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Musa W. Bara
Editor-in-Chief

Liquidity Management and Corporate Profitability: Evidence from Nigerian Listed Consumer Goods Companies

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Abstract

This study investigates how liquidity management helps Nigerian listed consumer goods companies to increase their profitability to the benefit of shareholders. The study uses secondary data from the Audited Annual Accounts and Report of the fourteen sampled out of the twenty listed consumer goods companies on the floor of the Nigerian Stock Exchange for the period of eight years from 2012 to 2019. The samples was based on data availability and must have not been delisted for the period under study. Panel data regression in STATA was used for the analysis. Three regression were carry out and the result indicates that liquidity management has the ability to increase the profitability of listed consumer goods companies in Nigeria by about 58%. Hence, for every ₦100 investment in liquidity and was properly manage; the companies might generate a profit ₦11.4 as reveals by a mean 0.11. Moreover, despite the fact that the consumer goods companies do not maintain the default liquidity position, the maximum and minimum value of 2.837 and .074, the sampled companies' current assets outweigh their current liabilities. Thus, the study recommends the need for the consumer goods companies in Nigeria to ensure effective and efficient inventory management system that will help them to overcome stock-out problem. Moreover, monitoring mechanism should also be in place to ensure credit sales are given to creditworthy customers, with good credit rate. While, government can help the companies through lower cost of capital and import duties to help them in increase profitability.

***Keywords**: Liquidity, profitability, inventory, liquidity, companies*

1.0 INTRODUCTION

Many factors contribute to growth and survival of corporate entities, which can be internal and external factors. According to Madugba & Ogbonnaya (2016), Ademola (2014) among the most important factor is liquidity and its management. This is because liquidity helps companies to maintain daily operations. Hence, inadequate management of working might jeopardise future survival of companies and consequently affects their market value (Ogundipe, Idowu & Ogundipe, 2012). Liquidity represent the circulation fluid of businesses that ensure the movement of funds from one point to the other and ensure optimal utilization. The optimal utilization will greatly help companies remain as a going concern entity (Ademola, 2014).

For an optimal liquidity to be achieve there is need for companies to have a balance between current assets and current liabilities. The balance will help them to overcome operational difficulties in an effective and

efficient maaner (Ajayi, Abogun & Odediran, 2017; Watson & Head, 2014). The effectiveness will be in the form an appropriate cash balance, appropriate inventory level, appropriate time to place order of new inventory, volume of debt to offer to customers and the length of time to settle outstanding payables. Therefore, inappropriate combination of the current assets and current liabilities might negatively affect corporate survival and their profitability (Abdulazeez, Baba, Fatima & Abdulrahaman, 2018). Liquidity assess company's aptitude to strike a favourable balance between its current assets and liabilities in order to guarantee short-term financial position and ability to sustain daily business activities.

Consequently, consumer goods companies unlike service companies cannot do without stock of inventory, offer product on post-paid basis and must hold cash balance. With the increasing Nigeria population to over 200 million citizens, there is potential market growth for the consumer goods companies; couple with the implementation of the new minimum wage. Against this background, the study attempt to assess the impact of liquidity management on profitability of Nigerian listed consumer goods.

2.0 LITERATURE REVIEW

2.1 The concept of liquidity

Various scholars and researchers define liquidity in almost the same way, but they differ in having an agreement on what should be an appropriate combination of the company's liquidity (Abdulazeez, Baba, Fatima & Abdulrahaman, 2018; Iqbal, Ahmad, & Riaz, 2014; Ogundipe, Idowu, & Ogundipe, 2012). Hence, the success of a company depends on its ability to generate and effectively manage excess fund over possible expenditure (Madugba & Ogbonnaya, 2016; Chary, Kasturi & Kumar, 2011).

Ajayi, Abogun & Odediran (2017) defined liquidity as the net total company's investment in current assets and current liabilities. The purpose of the investment is to meet short-term financial obligations of the company and other operational requirement that will facilitate smooth operation of the company.

Arnold (2013), Watson & Head (2013) grouped liquidity into three main components (inventory, receivables and payables and cash management). Inventory comprises all stock of raw materials, partly completed products and finished products. Receivables represent amount receive or to be receive from customers, while payables are outstanding settle to be made suppliers in the ordinary course of business operation. Cash management on the other is the policy formulation to defer settlement of liabilities and hasting debt collection from customers.

According to Abdulazeez, Baba, Fatima & Abdulrahaman (2018) companies can measure their liquidity efficiency using the following:

- Debtors' collection period, which refers to the period in days it take customers to settle their debts on goods and services supplied to them on credit. That is how long it takes the company receive cash from credit sales. This is the time taken by customers to settle their liabilities in respect of goods and service supplied to them on credit. The shorter the time the better might be the company's profitability (Valahzaghard, & Ghalhari, 2014).

- Creditors' payment days on the other hand, refers to the number of days the company takes to settle its suppliers for the goods and services supplied by them on credit. The longer the days the better for the company, because the supplier will serve as an interest free loan. Nevertheless, the suppliers might not allow unnecessary delay in payment, except in a highly competitive market (Pourali, Imeni, & Taherpour, 2013).
- Cash conversion cycle is the length of time in days that takes companies to purchase input, process them into finished products and receive money from their customers. The lower the days to better for the company and vice versa (Anser & Malik, 2013; Attari & Raza 2012). That is the number of days a company take to convert its short-term resources into cash. This will facilitate raising internal finance and growth of the company.

However, Lamberson (1990) in Madugba & Ogbonnaya (2016) opines that the main reason of liquidity is to maintain optimum level of cash and marketable securities in order to maximize the value of the company. Madugba & Ogbonnaya (2016), uses the following to measure liquidity of a company:

Liquidity cycle, which refers to the average length of time the company was able to turn short-term fund into cash. It measure liquidity in terms of company's ability to settle short-term obligations (Usama, 2012).

Net liquidity, this is the difference between company's current assets and current liabilities over a given period. To avoid solvency and going threat, current assets must adequate to cover current liability. According to Watson & Head (2013), the ideal current ratio is 2:1, but this is not applicable to all companies. Therefore companies should efficiently plan and control their current assets and liabilities in such a way to maintain liquidity (Ebenezer & Asiedu, 2013).

2.2 Empirical review

Corporate financial survival depends largely on its ability to generate excess funds against it possible expenses. Therefore, liquidity need to be efficiently utilise because of their high proportion against total assets employed (Chhapra & Naqvi, 2010). This may involve planning and controlling current assets and liabilities in order to avoid settle risk. Proper management of liquidity has the potential of increasing profitability and market value (Madugba & Ogbonnaya, 2016; Ul-Haq, Sohail, Zaman & Alam, 2011).

Plethora of empirical studies on liquidity management was conducted across the world to postulate its relationship with corporate profitability. Gulia (2014), assess liquidity management on the firms' profits after tax and cash profits of the leading Indian pharmaceuticals firms. The study employed correlation and multiple regression and conclude that there exists relationship among variables with significant impact. Madugba & Ogbonnaya (2016) investigate the effect of liquidity management on profitability of manufacturing companies in Nigeria using published audited financial statement with the aid of multiple regressions. The result reveals that average payment period and average collection period has significant and positive impacts on both Earnings per share and Return on capital employed. In contrast to their findings, Abdulazeez, Baba, Fatima & Abdulrahaman (2018) results shows a

negative relationship except for cash conversion cycle, which has positive but insignificant relationship with profitability. In line with this, Le, Vu, Le, Du & Tran (2018) opined on a positive association between liquidity and firm financial from Ho Chi Minh Stock Exchange. However, Ajayi, Abogun & Odediran (2017) reported a contrasting result using correlation and panel regression analysis, where they that a negative relationship exists between cash conversion cycle (CCC) and profitability while there is a positive relationship between average collection period (ACP) and profitability. While Chhapra & Naqvi (2010) study using correlation, regression analyses and analysis of variance shows a strong positive and significant relationship between liquidity management and firm's profitability in Pakistan's textile sector. Moreover, Ul-Haq, Sohail, Zaman & Alam (2011) study from Pakistan cement industry with the aid of correlation coefficient and multiple regression analysis reported positive association between liquidity management and profitability. In line with their findings, Taani (2012) study from Jordan listed companies using Pearson's rank correlation test, ANOVA F- test, and multiple regression analysis reported significant relation between liquidity management policy and net income. Agha (2014) reported that liquidity management has a significant impact on the profitability of listed pharmaceutical companies on Karachi stock exchange. Alavinasab & Davoudi (2013) study that investigate the relationship between liquidity management and profitability for listed companies on Tehran stock exchange using cash conversion cycle, the current ratio and current asset to total asset ratio as the proxies of working of liquidity and current liabilities to total asset ratio and debt to asset ratio as the proxies of profitability. The result from Multivariate regression and Pearson correlation test indicates a negative and significant relationship existed between liquidity management and profitability. However, contrary to their findings, Jayarathne (2014) who examine the impact of liquidity management might have on profitability of listed manufacturing companies in the Colombo Stock Exchange, Sri Lanka and found out that there is a negatively relationship exist between liquidity proxied by account receivable period, inventory turnover period and cash conversion cycle and companies profitability. The study further recommend for effective management of liquidity to enhance profitability.

3.0 RESEARCH METHOD

The aim of this paper as mentioned before is to study the impact of liquidity management on profitability Nigerian listed consumer goods industry. The population of the study comprises all the twenty (20) Consumer goods companies listed on the floor of Nigeria Security as at 22nd November 2020.

Table 1: Population of the study

S/N	Company	Date of Listing	Date of Incorporation
1	Cadbury	1st January 1976	9th January 1965
2	Champion Bre.	1st September 1983	31st July 1974
3	Dangote Sugar	8th March 2007	4th January 2005
4	DN Tyre & Rubber	21st October, 1961	21st October 1961
5	Flour mills of Nig.	14th August, 1979	29th September 1960
6	Golden Guinea Brew. Plc	1st January 1979	26th September 1962
7	Guiness	2nd January 1965	29th April 1950
8	Honeywell Flour	20th October 2009	9th July 1985
9	Int. Breweries	30th March, 1992	22nd December 1971
10	Mcnichols	18th December 2009	26th April 2004
11	Multi-Trex Integrated Foods	1st November 2010	30th October 1999
12	N Nig. flour mills	26th September 1978	29th October 1971
13	Nascon	20th October 1992	30th April 1973
14	Nestle	20th April 1979	25th September 1969
15	Nig. Breweries	5th September 1973	16th November 1946
16	Nigerian Enamelware	28th December 1979	21st May 1960
17	PZ	18th February, 1974	12th April 1948
18	Unilever	1st April 1973	4th November 1923
19	Union Dicon Salt	23rd September 1993	12th November 1991
20	Vitafoam	1st November, 1978	8th April 1962

Source: Generated by the researcher from audited annual account and report of the consumer goods companies.

The study adopted an Ex-post factor research design and utilizes secondary data that was extracted from the audited annual account and report of the fourteen (14) sampled listed consumer goods companies. The companies were selected based on data availability, have constantly published it audited annual account and report for eight years from 2012 to 2019 financial year and must have not been delisted for the period under study (Ansah & Yeoh, 2005). The choice of seven years from 2012 is because that was the first year Nigerian firms produced financial statement using IFRS as directed by the Nigerian Financial Reporting Council. Thus, the sampled consumer goods companies are:

Table 2: Sample of the study

1	Cadbury	1st January 1976	9th January 1965
2	Champion Bre.	1st September 1983	31st July 1974
3	Dangote Sugar	8th March 2007	4th January 2005
4	Flour mills of Nig.	14th August, 1979	29th September 1960
5	Guiness	2nd January 1965	29th April 1950
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10	Nestle	20th April 1979	25th September 1969
11	Nig. Breweries	5th September 1973	16th November 1946
12	PZ	18th February, 1974	12th April 1948
13	Unilever	1st April 1973	4th November 1923
14	Vitafoam	1st November, 1978	8th April 1962

Source: Generated by the research from Table 1

Source: Lab Test Research Result 2018

In analysing the data of the sampled consumer goods companies, panel regression utility with modification is used to define the association between liquidity management and their profitability. Abdulazeez, Baba, Fatima & Abdulrahaman (2018); Le, Vu, Le, Du & Tran (2018); Ajayi, Abogun & Odediran (2017) and Madugba & Ogbonnaya (2016) also used the regression utility function. The justification for the use of panel data regression is because the sample data was made-up of time series with cross sectional characteristics (Hsiao, 2003).

CFPit = β0 + β1SLTTAit + β2SIZEit + β3TANGit + β4LIQit + β5LTLTAit + β7 TLTAit + β8 ROAit + β9AGEit + eit…………………………………………… ……….(1)

Where SLTTA is short-term liability to total assets, SIZE is assets base, TANG is tangibility of the company, LIQ is liquidity position of the company, LTLTA is long-term liability to total assets, TLTA total liability to total assets, ROA is return on assets and AGE is the age of the company.

4.0 RESULTS AND DISCUSSION

This section present the interpretation of the data analysed from the annual report and account of the sampled listed consumer goods companies.

Table 3 below shows a mean, minimum and maximum rate of profit increase to be experience by Nigerian listed consumer goods companies of 45% to 150% in respect of short-term liability to total assets. This implies that the rate acceptable especially with 12% spread level as indicated by standard deviation. Tangibility recorded a minimum of 60% and maximum of 150% is a welcome indicator more especially with 20% dispersion level.

In same vein, liquidity shows a minimum of 74% and maximum of 284% with dispersion of 52%. This indicates that Nigerian consumer goods companies have the capability to utilise their liquidity to their advantage and can be able to generate more revenue and profit to the benefit of their shareholders. This evidenced by the ROA of the sampled companies, which shows that for every ₦100 liquidity investment, they might realise a profit of ₦11.4 as reveals by a mean 0.11. This indicates that liquidity management has positive impact on the company's performance.

Table 3: Summary Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
sltta	120	.4547577	.194819	.163	1.497
size	120	.1385131	.1001068	.007	.597
tang |	120	.5932465	.1893097	.195	1.504
liq |	120	1.061587	.5220839	.074	2.837
ltlta |	120	7.865627	.5668849	6.832	10.44648
tlta |	120	.4918823	.1927427	.143	.885
roa |	120	.1143589	.0943355	-.18	.379
age |	120	1.350845	.344266	.477	1.724

Source: Generated by the researcher from audited annual account and report of the LDMBs using STATA version 14.0

Table 4 below shows the out of the regression analysis from the sampled consumer goods industry, where three regression were carry out. These are Ordinary Least Square, Fixed Effect and Random effect regression. The reason behind running the three regressions is to avoid the possible biasness of the Ordinary Least Square (Baltagi, 2005).

