.047$). This implies that increasing these variables will significantly increase pregnant women's patronage of the MHC for delivery of their babies and by implication ameliorate complications attached to births attended by unskilled birth attendants.

Table 3 : Factors influencing respondents' utilization of MHC facility for delivery

Independent Variables	Beta coefficient	S.E.	Sig.
Constant	-7.380*	1.773	0.010
Mobile phone follow-up (dummy: no = 0; yes = 1)	0.217*	0.0510	0.009
Literacy level (dummy: below sec = 0; sec & above = 1)	0.318*	0.079	0.006
Satisfaction rating of HC workers	2.359*	0.783	0.003
Number of previous births	-0.103	0.172	0.550
Proximity to HC facility (dummy: no = 0; yes = 1)	0.424	0.387	0.273
Number of ANC visits	0.305	0.180	0.095
Monthly Income (in naira)	0.130*	0.060	0.042
Family influence (dummy: no = 0; yes = 1)	0.289*	0.124	0.047

*Dependent variable is the actual utilization of healthcare facility (utilization =1; otherwise = 0); -2 Log likelihood = 122.504; Nagelkerke R^2 = 0.482; *sig ≤ 5%*

Source: Computed from field survey (2014)

IV. Conclusion and Recommendations

This study assessed the factors influencing the utilization of Maternal Healthcare Centers (MHC) for delivery among pregnant women. The participants were selected from among pregnant women attending ante-natal care in the healthcare centers in Ikenne LGA of Ogun state Nigeria. The investigation concluded by affirming significant impact of corroborative telephone-call motivation of respondents towards utilization of MHC. Similarly, respondents' literacy level, their satisfaction rating for of healthcare workers at the MHC, their monthly income and family (especially husband) influence positively influenced utilization of MHC for delivery. Based on the findings of the study, it is recommended that with the increase in availability of mobile communication services providers in Nigeria, phones should be intensively used for addressing health delivery bottle necks and motivating MHC utilization. Furthermore, careful considerations should be given to subsidizing maternal healthcare cost, conducting periodic appraisal of the quality of ANC education delivery and family ties when formulating policies or initiating programmes targeting maternal healthcare and utilization of MHC services.

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

Structure

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

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

Abstract, used in Original Papers and Reviews:

Optimizing Abstract for Search Engines

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

Key Words

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

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

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

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

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

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

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

Acknowledgements: Please make these as concise as possible.

References

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

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

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

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

Tables, Figures and Figure Legends

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

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

Preparation of Electronic Figures for Publication

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

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

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

6. AFTER ACCEPTANCE

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

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

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

(Free of charge) from the following website:

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

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

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

TECHNIQUES FOR WRITING A GOOD QUALITY RESEARCH PAPER:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Informal Guidelines of Research Paper Writing

Key points to remember:

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

Final Points:

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

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

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

General style:

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

To make a paper clear

· Adhere to recommended page limits

Mistakes to evade

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

In every sections of your document

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

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

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

· Align the primary line of each section

· Present your points in sound order

· Use present tense to report well accepted

· Use past tense to describe specific results

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

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

Title Page:

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

Abstract:

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

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

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

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

Approach:

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

Introduction:

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

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

Approach:

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

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

Procedures (Methods and Materials):

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

Materials:

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

Methods:

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

Approach:

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

What to keep away from

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

Results:

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

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

Content

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

What to stay away from

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

Approach

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

Figures and tables

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

Discussion:

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

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

Approach:

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

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

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

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

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- To guard yourself and others from possible illegal use please do not permit anyone right to use to your paper and files.

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

INDEX

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