With 1.0000 RS and 58.2% probability index, Nigerian listed consumer goods companies have the tendency of increasing their profitability through effective management of their liquidity. While the remaining 41.8% increase in profitability might be cause by

some other factors not explain the regression function. Hence, the positive result of the tangibility, liquidity and long-term liability to total assets might serve as an evidence to accept the results.

Table 4 Regression Result.

Variable	OLS	FE	RANDOM
Size	-.9998215	-.9998215	-.9998215
tang	.9998885	.9997206	.9998885
liq	.0001208	.0002244	.0001208
ltlta	-.0002123	-.0000378	-.0002123
tlta	-.0000356	.0000222	.0000356
roa	.0004902	.0009755	.0004902
age	-.0004897	-.0011395	-.0004897
_cons	.0023199	.0017916	.0023199
Prob	0.0000	0.5818	0.5818
R^S	1.0000	1.0000	1.0000

Source: Generated by the researcher from audited annual account and report of the LDMBs using STATA version 14.0

4.1 Bulk Density

Table 5 below shows the correlation matrix of the study variables where tangibility, long-term liability, total liability and ROA where all moderate at 0.8645, 0.3381, 0.1183 and 0.3021 respectively, whereas, size and liquidity reveals perfect strong negative relationship. The overall correlation result indicates that the variables pit the study since their relationship does not equals to zero.

Table 5: Correlation matrix

	Sltta	size	tang	liq	ltlta	tlta	roa	age
sltta	1.0000							
size	-0.3110	1.0000						
tang	0.8645	0.2088	1.0000					
liq	-0.3885	-0.2035	-0.5072	1.0000				
ltlta	0.3381	0.3128	-0.1821	0.0414	1.0000			
tlta	0.1183	0.4884	0.1363	-0.5837	0.0856	1.0000		
roa	0.3021	0.0934	-0.2616	0.2435	0.1313	-0.1441	1.0000	
age	0.0841	-0.0539		0.0583	-0.0447	-0.2255	-0.0856	0.0668	1.0000

Source: Generated by the researcher from audited annual account and report of the LDMBs using STATA version 14.0

5.0 CONCLUSION

This paper examined empirical how liquidity impact on profitability of listed consumer goods companies in Nigeria using panel data regression. It covers the period of eight (8) years from 2012 to 2019. The study was

considered important given the importance of short-term source of finance to business (Watson and Head, 2013). The findings of this study suggest that short-term finances increase firm's profitability, looking at the performance measures considered by the study. Therefore, it was recommends that listed consumer goods companies should try as much as possible to explore and effectively utilize available short-term finance at their disposal. Moreover, government should try as much as possible to reduce the cost of borrowing to enable firm's achieve a reasonable combination of debt into their capital structure and enjoy the relative tax savings advantage of the debt.

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Accounting in Cloud Computing: The Conceptual Issues

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Abstract

This study examines the conceptual issues of accounting in cloud computing. The adopts explanatory research design. The study uses mainly secondary source of data. The study concludes that accounting in the 21st century cannot be imagined without the support provided by information technology. The innovative cloud computing phenomenon has proven its value not only in the information technology industry, but also in the accounting field. Thus, a new concept has emerged: cloud accounting is the next big thing that is promising to reshape the accounting function. By using this service-based model, a company will be able to access its financial data over the internet, through a web browser.

Keyword: Cloud Computing, Conceptual, 21st century, ICT

1.0 INTRODUCTION

Today, technological development affects every aspect of human life. The developing technologies also affect the access of organizations to information, speed of processing information, and communication ways. Beginning to use computers and internet enables the data to be formed and stored in digital media and also allows for the information and data kept in data storage area to be shared and used all over the world. Thanks to the developing technology and internet, the users shifts from the infrastructure of classical information technologies, which gives local scale and constricted service opportunities, to cloud information technology, which is flexible and economic and gives opportunity to reach from everywhere. Cloud computing is defined as a technology, which provides remote access by a network and is used by ten thousands of customers (Marešová and Kuča, 2015)

Accounting for many centuries has been considered a discipline that did not give up fashions, and ensure the stability of the accounting system and the ability to perform the basic function of which is to provide information to help the settlement of the ongoing management of their activities. In recent years, the pace of development accelerated accounting. Accounting principles and practices have been advancing rapidly in today's business world and while the rules of the global economy are more or less constant, the advancement in technology, the emergence of cloud accounting, has made the accounting system more potent than it was . Cloud accounting is a modern concept processing accounting data with a set of

information distribution system and applications in the framework of the concept cloud without needing for the users to know physical position and system structuring (Mihalache, 2011).

A cloud based accounting solution enables the possibility to respond numerous and complex demand and activities by means of integrated online system and, in turn, reduces the amount of labor that is necessary for accounting department (Dimitriu and Matei, 2014). Cloud accounting requires to access to the accounting software and data through an internet browser. Software is

provided on the basis of subscription and data is stored in a remote server. Cloud accounting is usually managed by Cloud service providers (CSPs). Cloud services are accounts stored on a server. Companies can either choose dedicated cloud services or shared cloud services depending on their budgets. Cloud accounting software is generally believed to be faultless since it allows the access of cloud-based software from any device with an internet connection without excluding small business owners. With a software that can fit into a whole ecosystem of adjuncts, cloud accounting appears to be quicker, more consistent, and cost-friendly (Rao, Jyotsna and Sivani, 2017).Therefore, this study examines the conceptual issues of accounting in cloud computing. In addition to this introductory section, , the paper contains three sections .Section two reviews literature relevant to the topic, section three presents the research methodology, while section four concludes the paper.

2.0 LITERATURE REVIEW

This section examines the conceptual issues of accounting in cloud computing along the following line: concept of cloud computing, features of cloud computing, benefits of cloud accounting, cloud accounting software, cloud accounting software providers and deployment models for cloud in business.

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2.1 Concept of Cloud Computing

Kavzoğlu (2012) views cloud computing is a service getting model through desktop computer,

tablet or smart devices by being connected to the other servers via internet without needing any software or storage units. According to Mell and Grance (2011) cloud Computing is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (for example networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction. Kim (2009) defines Cloud Computing as "being able to access lies, data, programs and third party services from a web browser via the Internet that are hosted by a third-party provider" and "paying only for the computing resources and services you used. Youseff et al. (2008) postulated that Cloud Computing inherits its concepts from peer-to-peer architecture, autonomic

computing, virtualization and service-oriented architecture (SOA). While Aymerich et al. (2008) state that the nascence of Cloud Computing as a new distributed computing paradigm a subset of grid computing technologies, which itself is an extension of cluster computing. Fox (2009) concludes that Cloud Computing is an extension of the client – server architecture introduced in the 1980s.

2.2 Features of Cloud Computing

Stamford (2009) documented five features of cloud computing as follows:

2.2.1. Service-based: It is summarized with an interface well defined by consumer. Interfaces hides the details of application and enables to response by service providers to consumer of service in fully automated way

2.2.2. Scalability and Flexibility: Service can scale up or down capacity just as customer demands on the basis of full automation (it can take a few seconds for some service and hours for others). Customer has a flexibility to add and take out capacity

2.2.3. Share: The resources of information technologies can be accessed as a service shared by more customers.

2.2.4. It is measured according to the use: Service provider has an accounting system that can form different pricing plans and models. Such a system offers pricing options to consumers according to the amount of service they use.

2.2.5. It uses internet technologies: Service is provided by using internet definers, formats, and protocols such as URLs, http, and IP. Many web technologies can utilize internet – based services such as book selling by Amazon and Gmail by Google.

2.3 Benefit of Cloud Accounting

According to practitioners, online accounting can benefit both accounting professionals and the

business itself. Nowadays companies are moving beyond seeing cloud technology only as a means to reduce IT costs; many organizations are now aware of other important capabilities of cloud computing like *elasticity, scalability and its self-service nature.*

Gartner (2014) opined that the most significant advantage of cloud technology is the ability to access resources remotely and based on request, thus enhancing *business agility* and impacting the entire economic field. Due to the actual location of financial data (on the provider's data centre) and because it is accessed over the internet, cloud accounting enables users to operate their data at any time and from any location. Both large and small enterprises have the opportunity to acquire high-end technology for a low price; they only pay a periodic subscription fee, based on their needs (usage) instead of investing in expensive hardware and applications. One of the most noted benefits of cloud technology is related to substantial *cost savings* in information technology budgets.

Computerworld (2014) considered that by adopting the cloud model, businesses can easily scale up and down and immediately adapt to the increasingly dynamic and

challenging economic context. Given the fact that cloud software is delivered as a service, companies have the possibility to adapt their financial application depending on the necessary level of service or volume of work. In addition, by adopting a cloud accounting solution, users can automatically perform repetitive and resource-consuming activities, hence *optimizing the business workflow*. Other important characteristics of cloud accounting are the *ease of use and the intuitive design*; cloud accounting applications can be approached by both financial experts (accountants, auditors) and non-experts (business owners, business partners). Another useful feature refers to the companies' possibility to *use a trial version* of the cloud accounting solution. By doing so, companies are able to decide whether the cloud accounting model is suitable for them, before making a long-term commitment.

The cloud model enables *collaboration and communication* between users and different business

associates, who are able to simultaneously and remotely access accurate and real-time financial

information, no matter their location. A simple example of cloud-based collaboration feature refers to the online payment of clients' invoices that can be made effortlessly. This shift from paper-based accounting reports to timely financial dashboards can ensure greater insight into the business profitability.

Another relevant aspect that is noted by Osintsev (2013). should be considered by organisations is the increased *level of security* ensured by cloud applications. Users have got restricted and specific levels of access to the cloud solution. The company's financial data, hosted in the cloud, is regularly backed up and closely protected though encryption and complex security protocols

2.4 Cloud Accounting Software

Cloud Accounting Software was mainly developed to solve the problem of portability of data. Earlier, a file required to be accessed later was stored on hard drives or USB flash drives. Devices like Hard drives, USB flash drives and other portable storage devices made transporting information between multiple machines an easy process. However, these traditional methods of storage had significant drawbacks. For example, data stored on hard drives are susceptible to loss of data through different situations such as fire accidents, non-functioning of any of the tiny mechanical parts of the drive among others. In case an important document is stored on a USB flash drive there is always a chance of losing the data during travel or due to damage occurring to the drive. The working of Cloud based accounting software is similar to the other cloud based software. Files which are generally stored on a hard drive are stored online. This ensures that the information is easily accessible. With the development of mobile devices, especially the smart phones, cloud based accounting enables the users to manage their finances from wherever they are. Thirmal Rao, .Jyotsna and Sivani (ND) noted the basic

steps which can be followed to use Cloud based accounting software:

2.4. **1. SCAN To scan or photograph documents:** The first step is to scan or take a photograph of the required financial documents **digital** versions of financial documents can be made through a variety of devices such as a Mobile Phone Camera and Office Scanner.

2.4. **2. UPLOAD Upload files to the cloud:** The cloud accounting service provider gives the client a Login ID and a Password so that the client can access his In cloud account, upload the documents to the cloud and immediately the documents become a part of the service provider"s records.

2.4.3. VIEW Access the documents whenever required: By the use of Cloud accounting, there is access to a flexible service which allows the users to view their business accounts wherever and whenever required and through any device.

2.5 Cloud Accounting Software Providers

The issue of software provision is at the heart of the cloud accounting. The software sets in motion the wheels behind the whole cloud accounting concept. Over time, technological advancements have seen new software make way into the market, each with its own unique element that sets is aside from competitors. This paper identifies the following software providers;

2.5.1 Xero

Du and Cong (2010) considered that Xero, founded in New Zealand, has grown to become one of the most preferred accounting software providers, having amassed great influence in the business world to garner over 250,000 active users on the global scale. The software providers have laid emphasis on the small business sectors availing efficient accounting services to more than 100 countries. Christauskas and Miseviciene (2012) Referred to it as the "Apple of cloud accounting," Xero has displayed massive potential and capacity to surpass geographical limitations growing to become one of, if not the best cloud accounting Importantly also the accounting software provider has remained true to its mission and showcased objectivity to achieving its vision, which is, to "be the global leader in matters cloud accounting." In line with this, the company has availed a number of cloud solutions, key ones being; facilitating client-centered accounting options that ensure business goes on as usual, anywhere and anytime. Significantly also, by facilitating report and final management the business has created a brand for itself in the cloud computing industry.

2.5.2 Sage One

Treves (2017) posited that cloud accounting software Provider Company lays emphasis on making the experience more efficient through the introduction of smarter services day after day. Among the areas the service provider focuses on is enhancing organization-consumer conversation made possible through the creation of interactive cloud software, where clarifications between the two parties can be made instantly . Alali and Yeh (2012). noted also, Sage One enhances the management of finances by availing

secure channels, which are not only user friendly but also fluid to consumer needs, meaning a single organization for instance, a hospital can create a working software that can facilitate storage and processing of patients' records as per the Wings or type of treatment they require.

2.5.3 KashFlow

Feuerlicht (2010). Opined that KashFlow depends on the preface of making it simple to manage large and smaller businesses alike weighing in on the advantage that the individuals harnessing and taking charge of the idea need not have deep accounting skills. In order to achieve this, the software provider company KashFlow has incorporated almost a hundred systems including inventory management, branch monitoring, User Interface virtual interactions and e-commerce just to mention a few .On the other hand, Youssef (2012) documented that the developers have created email oriented and cloud and crypto store systems which induce all operations giving the company a major advantage as compared to its vicious competitors in this line of business. Importantly also, KashFlow has invested a lot of resources in their products is investing in hosting, where an emphasis is put on enhancing system's multiple data integrations hence making it a preferred choice for large organizations.

2.5.3 Free Agent

Christauskas & Miseviciene (2012) positioned that the Software provider company was set up in 2007, and sought to bridge the gaps that the original creators had identified in cloud accounting. The company grew to become multinational company specializing in not just the normal inventories and payrolls but as well as developing time track systems, which execute operations as programmed automatically. These services coupling up with the way that their services are easy to use has allowed the company garner positive feedback from consumers growing to become a multinational company estimated to be offering services to over 40, 000 freelancers alongside other small and large businesses Located in Edinburg. Youssef (2012)considered Free Agent has traversed local business operations leading in microbusiness management which have made it a preferred choice amongst small business enterprises, and finally, the fact that their team is consumer needs driven, where they show concern in growing the business has given it a good brand name amongst customers .

2.5.4 QuickBooks

Dimitriu and Matei (2014) noted that this company poses a big competition to the small-scale software company rivals as it is driven towards enhancing account on small-based businesses. Boasting in peer to peer (P2P) connectivity the company has taken slow but sure strides and builds up a reliable software provider partner that meets HM Revenues and Customs (HMRC) requirements. This certification has made it a consumer base as people are assured that their information and data is kept safe .In addition, by offering an easy setup process where new users receive systematic

guidelines have facilitated its brand development, as it is renowned for its user-friendliness.

2.6.0Deployment models for cloud in business

In this context, models are used to represent the various channels through which the incorporation of cloud accounting into organizations can be achieved. According to Arsenie-Samoil (2011) , there are four models include;

2.6. 1Private Cloud Accounting. In this model, Zissis and Lekkas (2012) documented that cloud resources are directed towards creating cloud services, which are sourced and operated within the constrictions of a single organization. In other words, the single premise structuring permits only internal access and management of the information stored over specific channels. Significantly also, this method is regarded as the most secure as chances of third-party compromise are limited.

2.6.2 Public Cloud Accounting Model: As suggested by the name, this model evokes capacity for the larger public to access the cloud services, which is made possible for organizations aiming to get more consumers as well as giant institutions to efficiently manage accounting operations for instance; government agencies, schools, hospitals and public service provider centers just to name a few.

2.6.3 Community Cloud Accounting Model: The cloud service avails interconnections between different organizations. This enhances exchange and storage of information over cloud channels which is critical in the creation of vertical markets. Zhang and Gu (2013) noted For like driven organizations cloud connectivity that mothers accounting makes it easier for idea sharing, in turn boosting businesses as organizations get to learn to utilize market analysis grasping want is working for the organization and what is not.

2.6.4 Hybrid Cloud Accounting Model: Pacurari and Nechita (2013) viewed it as the combination of two or more of the aforementioned models, which, is designed to avail a wider scope of services to organizations. By use of cloud computing, it becomes easier for organizations to manage portable media and other virtually enabling platforms.

3.0 METHODOLOGY

The explanatory approach was adopted in this study. The study uses mainly secondary data through review of relevant literature on the conceptual issues of accounting in cloud computing.

4.0 CONCLUSION

Accounting in the 21st century cannot be imagined without the support provided by information

technology. The innovative cloud computing phenomenon has proven its value not only in the information technology industry, but also in the accounting field. Thus, a new concept has emerged: *cloud accounting* is the next big thing that is promising to reshape the accounting function. By using this service-based model, a company will be able to

access its financial data over the internet, through a web browse. Thus, Cloud accounting can be highly beneficial for business as it offers efficient technology and accounting service at a lesser cost. The customization offered by cloud accounting is a great benefit to any business adopting it, which enables every business whether small, medium or large to customize cloud software according to their requirements .In the near future, access to on-demand, actionable business data will be a daily necessity for an enterprise.

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Helminthes Parasites of Chicken (*Gallus Domesticus*) In Damaturu Metropolis (A Case Study of Locally Sold Chicken in Damaturu Main-Market)

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Abstract

This project work examined the prevalence of Helminthes parasites of chicken (Gallus domesticus) in Damaturu metropolis. A total number of 50 intestinal samples were collected from Damaturu Main Market which comprises of 25 gastro-intestinal tracts of male chickens and 25 gastro-intestinal tract of female chickens, where 26 chickens were found to be infected, out of these, 14 males were found to be infected representing (28%) and 12 female chickens were found to be infected representing (24%). The investigation revealed that seven (7) species of Helminthes parasites were recovered and recorded accordingly, these include Raillientina echinobothrids (20%), Raillietina cesticullus(8%), Hymenolepsis Carioca (4%), Hymenolepsis diminuta (8%), solium (4%), ascaridia galli (4%) and the least cotugnia (4%) respectively. Finally, recommendations have been made on the improved management and veterinary hygiene of these chickens in a hygienic way.

1.0 INTRODUCTION

Helminthes also commonly known as parasitic worms are large multicellular organisms, which when mature can generally be seen with the naked eye. They are often referred to as intestinal worms, even though not all Helminthes lives in the intestines. For example schistosomes are not intestinal worms, but rather reside in blood vessels (Bhatt, *et al.*, 2012).

There is no clear consensus on the taxonomy of Helminthes, it is more of a commonly used term to describe contain worms with superficial similarities. These are flatworms (*Platyhelminthes*), namely cestode (tapeworm) and trematodes (liver flukes), and round worms or (nematode) all these are

parasitic worms and also Annelida, which are grouped as an ectoparasite like the leeches (Bhatt, *et al*., 2012).

Many, but not all, of the worms referred to as Helminthes belongs to the group of intestinal parasites. An infection by a helminthes is known as helminthiasis. The same naming convention applies to all Helminthes whereby the ending "asis" (or in veterinary science the ending "asis") at the end of the name of the worm is added to signify the infection with that particular worms, for example, Ascaris is the name of a particular helminth and ascariasis is the name of the infectious disease caused by *Helminthes*. (Matta 2010)

Helminthes are worm-like organisms living in and feeding on living hosts, receiving nourishment and protection while disrupting their host's nutrient absorption, causing weakness and disease. Those that live inside the digestive tract are called intestinal parasites. They can live inside humans and other animals in their adult form, Helminthes cannot multiply in hundreds. Helminthes are able to survive in their mammalian hosts for many years due to their ability to manipulate the immune defense by secreting immunomodulatory products. Helminthes ova (or eggs) have a strong shell that protects the eggs against a range of environmental conditions (Vijayakumar and Nadakal 2011).

Helminthes are group of organisms which share a similar form but are not necessarily related as part of evaluation. *Helminthes* include members of the following taxa; monogeneans, cestodes (tape worm), *nemat*ode (roundworm), and trematodes (flukes). The number of different *Helminthes* is vast, it is estimated to be around one million species. The *nemat*odes are the most diverse of all the *Helminthes* with the highest number of species. There may be as many as 300,000 species of parasites affecting vertebrates, and as many as 300 affecting humans alone. (Bhatt *et al.*, 2012).

Characteristics that are common for all *Helminthes* include:

Life cycle:

a) The life span of adult worms varies tremendously from one species to another but is generally in the range of 1 to 8 years. This life span of several years is a result of their ability to manipulate the immune defense of their hosts by secreting immunodulatory products.

b) *Helminthes* can be either hermaphrodite (i.e. can have both sexes in the same organisms), like tapeworms and the flukes (except the blood fluke which is not a hermaphrodite), or have their sexes differentiated, like the round worms.

Eggs:

a) All *Helminthes* produce eggs (also called ova) for production.

b) *Helminthes* eggs have a strong shell that protects them against a range of environmental conditions. This shell consists of three layers a lipoidal inner layer a chitinous middle years and outer proteinic layer.

c) Generally thousand or even hundreds of thousands of eggs are produced each time

the female worm deposits its eggs, a process called oviposition.

d) The frequency of egg deposition from an adult *Helminthes* is generally daily, or up to six times per day for some Taenia species.

e) Adult trematodes lay smaller numbers of eggs compared to cestodes or *nemat*odes. However, the egg develops into a Miracidia from which thousands of cercarie, swimming larvae develop. This means that one egg may produce thousands of adult worms.

f) *Helminthes* eggs remain viable for 1-2 months in crops and many months in soil, fresh water and sewage, or even for several years in feces, fecal sludge (historically called night soil) and sewage sludge a period that is much longer compared to other kinds of microorganisms.

Larvae:

a) Larvae hatch from these eggs (If the eggs are viable), inside or outside the hosts, depending on the type of *Helminthes* Life cycle of *Helminthes* differ in this and other specific aspects. Eggs that are no longer viable do not produce any larvae.

b) The larvae maturing in the host take from about two weeks up to four months depending on the *Helminthes* species (Gadzama, 2016).

AIM AND OBJECTIVES

The aim and objectives of this work is to

i. Investigate the prevalence of *Helminth*iasis in chickens (*Gallus domesticus*) slaughtered in Damaturu Main Market.
ii. Identity the *Helminthes* parasites.
iii. Asses the losses incurred as a result of *Helminthes* infection

2.0 MATERIALS AND METHODS

Materials: - The following materials were used

Apparatus

i. Petri- dishes
ii. Dissecting set
iii. Beakers
iv. Microscope
v. Microscope slide
vi. Dropper
vii. Conical flasks
viii. Coverslip
ix. 1-litre volumetric flasks
x. Surgical gloves
xi. Cotton wool
xii. Specimen's bottles

Reagents

i. Distilled water
ii. Normal saline
iii. 10% *formaldehyde*

Biological Specimen

i. Gastro-intestinal tract of chickens (*Gallus domesticus).*

Sampling

A total of 50 gastro-intestinal tracts of chickens (*Gallus domesticus*), 25 males and 25 females were collected from Damaturu main market at the rate of 10 samples per week.

Laboratory Examination

Each gastro-intestinal tracts was opened and examined separately and the content were kept in separate petri-dishes. The contents were repeatedly washed with water to cover embedded worms.

Counting

The parasite(s) in each gastro-intestinal tract were counted and recorded accordingly.

Preservation

The parasite(s) found in each gastro-intestinal tract were collected after counting, washed in distilled water and immediately dropped into formaldehyde, which fixed them in an extended state.

Identification

The parasite(s) that were preserved were identified using the keys described by (Troncy, 2013; Soulsby *et al.,* 2019).

3.0 RESULT AND DISCUSSION

Diversity of *Helminthes*

A total number of (50) intestinal samples were examined out of which (26) were found to be infected. The most common *Helminthes* identified were cestodes species, as indicated in the table below.

Table 1: *Helminthes* cestodes species

Date	No. of Chickens Male	Male Chickens	Female Chickens	No. of infected Chickens	No. of Uninfected Chickens	% of infected
10-11/7/2017	10	05	05	04	06	40%
12-13/7/2017	10	05	05	06	04	60%
14-17/7/2017	10	05	05	05	05	50%
18-19/7/2017	10	05	05	05	05	50%
20-21/7/2017	10	05	05	06	04	60%
TOTAL	50	25	25	26	24	

Table 3: showing the incidence of intestinal Helminthes found in male and female chickens

Date	No. of Male Chickens Observed	No. of infected Male	No. of Uninfected Male	Percentage % of infected	No. of Female Chickens Observed	No. of infected Female	No. of Uninfected Female	Percentage % of infected
10-11/7/2017	05	03	02	60%	05	01	04	20%
12-13/7/2017	05	02	03	40%	05	04	01	80%
14-17/7/2017	05	05	00	100%	05	00	05	0%
18-19/7/2017	05	02	03	40%	05	03	02	60%
20-21/7/2017	05	02	03	40%	05	04	01	80%
TOTAL	25	14	11		25	12	13	

Table 4: Showing the Helminthes Parasites Species Found in Chickens

S/N	***Helminthes*** **parasite species**	**No. of *Helminthes* parasites found in chickens**	**Percentage % of *Helminthes* found**
1	*Raillietina echinobothrids*	10	20%
	Raillietina cesticullus	4	8%
3	*Hymenolepsis diminuta*	4	8%
4	*Hymenolepsis carioca*	2	4%
5	*Taenia solium*	2	4%
6	*Ascaridia galli*	2	4%
7	*Cotugnia diagonopora*	2	4%

4.0 DISCUSSION

A total number of 50 gastro-intestinal tracts of chicken (*Gallus domesticus*) were collected from Damaturu main market, out of these (26) chickens were found to be infected which represents (52%). The gastro-intestinal tracts comprises of 25 male chicken's intestine and 25 female chickens intestines. Out of which the males were found to have the higher rate of infections with (28%) and the least with females (12%).

The commonest, of *Helminthes* parasite found in the chickens is *Raillietina echinobothrids. Raillientina echinobotharids* has the highest rate of species found with 10 infected chickens representing (20%) followed by *Raillientina Cesticillus* (80/0), *Hymenolepsis diminuta* (8%), *Hymenolepsis carioca* (4%), *Taenia solium* (4%), *Ascaridia galli* (4%)and *cotugnia diagonopora* with (4%) respectively.

5.0 CONCLUSION

In conclusion *Helminthes* infection is a common cause of all kinds of damage, hence they inflict a degree of damage to the domestic chickens which includes reduced egg production, pathological changes in the heart, lung, liver, intestine, pancreas and intercostal and thoracic muscles in chicken with natural infection.

Also most chickens with high worm burdens appear to weigh less than those having low worm burden, therefore reduces the meat value or price of these chickens. In view of this, therefore, *helminth*ic infection can cause serious damage to the domestic chicken (*Gallus domesticus*), reducing to the nutritional value of the eggs produced by chickens, and the meat derived from the chickens, therefore adequate measures should be taken to reduce and stop the prevalence of *helminth*ic infections.

6.0 RECOMMENDATION

Since the mechanisms of transmission of *helminth*iasis are easily found in the environment and these vectors are commonly found around every environment organisms such as Ants, flies, Earthworm, termites and other varieties of insects and organisms. Therefore, there is need for improved management in addition to proper veterinary attention, so as to achieve meaningful productivity of the local bread of chicken. For profitable poultry production in the avoid-zone therefore, a chemoprophylactic cover may be essential in order to minimize weight loss and drop in eggs production.

A routine deworming programme may be essential for large-scale poultry production in the arid-zone, so as to minimize weight loss and drop in egg production due to *helminth*iasis.

Proper feeding and watering hygiene (use of feeders and waters) should not be neglected, particularly to control parasites with a direct life cycle. Also rearing on grating reduces contact between poultry and certain vermin (Woodlice, Termites and Earthworm).

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Prevalence of Malaria Parasites among Peoples in Fika and Potiskum Towns in Yobe State

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ABSTRACT

Malaria is a disease that is widely common in tropic and sub-tropic countries of the world. The disease is easily preventable, treatable and curable but remain a major public health problem in the sub-Saharan tropic majorly due to high level of Illiteracy, couple with negative attitude of Government. The study investigate the prevalence of malaria parasites among people in Fika and Potiskum towns in Yobe state. The Prevalence of Malaria Parasite was assessed using Rapid Diagnoses Test (RDT) and gold standard methods. The results revealed that the prevalence of malaria parasite is commonly among the age group of 0 – 12 years, on the gender bases however, indicated that female has the highest prevalence with the total of 3,838 for Fika General Hospitals and Dog Nini Potiskum with 3,021 respectively. The study recommended that effective environmental sanitation, geared towards the clearing of bushes and gutters could substantially reduce the spread of vectors, hence reduce the incidence of malaria in endemic regions. Provision of adequate pediatric drug formulations, targeted preventive interventions, and treatment guidelines for young infants. Other suggested measures include District Health Office and health extension workers should be involved and to increase mosquitoes nets distribution in the community, the District Health Office should also focus on reducing or eradicating malaria breading sites by self-help group through community participation.

KEYWORDS*: Heamlysis, Anopheles mosquitoes, Merozoites, endemic, infanticide.*

1.0 INTRODUCTION

The malaria is a disease that is easily preventable, treatable and curable but remain a major public health problem. About hundred million clinical cases of malaria are reported yearly in the country. This situation is due primarily to inadequate and ultimately release of found meant for malaria control activities (NPC, 2006). Malaria adversely affects all age groups in rural and urban communities in Nigeria. Successful control of malaria will increase productivity, improve health, reduce school absenteeism, reduce poverty and facilitate the attainment of the sustainable development goals (SDGs). The term Malaria refers to as human disease that is caused by sporozoan parasites, genus Plasmodium in the red blood cells, which is transmitted by the bite of infected female Anopheles mosquitoes. Plasmodium are organisms that cannot survive outside of their hosts (Deffrey and Sachs, 2001; WHO, 2012).

Malaria is one of the world's most vital public health challenges compromising development in countries with high level of Illiterate and accounting for up to an overwhelming 2.7 million deaths per annum (Gardner *and Noor*, 2002). More than 3 billion people (~40%) reside in areas of the world where malaria is prevalent. As such, the disease is largely responsible for the poor economic growth of these areas, which further contributes to more cases of malaria (Korenromp, Tran and Saier, 2005). Malaria is a complicated disease and its spread may be attributable to a variety of factors such as ecological and socio-economic conditions, displacement of large population groups, agricultural malpractices causing an increase in vector breeding, parasite resistance to antimalarial drugs and vector resistance to insecticides.

In 1998, The World Health Organization (WHO) established a global partnership called Roll Back Malaria (RBM) in an attempt to halve the world's malaria frequency by 2010. Apart from RBM, a number of promising antimalarial drug and vaccine discovery projects have also been launched. This includes the Medicines for Malaria Venture (MMV) funded by a number of organizations including. The Bill and Melinda Gates Foundation, for the development of novel antimalarial. The latter has also contributed more than 300 million US dollars to the Malaria Vaccine Initiative (MVI) (http://www.rbm.who.int; WHO, 1998).

Malaria is a worldwide health problem where Sub-Saharan Africa being the worst hit (WHO, 2013). In Africa, malaria is not only a health problem but also a development problem (Gallup, Sachs and Mellinger, 2001). Studies within malaria endemic countries further suggest that economic growth is likely to go down by at least one percent due to this disease (Malaney *and Russel*, 2004).

This has pushed countries to allocate resources towards controlling or eliminating malaria. Concerted efforts that have been put in place include the use of insecticide-treated bed nets, indoor residual spraying for vector control,

chemotherapy and epidemic preparedness (Kokwaro, 2009; MOPHS, 2010).

However, the country is still far from eliminating the disease due to inadequate diagnostic equipment in health facilities, improper or non-use of insecticide treated nets (ITNs) and non-compliance with treatment regimes (Schantz-Dunn and Nawal, 2009). For example, in malaria endemic areas especially around the lake and Coastal regions, three out of five children under five years of age sleep under ITN while majority 9 out of 10 of these children in the endemic lake region sleeps in a home that has not been sprayed (Pathania, 2014b). Currently, early treatment with effective antimalarial drugs is the main life-saving intervention but treatment is threatened by the increasing resistance of parasites to the existing drugs (Laxminarayan *et al.*, 2006). The reason surrounding intensification of drug resistance emanates from inappropriate use of antimalarial drugs (WHO, 2015a).

The aim of the study is assess the prevalence of malaria among people of Fika and Potiskum towns of Yobe State.

2.0 CURRENT ANTIMALARIALS

Various drugs have been developed and used in the fight against malaria. As with the vaccines, antimalarials target different stages of the parasite life cycle within the human host and specifically interfere with processes that are essential to parasite survival. Eradication of malaria with the use of antimalarials is, however, continuously compromised by the increased prevalence of parasite resistance to the small amount of available commercial drugs. Figure 1 shows the different stages of the parasite life cycle and drugs that specifically target these stages of parasite development.

The pre-erythrocytic, asexual intra-erythrocytic and sexual exo-erythrocytic stages are shown. The different intra-erythrocytic phases of malaria parasite development are also given. Finally, drugs that have been used at each stage are shown in the dashed boxes (Chauhan, Srivastava, and Olliaro, 2001).

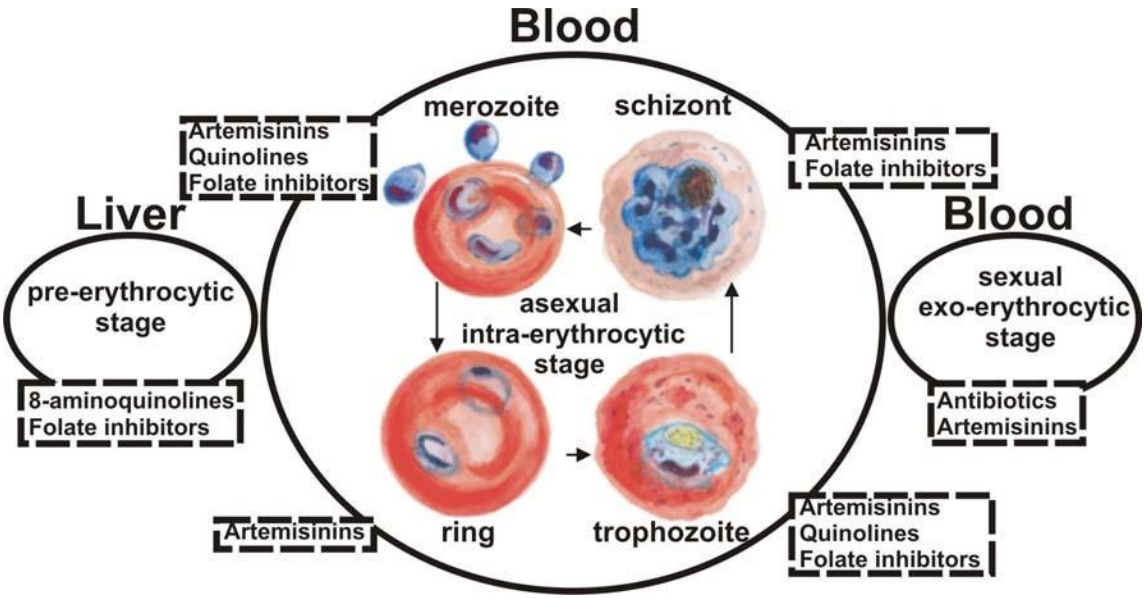

Figure 1: A schematic diagram of the parasite life cycle within the human host showing the targets of different antimalarials during the developmental stages. (Source: http://www.cdc.gov/malaria/about/ biology/index.html)

The Prevalence

(a) Malaria is a leading cause of morbidity and mortality in the developing world, especially in sub-Sahara Africa where the transmission rate is highest and considered as a major obstruction to economic development (Sacs and Malinet, 2002).

(b) Malaria is a disease which can be stopped and is a curable disease. It causative agent is plasmodium species. The parasite is transmitted throughout the world by a specific number of anopheles vector mosquitoes. It is basically an environmental disease since it requires specific habitat with surface water reproduction or adult mosquitoe survival and development rate of both the vectors and parasite population are influenced by temperature (Ceccata et al., 2005).

(c) There are various reason of continuation and re-emergence of malaria for example economic reason declining control programs and mosquitoes/parasite adaptation to pesticides drugs and environmental changes, all contribute or play a vital role in the development and increase of malaria disease. In some countries especially in Africa the movement of population for political or economic reasons create another dangerous factor to spreading of malaria similarly migrant and the refuges may be a new parasite to the area and increase transmission in settled population (Giada et al., 2003).

3.0 METHODS

a) Microscopy Method (Gold Standard)

A *thin film* was prepared by placing a drop of blood in the centre of a microscope glass slide and using the corner of a clean slide to

spread the blood to cover an area of about 10 mm^2. The slides was labeled using the respective patient numbers assigned at the laboratory. The slides was air dry and stained with 5% Giemsa's solution for 20 minutes, this was carried out for identification and quantitation of asexual *P. falciparum* species. The slides was rise under mild running tap water and allowed to air-dry. For the *Thick film*, a small drop of blood was placed at the centre of the grease free slide and spread with the edge of another slide in a repeated coil shaped to a diameter approximately 2cm. The slides was labeled and left horizontally while drying and was kept well to prevent them from dust and damage. It was stained using 5% Giemsa stain for 20 minutes and observed microscopically under X100 oil objective lens and result was record

b) Rapid Diagnostic Test (RDT)

A rapid lateral flow immuno chromatographic *in vitro* antigen detection test kit Histidine rich protein 2 *Plasmodium falciparum* (HRP2Pf) was used to detect malaria in patient's blood samples according to the manufacturer's instructions. About 5 µl of blood sample was collected using a micro-pipette provided, the whole blood was added into the "S" well and 60 µl assay buffer solution added to the "A" well and result was read after 20 minutes. The diagnostic sensitivity and specificity was determined according to World Health Organization standard, positive and negative predictive value was performed according to Manufacturer's recommendations.

4.0 RESULTS

The result of these study showed that the prevalence of malaria parasite among people attending general hospital and Dogo Niniward in Potiskum towns in Yobe State. The results were shown in Bar charts below:

4.1 Age distribution

Age distribution of the patients with prevalence of malaria parasite attending general hospital, primary healthcare in Fika and Dogo Niniward ward Potiskum towns**.** The age groups distribution for General hospital Fika was shown in figure 2 and Dogo Nini ward Potiskum was presented in figure 3.

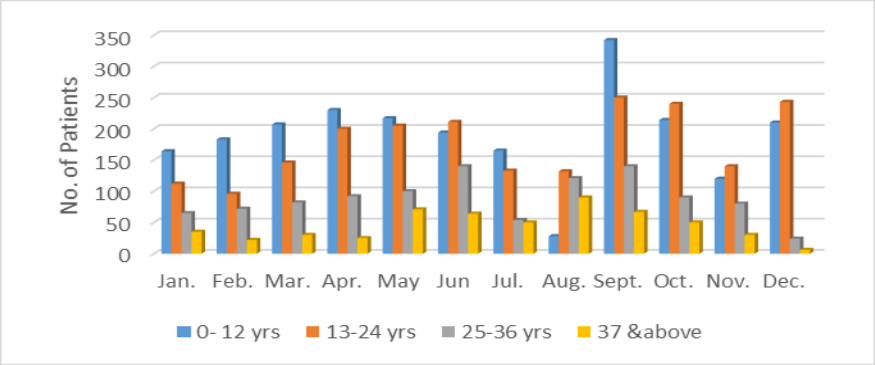

Fig. 2. Bar chart of Malaria parasites among people attending General Hospital Fika Town based on age groups from January to December, 2021

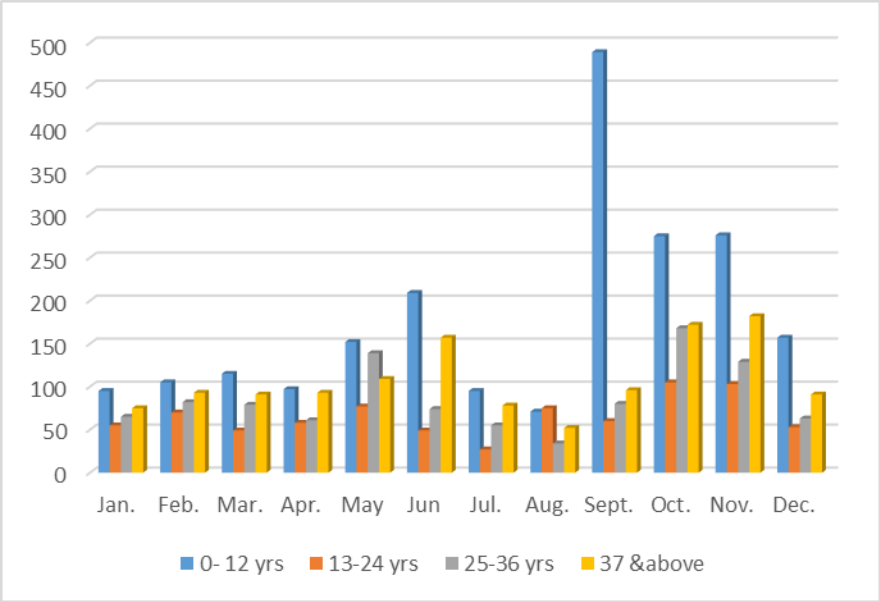

Fig. 3. Bar chart of Malaria parasites among people in Dogo Nini Potiskum based on age group from January to December, 2021

Gender Distribution of Patient with Prevalence of Malaria Parasite

Gender distribution of the patients with prevalence of malaria parasite attending general hospital, primary healthcare in Fika and Dogo Niniward in Potiskum towns. The *Gender Distribution* for General hospital Fika was shown in figure 4. and Dogo Nini ward Potiskum was presented in figure 5.

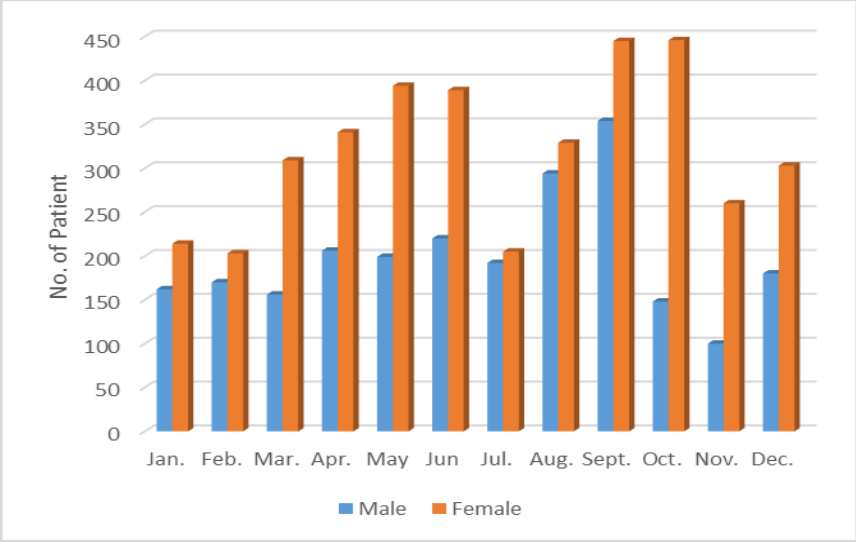

Fig. 4. Bar chart showing Malaria parasite among people attending General Hospital Fika Town based on gender from January to December, 2021

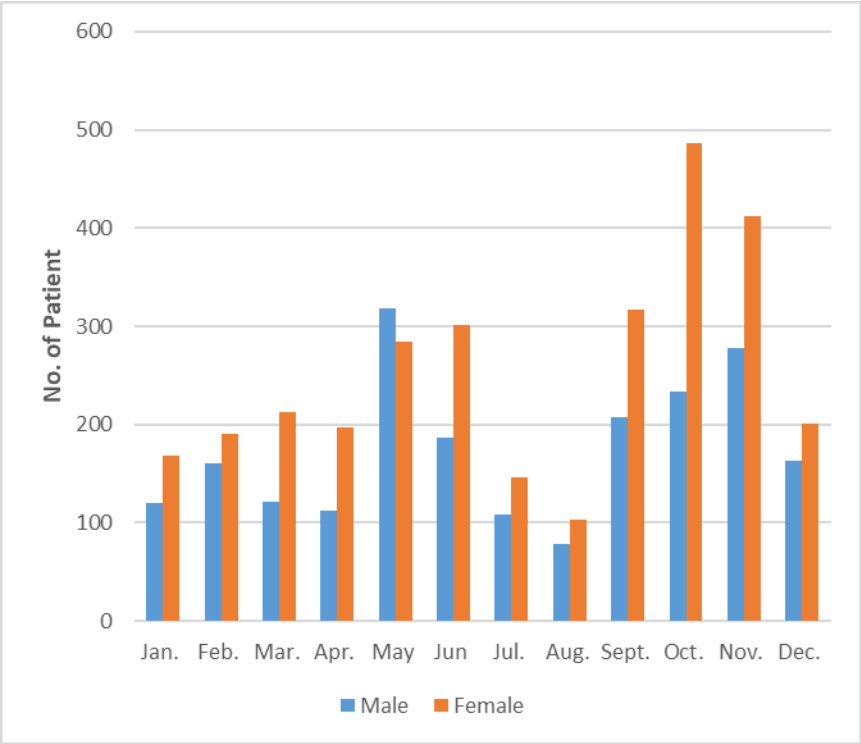

Fig. 5. Bar chart Showing Malaria parasite among people in Dogo Nini Potiskum based on Gender from January to December, 2021

5.0 DISCUSSION

Malaria is one of the world's most vital public health challenges compromising development in developing countries and accounting for up to an overwhelming 2.7 million deaths per annum (Gardner *et al.*, 2002). More than 3 billion people (~40%) reside in areas of the world where malaria is prevalent. As such, the disease is largely responsible for the poor economic growth of these areas (Korenromp, Tran, and Saier, 2005). Malaria is a worldwide health problem where Sub-Saharan Africa being the worst hit (WHO, 2013). In Africa, malaria is not only a health problem but also a development problem (Gallup and Sachs, 2001). Studies within malaria endemic countries further suggest that economic growth is likely to go down by at least one percent 1% due to this disease (Malaney *and Russel*, 2004), being the worst in sub-sahara Africa, this has pushed countries to allocate resources towards controlling or eliminating malaria. Concerted efforts that have been made including the use of insecticide-treated bed nets, indoor residual spraying for vector

control, chemotherapy and epidemic preparedness (Kokwaro, 2009; MOPHS, 2010).

The General hospital Fika based on the data collected from the study indicated that the prevalence of malaria parasite is commonly among the age group of 0 – 12 years children in the January to March account for the number of 554 of patients group, the age of 13 – 24 scored 354 patients, 25 – 36 years has a number of 219 patients, while the age group of 37 years and above has a total number of 87. The month of April to June has indicated that prevalence of malaria are commonly among the children age of 0 – 12 years with number of 641 patients, followed by 13– 24 years with a total number of 616 patients, the age group of 25 - 36 account the total number of 332 while the age group of 37 and above account for 160 patients. The month of July to September also indicated that malaria parasite are commonly the children age group of 0 -12 years which account the total number of 535 followed by the age group of 13 – 24 years which account the total 515, followed by the age group of 25 – 36 years which account 311 while elderly with age of 37 and above account the number of 207.

The study also indicated that in the months of October to December the prevalence of malaria parasite are commonly occurred among the children age group of 0 -12 years which account the number of 544, followed by the age of 13 – 24 years with the total number of 623, the age of 25 – 36 years which account the number of 194 while the age group of 37 years and above account the number of 86. The study also revealed that the prevalence of malaria parasite based on the gender, status indicated that female has the highest number with the total of 3838 while the male has a total number of 2,381.

Based on the result from the data collected from Dogo Nini Potiskum, the study revealed that the prevalence of malaria parasite is more affected among the age group of 0 – 12 years children in the January to March with the number of 315, while the age group of 37 years and above has a total number of 259, the age of 25 – 36 years has a number of 226 followed by 13 – 24 has followed with total number of 174. The month of April to June has shown that prevalence of malaria are commonly among the children age of 0 – 12 years with number of 458, followed by elder age group of 37 years and above with number 359, followed by 25 – 36 years with total number of 274 while 13– 24 years with a total number of 184. The month of July to September also Shows that malaria parasite are commonly among the children of age group of 0 -12 years which account the total number of 655, followed by the age of 37 and above account the number of 226, followed by the age group of 25 – 36 years which account 169 followed the age group of 13 – 24 years which account the total 162.

The study also indicated that in the months of October to December the prevalence of malaria parasite are commonly occurred among the children age group of 0 -12 years which account the number of 708, followed by the age of 37 years and above with total number of 445, the age of 25 – 36 years which account the number of 360 while the age group of 13 -24

years with a total number of 261. The study also indicated the prevalence of malaria parasite based on the gender as well as the status shows that female has the highest number with the total of 3021 while the male has a total number of 2,088.

5.1 Conclusion

Malaria, especially the predominant Plasmodium falciparum, is an important public health problem among the adult inhabitants of the study area. Males and those in the age group of 0–12 years are highly vulnerable groups for malaria positivity, and factors like travel history and availability of stagnant water around dwelling are the risk factors of occurrence, malaria prevalence is commonly in the month August and some in September.

The prevalence of malaria parasite observed in this study Dogo Nini revealed that malaria was still widespread in the study area. It was observed that malaria parasite was most prevalent between ages groups 0 - 12, but the difference between the age groups was not significant females had a higher prevalence of malaria infection than males. The prevalence of malaria is now becoming contagion especially in developing countries such as Nigeria. The issue of malaria has now become a major challenge for medical practitioners and this is becoming a public health concern.

5.2 Recommendations

The results obtained in this study areas should serve as a baseline for further treatment activities, particularly those months where the prevalence are obvious. Awareness to educate people especially the rural communities should be intensified. The vulnerable age group 0-12 years should use ITN and Spray of insecticides.

Therefore, during the implementation of malaria prevention and control activities, special consideration should be given to personnel who travel and work away from home.

The Health Office and health extension workers should be directed to work to increase mosquitos nets distribution in the community and focus on reducing or eradicating vector breading sites through community participation.

It is suggested that effective environmental sanitation, geared towards the clearing of bushes and gutters could substantially reduce the spread of Vectors, hence reduce the incidence of malaria in these regions.

Provision of adequate pediatric drug formulations, targeted preventive interventions, and treatment guidelines for young infants.

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Isolation of Bacterial Flora from Beans Cake Sold at the Commercial Area of Federal Polytechnic Damaturu, Yobe State

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ABSTRACT

Ten (10) samples of beans cake (Kosai or Akara) were collected from the Federal Polytechnic Damaturu environment to determine the bacteriological quality, level of concentration and to isolate and identify some of the organisms present in Kosai. 0.1mls of the Akara sample which is prepared by dissolving 5.0g of the sample in 10mls of sterile distilled water. The samples were spread plated on nutrient and macConkey agar and then incubated at 37^{o}C for 24 hours. The bacterial colonies were counted using a colony counter. The result revealed that the total microbial load range from 0.7 – 18.9X10^{3} cfu/g and the preliminary gram staining of the colonies revealed the presences of both gram positive and negative organisms in most of the colonies. Four organisms were identified from the colonies which include; Shigella spp (17.9%), Escherichia coli (28.50/0), Salmonella spp (17.90/0) and Staphylococcus aureus (35.7%) respectively. These isolates were commonly found to be the contaminants in food and water. Sources might be through handling, packaging and production process. Staphylococcus aureus which occurs in about 35.7% of the samples that were studied calls for more proper hygiene and handling as these isolate were known to cause infection even at a very low concentration. Base on this study one can deduce that the handling process is fairly good and is evident in the low amount of bacterial count and the absence of fastidious isolate such as Pseudomonas spp and also the limited number of isolated organisms. It's therefore recommended that proper hygiene and handling process be encouraged among the sellers and buyers of beans cake in oder to limit the chances of infections caused by these microorganisms.

1.0 INTRODUCTION

Food elaborated with satisfactory hygienic standards is one of the essential conditions for promoting and preserving health, and inadequate control is one of the factors responsible for the occurrence of food borne disease outbreaks (Oliveira *et al.,* 2016). Illness resulting from food borne disease has become one of the most widespread public health problems in the world today. The surveillance of food-borne disease outbreaks is fairly established in developed countries but in spite of that only less than 10% are recorded in official statistics. In case of developing countries, it could be even less than 1% (WHO, 2006). International studies have shown that a significant proportion of food borne diseases arise from practices in the kitchen of a home (Scoff, 2019; Bryan, 2017, Redmond and Griffith, 2004). Several studies assessing different kinds of consumer groups identified food prepared in the family home as a major source of food poisoning (Jay *et al*., 2018; Anderson *et al*., 2004).

There is an increasing tendency for the populace to patronize out-door foods also called snacks or "Take-away-foods" in the Polytechnic Campuses in particular and in the society at large. The term "Snack" is used to describe "High-Energy" foods such as crisps of all types, fried fish or meat, and even African delicacies such as "Akara" (fried beans cakes), "Moin-moin" (steamed bean pastry food), oil-fried ripe plantain (or "Dodo") etc. Snack foods are very popular worldwide especially among children and the working class. Furthermore, snack foods are increasingly becoming choice foods as a result of general food-shortages and poverty in the third world countries, (as a result of low income, which encourages expenditure of limited money on the often cheaper snacks); and urbanization influence which encourages more hours of work away from home.

Foods are usually contaminated with microorganisms as a result of inadequate preparation, unsanitary handling, ineffective storage, improper packaging and unsanitary exposure. According to Isara *et al.,* (2010) the prevalence of food contamination in the fast food restaurants in Benin in Nigeria, was found to be 37.5%, in which *Bacillus cereus* and *Staphylococcus aureus* were the most commonly isolated bacteria, while salad, meat pie and fried rice were the most commonly contaminated foods. Foods are easily contaminated as they serve as rich substrates for most microorganisms including different pathogens which could cause gastroenteritis and food poisoning. (Jay, 2005).

2.0 FOOD POISONING

Food poisoning syndrome results from ingestion of water and wide variety of food contaminated with pathogenic microorganisms (such as bacteria, viruses, protozoa, and fungi), their toxins and chemicals. Food poisoning must be

suspected when an acute illness with gastrointestinal or neurological manifestation affect two or more persons, who have shared a meal during the previous 72 hours. The term as generally used encompasses both food-related infection and food- related intoxication. Some microbiologists consider microbial food poisoning to be different from food-borne infections. In microbial food poisoning, the microbes multiply readily in the food prior to consumption, whereas in food-borne infection, food is merely the vector for microbes that do not grow on their transient substrate. Others consider food poisoning as intoxication of food by chemicals or toxins from bacteria or fungi (Sridhar, 2006).

2.1 Bacterial Etiology of Food Poisoning:

Food infections by bacteria can be divided into two types:

1. Those in which the food does not ordinarily support the growth of pathogens but merely carries them. E.g. Salmonella, Shigella, Vibrio etc.

2. Those in which the food can serve as a culture medium for growth of pathogens to numbers that can infect the person.

Food borne infections by bacteria can also be classified as toxication and food-infections. Intoxication, the toxins are released by bacteria such as *Clostridia*, *Bacillus* and *Staphylococcus species*. In food infections, the bacteria are ingested, which later initiate the infection.

Staphylococcus aureus

S. aureus is gram positive cocci that occurs in singles, pairs, short chains, tetrads and irregular grape like clusters. It is present ubiquitously in the environment, but only those strains that produce enterotoxin can cause food poisoning. Food is usually contaminated from infected food handler. The food handler with an active lesion or carriage can contaminate food. The incubation period is usually 1 -6 hours since the ingested food contains preformed toxin. The clinical features are sudden and characterized by vomiting and diarrhea, but no fever. The illness lasts less than 12 hours. There are no complications and treatment is usually not necessary.

Laboratory diagnosis: The presence of a large number of *S. aureus* organisms in a food may indicate poor handling or sanitation; however, it is not sufficient evidence to incriminate a food as the cause of food poisoning.

Staphylococcal food poisoning can be diagnosed if they are isolated in large numbers from the food and their toxins demonstrated in the food or the isolated *S. aureus* must be shown to produce enterotoxins. Dilutions of food may be plated on Baird-Parker agar or Mannitol Salt agar. Enterotoxin may be detected and identified by gel diffusion.

Escherichia coli

Escherichia coli are bacterium that is common, but certainly not the most abundant among bacterial, inhabitant of human intestine. It was also lives in the intestine of many other animals, wild as well

as domestic animals (USA FDA, 2002). Normally *Escherichia coli* do not cause disease; rather it is to serve a useful function in the body suppressing the growth of harmful bacteria species and by synthesizing appreciable amount of vitamins. Although some strains, causes diarrhea and it is the most common causes of urinary tract infections. Currently there are four recognized classes of entero virulent *Escherichia coli* that cause gastroenteritis in humans. Among these is the enterohemorrhagic (EHEC) strain designated as *E. coli* 0157:H7 is particularly virulent and has been responsible for several dangerous out breaks in people eating contaminated foods. According to US food and drug administration (2007), said that drinking water is tested for the presence of *E. coli* and related bacteria not because the bacteria are dangerous but because they are an indication of contamination by sewage, and m contain organisms like *Salmonella* that are dangerous. E. *coli* is the one of the most thoroughly studied living things (USA, 2007).

Diseases Caused By *Escherichia coli*

The disease caused by E. *coli* is characterized by severe cramping (abdominal pain) and diarrhea which is initially watery, but becomes grossly bloody, occasionally vomiting occurs. Fever either low grade or absent. Because E. *coli* lives in the intestine of humans, this has raised fear that genetically engineered version might escape from the laboratory (or factory) and takes up residence in human's producing a product that might be harmful, example it produce large quantities of one or more related, potent toxins that cause severe damage to the living of the intestine. These toxins (Vero toxin shiga-like toxin) are closely related or identical to the toxin produced by *Shigella dysentaniae* (Douglas, 2016).

Salmonella typhi

Salmonella typhi is a gram negative organism also, it is a rod-shaped, predominantly motile entero bacteria with diameters around 0.7-1.5ktm, length from 2-5ktm and flagella which grade in all direction (i.e peritrichous). They are chemoorganotrophs, obtaining their energy from oxidation and reduction reactions using organic sources, and are facultative anaerobes.

Most species produce hydrogen sulfate, which can readily be detected by growing them on media containing ferrous sulphate. Most isolates exist in two phases that is a motile phase I and a non-motile phase Il. Cultures that are non-motile upon primary culture may be switched to the motile phase using a cragic tube. *Salmonella* is closely related to the *Escherichia* genus and are found worldwide in cold and warm-blooded animals (i.e. including humans), and in the environment (Geidam, 2009).

Diseases Caused By *Salmonella typhi*

These diseases are caused by *Salmonella typhi*, they can cause illness like typhoid fever, pxch

I aratyphoid fever and food borne illness. The key to avoiding infection of

Salmonella typhi is prevention of fecal contamination in drinking water and food supplies. Since the only sources of thus agent are infected humans, it is possible to control transmission by proper hygiene, waste management, water purification and treatment of the sink. These measures are attained in developed societies attributing to the low incidence (Hensel, 2009).

3.0 METHODOLOGY

Sample Collection

Ten (10) samples each were collected from five different locations; Federal Polytechnic Damaturu and environs in well labeled plastic containers. The locations are Staff quarters (Q), Staff School (P), Main commercial area (A), Male Hostel (D) and Female Hostel (C).

Determination of Total Bacterial Count

0.1ml of each of the Akara sample were spread plated on nutrients and macConkey agar an incubated at 37ºC for 24 hours for determination of the total bacterial count all colonies were counted using the colony counter while the organisms with different morphologies on agar were isolated and sub-cultured for further identification.

Characterization and Identification of Organisms

Characterization was made by noting the morphological characteristics of the different isolates the agar plates. Physiological examination such gram's on as staining reaction and determination of motilities were all carried out to aid identification of the organisms. Biochemical tests such as indole, methyl red, Vosges Proskauer, catalase and coagulase tests were also carried out.

Motility

The medium (agar with concentration of 0.2-0.5) was inoculated with the test organism. A stab of each inoculate was made at the center of each tube. The tubes were incubated at 37ºC for 24 hours. The temperature was reduced for Pseudomonas. A diffused growth at the place of inoculation is considered as positive and restricted growth is considered as negative.

Indole Production

This was done by colorimetric reaction with P—Dimethylamino-benzaldehyde (Kovac reagent) to determine the ability of isolate to decompose the amino acid, tryptophan to indole. Peptone broth was prepared and dispensed in test tube and were inoculated with the isolate and incubated at 37ºC for 4 days. 0.5m1 of Kovac reagent was added to each tube shaking gently. Positive results were characterized with red alcohol layer.

Methyl Red

This was used to detect the production of sufficient acid during fermentation of glucose which is indicated by change in the color of the methyl red indicator. Isolates were inoculated into tube of previously prepared glucose peptone water and incubated at 37ºCfor 2 days. 5 drops of methyl red solution was added to each tube and color change was observed. Positive

results give red color while negative results give yellow with the indicator.

Voges-Proskauer

Tubes of glucose phosphate peptone water were inoculated and incubated at 37ºC for 2 days. 1ml of 40% KOH and 3m! of 5% solution of cz-naphtol in absolute ethanol was added to each tube. A positive result gives crimson color in 30 minutes.

Catalase Test

This test was performed in a test tube. 2m1 of 3% hydrogen peroxide was placed in a clean test tube. A sterile wire loop was used to pick a colony of the test organism and mixed with 2ml of 3% hydrogen peroxide in the test tube and observed for the production of gas bubbles which indicates a positive reaction.

Coagulase Test

The ability to liberate coagulase enzymes was tested by using human plasma. A loopful of human plasma was added to culture isolate on slide. Positive isolate give precipitation reaction with plasma, Test was also carried out at 37^0C for 24 hours. Positive tubes showed coagulation of the plasma in the tube.

4.0 RESULTS AND DISCUSSION

The study conducted on the microbial contamination of beans cake (kosai) revealed that the total microbial load range from 0.7-18.9 x 103cfu/g (Table l) and the preliminary Gram staining of the colonies revealed the presence of 'both Gram positive and negative organisms in most of the colonies. The organism with the highest frequency of occurrence taken as the baseline. Four (4) isolates were obtained which include; *Shigella spp* (17.9%), *Escherichia coli* (28.5%), *Salmonella spp*. (17.9%) and *Staphylococcus aureus* (35.7%) as indicated in Tables 2 and 3.

Table 1: Bacterial cell count and Gram staining of colonies

Sample	Bacterial Count (cfu/g)	Gram Stain Reaction
C1	1.6×10^3	Positive
C2	1.9×10^3	Positive
Q1	18.9×10^3	Negative
Q2	14.5×10^3	Positive
A1	9.2×10^3	Negative
A2	8.4×10^3	Negative
D1	0.7×10^3	Positive
D2	0.8×10^3	Positive

P1	2.0 X 10^3	Negative
P2	5.4 X 10^3	Positive

Table 2: Summary of the suspected microorganisms

Sample	Suspected Microorganisms
C1	*Staphylococcus aureus*
	Shigella spp
C2	*Escherichia coli*
	Shigella spp
	Staphylococcus aureus
Q1	*Escherichia coli*
	Staphylococcus aureus
	Shigella spp
Q2	*Escherichia coli*
	Shigella spp
	Staphylococcus aureus
A1	*Escherichia coli*
	Staphylococcus aureus
	Shigella spp
A2	*Escherichia coli*
	Shigella spp
	Staphylococcus aureus

Table 3: Summary of isolates frequency of occurrence

Organism	**Frequency**	**Percentage (%)**
Escherichia coli	8	28.5
Salmonella spp	5	17.9
Shigella spp	5	17.9
Staphylococcus aureus	10	35.7

5.0 CONCLUSION

In summary, microbial contamination of Kosai in the Federal Polytechnic Damaturu environs is low. The commonly isolated organisms determined are *Staphylococcus aureus* (35.7%) *Escherichia coli* (28.5%), while Shigella *spp* and *Salmonella spp* has (17.9%) each. These organisms can cause various and serious health problems. Proper hygiene and handling of the baked beans cake can help to limit the number of these organisms in baked beans.

6.0 RECOMMENDATIONS

From the work performed, the following recommendations are suggested:

1. Proper hygiene and handling process should be encouraged among the sellers and buyers of beans cake in order to limit the chances of infections caused by Microorganisms.

2. Further studies are to be conducted in oder to expand the coverage and also to identify the organism to their various strains and identify the toxins produced by them if at all any exist.

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An Assessment On the Utilization of E-Learning System in Teaching and Learning

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Abstract

Despite Women for Health, an NGO was committed to implementing E-learning in some Health Tertiary Institutions in Nigeria to strengthen their Education, the process seemed to be hindered by a number of barriers. Hence, this work aimed to assess the utilization of e – learning system in teaching and learning in order to determine the level of Teacher's and Learners' interest in utilizing E-learning system, the level of Teachers' and Students' competency in using E-learning system, and to find out the extent of e-learning system utilization. The sample size of the population was made up of 175 academic staff and students which were randomly selected in the institution. Data obtained was analyzed quantitatively. The instrument that was used in gathering data was questionnaire. Some of the findings showed that the teachers and the students had interest in utilizing E-learning as the mean was above 2.5; they had competency using the e-learning materials as their mean was also above 2.5 except item 12 which was rejected because it was below 2.5; but their extent towards utilization of the platform was not that good. Based on the findings of the study, recommendations were made to encourage the use of e – learning infrastructures to foster teaching and learning in the college. The college should as matter of its significance be organizing in house training for lecturers and students. Government should provide other necessary equipments for e-learning to colleges to enable them put in place necessary ICT infrastructures that will facilitate teaching and learning.

Keywords: e – learning, utilization, teaching and learning

1.0 INTRODUCTION

E-learning is among the most educational challenges of nowadays in Africa. To be able to tackle the challenges, teachers and students need not just to be computer literate, but also to develop skills in manipulating computer and other Information and Communication Technologies (ICTs) into their teaching and learning programs. E-learning as part of Student Centered Learning as opposed to Traditional Method of Teaching has become a wide range of applications in terms of

content, technology and services in other to enhance individual and organizational performance in educational line globally. According to Commission on Technology and Adult Learning (2001), e-learning refers to the use of ICTs to enhance and support teaching and learning processes. It is the instructional content or learning experiences delivered or enabled by electronic technologies and it incorporates a wide variety of learning strategies and technologies. E-learning ranges from the way students use e-mail and accessing course work online while following a course on campus to program offered entirely online.

Erah (2006) stated that e- learning refers to computer – enhanced training as opposed to the computer – based training of the 1980s. It is usually delivered in a personal computer and includes learning delivered by other communication technologies. To him, e – learning is an approach to facilitate and enhance learning through both computer and communication technologies.

Ogbu & Onele 2016 assessed the level of usage of Information and Communication Technologies (ICT), in teaching and learning of electrical and electronic subjects in Ebonyi State technical colleges. Specifically, the awareness of ICT components among teachers and students, the availability of ICT resources to the technical colleges, the extent of usage of ICT among teachers and students and the application of ICT to school teaching and learning were studied. Four research questions and two null hypotheses guided the study. Population of the study was 437 comprising of 48 teachers and 389 electrical and electronics students of the four technical colleges in Ebonyi state. Due to population size, all the teachers were sampled while simple random sampling technique was used to select a total of 130 students from the three senior classes of the four technical colleges. A five-point Likert type questionnaire was used for data collection. Mean statistic and standard deviation were used to answer the research questions while t-test and analysis of variance were used to test the null hypothesis at a 0.05 level of significance. Results showed that ICT were not fully utilized in the teaching and learning of electrical and electronic subjects in Ebonyi state.

Gabadeen, Alabi & Akinnubi, (2015) examined the adequacy of the available e-learning technological tools, their accessibility and utilisation at the Nigerian public senior secondary schools. The study adopted a descriptive survey method to collect data on available, accessible and utilised e-learning technology tools for secondary schools, using a questionnaire entitled "E-Learning Technologies Questionnaire" ELTQ. The findings of the study revealed that e-learning technologies were relatively available to the teachers and students, reasonably accessible and adequately accessible to students and teachers, respectively, and fairly utilized by both. There was no significant difference in the accessibility and utilization of the e-

learning technologies between the teachers and the students.

Bupo & Ndinech, (2015) investigated the utilization of e-learning among business education students in Anambra State tertiary institutions. Two research questions were posed and two hypotheses formulated. A total of 1603 business education students in four tertiary institutions in Anambra State made up the population of the study, out of which 320 students were used as sample. Mean rating and z-test were used for data analysis. The results showed that students often searched for educational materials online and checked results online; they fairly often read e-books and e-journals, teleconferenced with classmates during group work, send feedbacks to lecturers via emails and undertake courses on the internet. It was recommended, among others, that learning management systems should be introduced in the tertiary institutions and business education lecturers should make their books in the e-book format so as to encourage students' utilization.

Abbas, Alhassan & Hamza, (2015) addressed the issue of utilization of the available e-learning technologies by the academics of the college and provided answers to the following "To what extent do Academics find it easy to learn how to use e-learning technologies for teaching? To what extent do the Academics understand how the e-learning technologies work? To what extent do the Academics use e-learning technologies in the college? Survey research method was used for the study. The population of study comprises of 200 Academics across the Federal college of Education Zaria. The study discovered that there were availability of some of the e-learning technologies in the college, and most of the academics do not know how to use the e-learning technology for teaching, and learning: Only few of the academics use the e-learning technologies for teaching, they mostly use the technologies for entertainment.

Osuafor & Emeji, (2015) investigated the availability and utilization of e-learning facilities by science teacher educators in teaching pre-service teachers in South-East Nigerian Colleges of Education. One hundred and sixty-seven (167) science teacher educators participated in the study. A researcher developed fifty five-item questionnaire with reliability co-efficient of 0.87 was used to collect data. Four research questions guided the conduct of the study. Data were analyzed using mean and standard deviation. Results show that some of the listed e-learning facilities were available for teaching science in Nigerian Colleges of Education to a high extent. On the average however, most e-learning facilities were available to a moderate extent. Results also revealed that science teacher educators use e-learning facilities to a moderate extent. High cost of computer units, lack of prior knowledge on the part of the students on usage of computers, low browsing speed resulting to wastage of payer's money and unavailability of some e-learning facilities due to poor funding are

some of the factors that contribute to poor usage of e-learning facilities.

Atsumbe, Raymond, Enoch & Duhu, (2012) investigated the availability and utilization of e – learning infrastructures in Federal University of Technology, Minna, and determined the level of ICT implementation. The population of the study was made up of 382 students and 182 lecturers randomly selected from the four schools of the institution. Data obtained was analyzed using mean and t-test. Some of the findings revealed that e- learning infrastructures are not adequate in the university for teaching and learning and management's efforts towards the development of Information and Communication Technology (ICT) is mainly for administrative purposes. In addition, lecturers and students both have computers and laptops and can access the internet but, they do not use them for teaching and learning.

Nwana, (2012) revealed that e-learning in education is the wholesome integration of modern telecommunication equipment, particularly the internet into the education system. Furthermore, the main purpose of e-learning is to transform the old methods and approaches of curriculum implementation in order to bring about certain changes in the behaviour of the learners and the extent to which the changes take place.

2.0 RESEARCH QUESTIONS

i. What is the level of Teacher's and Learners' interest in utilizing E-learning system?

ii. What is the level of Teachers' and Students' competency in using E-learning system?

iii. What is the extent of e-learning system utilization?

3.0 METHODOLOGY

The design adopted in this study was descriptive survey research design. A sample size of 175 lecturers and students were sampled randomly and used as respondents for the study. A structured questionnaire was used to obtain data from respondents for the study. The instrument was submitted to the experts for both face and content validation, and ethical clearance was obtained from the research and ethics committee.

4.0 RESULT

Table 5: Distribution of Respondents Based on Gender

Gender	Frequency	Percentage (%)
Male	11	28.94
Female	27	71.05
Total	**38**	

The table above indicated that the percentage for male and female were 28.92% and 71.05% respectively

.**Research Question 1:** What is the level of Teacher's and Learners' interest in utilizing E-learning system?

Key: Strongly Disagree (SD), Disagree (D), Agree (A), Strongly Agree (SA)

Table 6: Responses Research Question 1

S/N	Items	SA	A	D	SD	X	Remark
1.	I need to be knowledgeable in using E-learning system to simplify my academic activities that are appropriate for teaching and learning.	27	9	2	0	3.66	Accepted
2.	Selecting information resources that are well-organized for use is needed for E-learning system.	15	23	0	0	3.39	Accepted
3.	I need to be e-learning system literate to search for information relevant for learning in multiple sources in a directed and reflective manner	21	15	1	1	6.32	Accepted
4.	Becoming literate in using E-LEARNING SYSTEM to select information classification scheme that allows efficient storage is needed.	13	23	1	1	3.26	Accepted
5.	I need be E-LEARNING SYSTEM literate to recognize and treat confidential or sensitive information appropriately	22	15	0	1	3.53	Accepted
6.	I need to be E-LEARNING SYSTEM literate to customize the presentation of information needed.	17	19	2	0	3.40	Accepted
7.	Citing appropriate sources is one of the fundamental parts of E-learning system	17	14	6	1	3.23	Accepted

In table 2, the objective one indicated that all the items were accepted because their mean are above 2.5. This shows that teachers and students were having interest in utilizing e-learning.

Research Question 2: What is the level of Teachers' and Students' competency in using E-learning system?

Table 7: Responses Research Question 2

S/N	Items	HC	C	BK	NC	X	Remark
8	I am capable of connecting the computer system and its peripherals.	9	12	14	3	2.7	Accepted
9	I am capable of booting the computer.	15	13	6	3	3.1	Accepted
10	I have adequate keyboard skills.	11	10	12	4	2.8	Accepted
11	I can use Microsoft Office Suite Application i.e. MS Word, Ms Excel, Ms PowerPoint, Ms Excel etc.	16	11	8	3	3.1	Accepted
12	I can set up a printer and print document.	8	12	3	15	2.3	Rejected
13	I can use internet and Email Services.	15	14	9	0	3.2	Accepted

Key: Highly Competent (HC), Competent (C), Basic Knowledge (BK), and Not Competent (NC)

In table 3, the objective two indicated that all the items were accepted because their mean are above 2.5 except item 12 in which it was rejected because it was below the mean 2.5. This shows that teachers and students were competent in manipulating computer as well as using internet and email services; but they did not have competency in setting up a printer.

Research Question 3: What is the extent of e-learning system utilization?

Table 8: Responses Research Question 3

S/N	Items	Always	Usually	Rarely	Never
14	I use computer and its peripherals for Teaching and learning	6	14	16	2
15	I use E-LEARNING SYSTEM for Teaching and learning	3	14	17	4
16	I use E-LEARNING SYSTEM for Finding and accessing information and educational materials	6	16	11	5
17	I use E-LEARNING SYSTEM for Making presentation	5	9	15	8
18	I use E-LEARNING SYSTEM for Preparing lessons/notes.	6	6	14	12
19	I use E-LEARNING SYSTEM for Communicating with teachers/students in assessment.	4	5	15	15
20	I use E-LEARNING SYSTEM for Communicating with other teachers/students for academic discussion.	2	8	11	18
	Total	32	72	99	64

The extent of utilization of E-learning as shown in the table above was that those that were rarely utilizing the plat form had the highest number followed by those that were usually utilizing having 72 responses, then, 62 respondents said that they never utilize the system. Only few respondents as compared to the remaining that were always utilizing the plat form.

In addition, the table above was analyzed using its item each as follow:

Item 14: I use computer and its peripherals for Teaching and learning

Table 9: Responses Research Question 1

Responses	Frequency	Percentage (%)

Always	6	15.79
Usually	14	36.84
Rarely	16	42.11
Never	2	5.26
Total	38	

Table 5 showed that 15.79% of teachers and students always used computer and its peripherals for teaching and learning, 36.84% usually used, 42.11% rarely used while 5.26% never used computer and its peripherals in teaching and learning.

Item 15: I use E-LEARNING SYSTEM for Teaching and learning

Table 10: Responses Research Question 5

Responses	Frequency	Percentage (%)
Always	3	7.89
Usually	14	36.84
Rarely	17	44.74
Never	4	10.53
Total	38	

Table 6 showed that 7.89% of teachers and students always used e-learning system for teaching and learning, 36.84% usually used, 44.74% rarely used while 10.53% never used the platform.

Item 16: I use E-LEARNING SYSTEM for finding and accessing information and educational materials.

Table 11: Responses Research Question 6

Responses	Frequency	Percentage (%)
Always	6	15.79
Usually	16	42.11
Rarely	11	28.96
Never	5	13.16
Total	38	

Table 7 showed that 15.79% of teachers and students always used e-learning for finding and accessing information and educational materials in teaching and learning, 42.11% usually used, 28.96% rarely used while 13.16% never used it for finding and accessing information and educational materials in teaching and learning.

Item 17: I use E-LEARNING SYSTEM in making presentation.

Table 12: Responses Research Question 7

Responses	Frequency	Percentage (%)
Always	5	13.51
Usually	9	23.68
Rarely	15	40.54
Never	8	21.62
Total	37	

The above table showed that 13.51% of teachers and students always used E-learning for making presentation for teaching and learning, 23.68% usually used, 40.54% rarely used while 21.62% never used it for making presentation.

Item 18: I use E-LEARNING SYSTEM in preparing lessons/notes.

Table 13: Responses Research Question 8

Responses	Frequency	Percentage (%)
Always	6	15.79
Usually	6	15.79
Rarely	14	36.84
Never	12	31.58
Total	38	

The above table showed that 15.79% of teachers and students always used E-learning platform for preparing lessons/notes in teaching/learning, 15.79% usually used, 36.84% rarely used while 31.58% never used it for preparing lessons/notes in teaching/learning.

Item 19: I use E-LEARNING SYSTEM for Communicating with teachers/students for assessment.

Table 14: Responses Research Question 9

Responses	Frequency	Percentage (%)
Always	4	10.26
Usually	5	12.82
Rarely	15	38.46
Never	15	38.46
Total	39	

Table 10 showed that 10.26% of teachers and students always used E-learning platform in communicating with teachers/students for assessment in teaching and learning, 12.28% usually used, 38.46% rarely used while 38.46% never.

Item 20: I use E-LEARNING SYSTEM for Communicating with other teachers/students for academic discussion.

Table 15: Responses Research Question 10

Responses	Frequency	Percentage (%)
Always	2	5.13
Usually	8	20.51
Rarely	11	28.21
Never	18	46.15
Total	39	

The above table showed that 5.13% of teachers and students always used E-learning platform in communicating with teachers/students for academic discussion,

20.51% usually used, 28.21% rarely used while 46.15%.

5.0 CONCLUSION

In summary, the researcher aimed in assessing the utilization of e-learning among Academics and students, and the outcome of the research showed that the teachers and the students had interest in utilizing e-learning as the mean was above 2.5; they had competency using the e-learning materials as their mean was also above 2.5 except item 12 which was rejected because it was below 2.5; but their extent towards utilization of the platform was not that good. It was shown that the teachers and the students were eager to utilize the platform despite they were lacking some materials/equipments by their side, and they had e-learning materials belong to them or owned by the management of the college like computer, scanner, printing materials and internet accessories etc. And it also showed that they were competent in manipulating the e-learning materials except the use of printing materials. Recommendations were made to encourage the use of e – learning infrastructures to foster teaching and learning in the college. The college should as matter of its significance be organizing in house training for lecturers and students on the use of ICT for teaching and learning especially the new ones. Government should provide laptops and other necessary equipments to colleges to enable them put in place necessary ICT infrastructures that will facilitate teaching and learning. Lastly, the future research in the aspect of this work that has not been covered needs to be done.

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Appraisal of Health and Safety Management of Construction Workers on Site in Damaturu

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Abstract

Construction industry is an important part of the economy in many countries and is often seen as a driver of economic growth especially in developing countries. Owing to its relatively labour intensive nature, construction works provide opportunities for employment for a wide range of people; skilled, semi-skilled and unskilled. Despite its importance, construction sites are considered risky with frequent and high accident rates and ill-health problems to workers. This study examined the health and safety management of construction workers on site in Damaturu. Questionnaires containing information relating to health and safety management at site were used for the collection of data. Mean Score Index was the statistical tool used, decision point was put at 2.0. The result revealed that there was low level of health and safety compliance among building construction workers with average mean score of 1.54 and the impact of accidents and injuries to the progress of the construction and family of the employee was high with average mean score of 2.10. It is also found that the factors influencing the implementation of the health and safety measure are: Health and Safety management policy, Training of employee on health, safety and management guideline, Leadership and management commitment, Health and safety committee and budgets for Health and Safety. The study recommends use of more proactive and integrated management mechanism to enforce the existing safety and health regulations in construction sites in Damaturu in order to prevent accidents, injuries and ill health on sites and construction work to progress.

1.0 INTRODUCTION

Health and safety management has a high responsibility, especially in construction industry since it is one of the huge sectors among other industrial sectors. Moreover, it has large number of workers and those workers need to be controlled by administrators such as managers, contractors and site engineers. Therefore, it is important to train and educate the novice engineers and workers and have health and safety plan and also follow the safety regulations to reduce the expected and unexpected accidents on construction sites.

Construction site is a very important place, as a considerable number of workers are involved in construction activities. Employments in construction site can be categorized into three groups; "Management and technical" work force, "Skilled" work force and "Semi-skilled and Unskilled" work force. Personnel with high educational qualifications, usually graduates, trained to design, manage and instruct the construction processes can generally be identified as "Management

and technical" work force. Persons who possess extensive knowledge and experience in their construction activities or profession are identified as "Skilled" work force. "Semi-skilled and Unskilled" work forces are the site labourers with little or no construction knowledge. Generally, all skilled, semi-skilled and unskilled workers are at risk of being injured, death or various illnesses in a construction site, although the level of risk varies with activities they are engaged in (Vitharana, 2015).

Pungvongsanuraks, Thitipoomdacha, Teyateeti and Chinda, (2010) elicited that construction industry is unique and complex compared with other industries and it contains a wide range of construction materials and products, building services, manufactures, contractors, sub-contractors, design operation, and refurbishment services. These complexities make the construction industry as one of the most hazardous industries that causes high rate of accidents. Safety in construction sites is needed to be highly considered in order to reduce the risk of being injured at work. Safety, health and welfare on construction sites", the training manual published by the International Labour Office in Geneva (2012), states that high rate of accidents occurs in the construction industry than in the other manufacturing sector.

Nigeria is enjoying relatively strong growth in construction activities, efforts towards ensuring improved safety performance have yielded minimal results. The enforcement of safety regulations is not widespread within the industry (Okoye *et al.*, 2016). More construction workers are killed, injured or suffers ill health than in any other industry (European Agency for Safety and Health at Work, 2004). It is however, disheartening that despite several efforts towards improving the health and safety status of Nigeria construction industry, continuous increases in the number of accidents both reported and unreported on construction sites still go unabated. Furthermore, Nigeria has a very high accident record attributable to lack of effective monitoring, reporting and control practices. Thus, occupational health and safety in construction work should start at the designing table and continue throughout the construction phases until the safety and health of end users is ensured due to the complexity of the industry and the hazards it contains (Kayumba, 2013).

As a state on transition, Yobe State is one of the few states in Nigeria that is witnessing tremendous infrastructural development especially with respect to building projects. Almost all these projects are being handled by the local Company, contractors and construction workers. Thus, the issue of whether these workers are complying adequately with health and safety issues and whether they comply with health and safety rules and guidelines on site come to fore.

Like in every other business environment, construction business should be guided by certain regulations to ensure health and safety of its workers. According to (Adebola, 2014) safety and health have become an integral component in the workplace as employers, labour unions and others engage in trainings and procedures to ensure compliance with

safety standards and also to keep a healthy workforce. These therefore forms the gab of this work which aimed at appraising the health and safety management of construction workers on the site in Damaturu, with the following objectives.

Objectives of the Study

1. To examine the level of health and safety compliance in the construction site.
2. To determine the factors that inhibit the compliance of health and safety measures at construction site.
3. To determine the factors influencing implementation of health and safety measures in the construction sites.

Overview of the Study Area (Damaturu)

Damaturu is a Local Government Area in Yobe State in northern Nigeria. Yobe's headquarters are in the town of Damaturu, the state capital. The postal code of the area is 620 with coordinates of 11° 44′ 40″ N, 11° 57′ 40″ E. The Local Government Area has an area of 2,366 km² and a population of 88,014 at the 2006 census. The town lies in a plains region that is covered by savanna and that supports crops of millet, sorghum (Guinea corn), and peanuts (groundnuts). The occupations of Damaturu people are mostly civil services, farming and business.

Figure 1: Overview of Damaturu Local Govt Area

2.0 LITERATURE REVIEW

Health and Safety Management System

Health and safety management system means the part of the Organisation's management system which covers: the health and safety work of organisation and policy in a company, the planning process for accident and ill health prevention, the line management responsibilities and the practices, procedures and resources for developing and implementing, reviewing and maintaining the occupational safety and health policy (Famakin and Fawehinmi 2012). The system should cover the entire gambit of an employer's occupational health and safety organization.

Occupational Health and Safety (OHS) is a very sensitive management responsibility that influences the very survival of organizations in some extreme cases. That is to say that construction projects do not operate independently of the society in which they are located (Neale, 2013). Thus, the emergence of new regulations, laws, standards and codes has also made many construction organizations to improve their safety performance. (Agwu, 2012) took safety management as a performance- oriented approach to construction safety that gives an organization a sustainable competitive advantage in the global marketplace by establishing a safe work environment that is consistent with peak performance and continuous improvement through the integration of all aspects of construction safety (intention, behaviour, culture and process).

Health and Safety can be viewed as a point at which all associated risks with a particular job are well managed in a reasonable manner. Ahmad *et al.,* (2016) defined safety as unique event that is paramount to continuous attainment of productivity. In the same vein, Ahmad *et al.,* (2016) opined that safety focus on curbing accidents at work setting and its negative effect on the workers in all manner. Assessment of various researchers such as: Idubor and Oisamoje (2013); Dodo (2014); and Umeokafor et al., (2014); on provisions and management of health and safety in construction project reveals that adoption and compliance with health and safety provision served as catalyst in optimizing construction production process.

Adeogun and Okafor (2013) report that in Nigeria the perspectives of most industries and organisations show that the stage of occupational health and safety is still at infancy in the country due to employer/employee attitudinal behaviour, lack of safety culture and non-implementation of OHS policies. In addition, only big multinationals recognise occupational health and safety and run the policies as constituted in their parent countries of origin (Adeogun and Okafor 2013).

Meanwhile a typically effective safety management system should encapsulate the actions managers at all levels take in order to create an organisational setting in which workers will be trained and motivated to perform safe and productive construction jobs (Olutuase, 2014). Al-Kilani (2011) suggests that safety management must be thorough, and it must be applicable to all aspects of the job, from the estimating phase of the project until the last worker has left the premise at the completion of the project.

Construction Health and Safety Knowledge

Safety knowledge encompasses awareness of occupational health and safety risks, including an evaluation of occupational health and safety programmes in an organisation (Akinwale and Olusanya, 2016). Sources of safety knowledge according to (Akinwale and Olusanya, 2016), include incident investigation, teamwork, collaborations, and survey of

safety culture. Problem solving entails specific decisions on occupational health and safety risks in an organisation. This implies decision-making for the maintenance of occupational health and safety.

The role of trainings in promoting health and safety has also been highlighted by Idubor and Osiamoje (2013), and Kumar and Bansal (2013) argue that effective safety knowledge among construction professionals can reduce accidents that directly or indirectly reduce project cost, because in developing countries, safety rules usually do not exist, and if exist; regulatory authorities are unable to implement such rules effectively. The above view is supported by (Kamar, Salleh, Mamter and Suhaimi, 2014). On this basis, (Idoro, 2008) infer that safety learning should not only be considered as an acquisition of knowledge through instructions and training in classrooms or other formal settings rather safety should be considered as the final outcome of a dynamic and collective construction process. In this case, a safe workplace is the result of constant engineering of diverse elements, such as knowledge and skills, equipment, and social interactions, which are integral to the work practices of various project stakeholders.

Health and Safety Practices in Construction Industries

The occurrence of risk in the construction industry has become a must encounter and as such requires proper identification, analysis and management to create a relatively conducive construction environment by improving the health and safety of the workers on site (Okechukwu, 2014). Health and safety at construction sites deals with both physical and psychological well-being of workers on sites and other persons whose health is likely to be adversely affected by construction activities on site (Kheni, 2008). Construction industry has many sub-sectors ranging from simple housing to major high-rise buildings as well as bridge, road, tunnel, and even under water construction; each of these sectors has its distinct hazard and risks determined by the peculiarities of its construction process irrespective of the project delivery (Ahmed & Mahmud, 2012). The twenty-first century construction is marked by rapid execution of projects and the extensive use of machinery and mechanized production processes. However, despite a relatively large pool of construction machines and mechanism as well as high level of prefabrication in building construction and installations, the proportion of manual labour remains approximately 50% (Okechukwu, 2014). In all over the world, construction workers are greatly exposed to death and injuries than workers in other occupations.

Construction Health and Safety Regulations

Nigeria like any other country in the world, health and safety regulations governing the construction industry and other work related industries exist. A number of legislations on occupational health and safety exist. These include; Labour Act of 1974 modified to Labour Acts 1990, and updated to Labour Act, Cap L1, Laws of the Federation of Nigeria (LFN), 2004; the Factories Act of 1987

which became effective in 1990 and later updated to Factories Act, Cap. F1, LFN, 2004 (FGN, 1999), (FRN, 2004); the Workman's Compensation Act of 1987 which became effective in 1990, modified to Workman's Compensation Act, Cap W6, LFN, 2004 and repeal to Employee's Compensation Act, No. 13, 2010 of the laws of the Federation of Nigeria (FRN, 2010), the Insurance Act, 2003 (FRN, 2003).

The Federal Ministry of Labour and employment is saddled with the responsibility of enforcing the Factories Act and Employee's Compensation Act, while the Labour, Safety, Health and Welfare Bill of 2012 empowers the National Council for Occupational Safety and Health of Nigeria to administer the proceeding regulations on its behalf. In the developed countries such as UK, USA, Australia, Singapore and Germany, these regulations are well developed and functional. However, despite being among the countries that signed the occupational health and safety law in the Geneva Convention of 1981, the pathetic health and safety situation in Nigeria construction industry still pervades.

In spite of numerous statutory provisions and expectations in Nigeria, gap still exist in health and safety management (Diugwu, Baba and Egila, 2012). Adeogun and Okafor (2013), contend that these acts are not being enforced in Nigeria as evidenced from the reports of unhealthy exposure to risks of workers and employees in various organisations. Kolo (2015) further observes that some provisions from these laws do not necessarily meet the conditions experienced in Nigeria.

Health and Safety Compliance in Construction Industry

Safety compliance refers to the state of being in accordance with established safety standards and regulations, or the process of becoming so. Safety compliance is regulated by safety compliance companies or organizations, as well as government legislation, and is monitored and enforced by these bodies to ensure compliance with the established standards. Businesses or companies in all industries must comply with safety regulations that are relevant to their industry (Safeopedia, 2017). According to (Idubor and Osiamoje 2013), lack of strict enforcement of OSH regulations enables non- compliance to OSH regulations; while (Okeola, 2009) state that non-compliance to OSH regulations is a major contributor to the poor state of OSH in Nigeria. On the other hand, OHS measures are said not to be effective in improving safety and health conditions in workplace (Kamau, 2014).

3.0 METHODOLOGY

This study was a Descriptive survey and observation research which made use of questionnaires containing well-structured preformatted set of information on health and safety management of construction workers' on site and a critical observation. Almost all construction works going on in Damaturu are being handled by the local company, contractors and construction workers. Though there were more than fifty construction projects going on in Damaturu at the time of this study, only six (6) construction sites were selected based on the nature of the project, the

scope of the project, the organisation of construction site, variety of construction workers involved, the stakeholders involved in the project and the location of the project. Majority of construction projects in the town were privately owned residential building projects with the owner being the contractor and involving few construction workers usually coming to work when their services were demanded. Secondly, majority of these projects were not organised and do not have regular construction activities going on in them. The questionnaires were administered to 65 construction workers (artisans) of various trades who were randomly selected. Out of this total number, 60 questionnaires were retrieved and used for analysis. Meanwhile, the data generated from questionnaire survey were subjected to descriptive and quantitative analysis using tables and Mean score Index was calculated. Means score index is mathematically represented as:

$$MSI = \frac{\Sigma Fx}{N}$$

Where,

MSI = mean score index of each variable;

f = frequency of responses to each rating;

X = score or rating given to each variable by the respondents; and

N = total number of responses concerning the variable.

4.0 RESULT AND DISCUSSION

Table 1: **Level of Health and Safety Compliance in the construction site**

S/N	Variables	Mean Score
1.	Health and Safety plan availability before commencement of Construction work	1.05
2.	Brief on health and safety before commencement of daily work	1.50
3.	Availability and Monitoring of health and safety policy and records	1.08
4.	Compulsory use of Personal Protective Equipment on site	1.33
5.	Adequate communication on health and safety issues to all concerned	1.58
6.	Available and Functional of First Aid Kits and Banners/Signs	2.00
7.	Health and Safety Rules and Regulations observation on site	1.33
8.	Health and Safety training and education	1.03
9.	Ladders and Scaffolding were properly and securely anchored and erected before ascending them	2.33
10.	Good, clean and proper handling of equipment and working environment	2.16
	Average Mean Score	**1.54**

From table 1 above, it was revealed that the average means score value (1.54) for the level of health and safety compliance by construction workers in the sites was low. This was a clear indication of health and safety non-compliance. Idubor and

Oisamoje (2013), contend that the numbers and magnitude of accidents occurring and recorded on construction sites in Nigeria underscored low level of health and safety practices. This fact is buttressed as health and safety plan/policy is one of the parameters in prequalifying suitable contractors for the award of construction projects in Nigeria (Windapo, 2013 and CDM, 2015).

Table 2: **Factors that inhibit the compliance of health and safety measures at the construction site**

S/N	Variables	Mean Score
1.	Unavailability/inadequacy of PPE	2.75
2.	Inadequate knowledge and training on health and safety to workers	2.83
3.	Not conducive using PPE because of weather	2.33
4.	Poor Leadership and commitment	2.67
5.	Lack of health and safety committee/guards	2.33
6.	Lack of good management guideline	2.00
7.	Low strict enforcement of health and safety policy on sites	2.16
8.	Employee low participation	1.50
	Average Mean Score	**2.32**

Table 2 above, reveals mean average value 2.32, indicated that Unavailability/inadequacy of PPE, Inadequate knowledge and training on health and safety to workers, Not conducive using PPE because of weather, Poor Leadership and commitment, Lack of health and safety committee/guards, Lack of good management guideline, and Low strict enforcement of health and safety policy on sites are the factors that inhibits compliance of health and safety measure at the construction sites. The table also reveals that employee participation has no influences on the compliance of health and safety measures on the construction sites.

According to (Idubor and Osiamoje 2013), lack of strict enforcement of OSH regulations enables non- compliance to OSH regulations; while (Okeola, 2009) state that non-compliance to OSH regulations is a major contributor to the poor state of OSH in Nigeria

Table 3: Factors influencing implementation of health and safety measures on construction sites

S/N	Variables	Mean Score
1.	Strict enforcement of Health and Safety management policy	2.67

2.	Proper and timely training of employee on health and safety	2.75
3.	Proper health and safety management guideline	2.50
4.	Leadership and management commitment	2.83
5.	Provision of health and safety committee/guards	2.17
6.	Availability of Personal Protective Equipment (PPE)	1.66
7.	Effective Employee participation	1.83
8.	Health and Safety budgets to ensure the adequacy of implementation	2.08
	Average Mean Score	**2.31**

From Table 3 Above, reveals that average mean score 2.31 on Factors influencing implementation of health and safety measures on construction sites was agreed that Strict enforcement of Health and Safety management policies influences implementation of health and safety measures on the construction sites.

This study is in-line with Olutuase (2014) who studied safety management in the context of Nigerian industry with an intention to compare level of compliance with the international standards. The study outcome established existence of safety regulations in the management of construction projects. However, the system seems to be poorly characterized by ineffectiveness and poor documentation. The study called for urgent attention on construction managers to strictly adhere with the provisions safety regulation requirements for site management. Idubor and Osiamoje (2013), opine that regulations without proper enforcement are tantamount to no laws.

Kumar and Bansal (2013) argue that effective safety knowledge among construction professionals can reduce accidents that directly or indirectly reduce project cost, because in developing countries, safety rules usually do not exist, and if exist; regulatory authorities are unable to implement such rules effectively.

5.0 CONCLUSION

The study finds that level of health and safety compliance by construction workers in the sites was low which is a clear indication of health and safety non-compliance and also showed how negligent government agencies were in pursuit of safety improvement in the construction sector. The study also revealed that strict enforcement of Health and Safety management policy, guideline, commitment, participation and availability of Personal Protective Equipment (PPE) are the factors that when put in place will influences implementation of health and safety measures on the construction sites. The study also finds that almost all the construction works going on in Damaturu are being handled by the local companies, contractors and construction workers.

The study in conclusion highlighted the need for effective and enforceable health and safety regulations in Damaturu and Yobe State, based on the result of this study, this would serve as a wakeup call to agencies responsible for ensuring strict implementation of safety rules on construction sites. And also to improve the health and safety performance of construction industry in the Damaturu, Yobe State government should establish the State Safety Commission whose function would include; policy formulation, setting of safety standard for all sectors in the state, issuance and withdrawal of safety compliance certificates at all levels, conduct of safety training, seminar and workshops, public enlightenment and awareness creation among others.

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Addressing The Economic Recession Through Career Guidance Services Senior Secondary Schools

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Abstract

This study examines career guidance services provided by school counsellors in secondary schools as a solution to economic recession in Yobe state. The main objective is to assess the career guidance services and ways through which the services help students. The study used 387 students randomly sampled from purposively selected schools. Questionnaire instrument was employed in data collection and the results show that school counsellors are more effective in career guidance services related to helping students to make appropriate career pathway selection, learn about strength, abilities and learning style, set educational and career goals, information search about careers and world of work selection. However, school counsellors under perform in helping students to make future educational planning, college selection and placement. No significant difference was found among gender excepts in educational Planning, college selection and placement with female students having better educational planning, collection selection and placement. The paper concluded that the school counsellors play greatly in the area of career decision making, goal setting and personal awareness. However, it is recommended that school counsellors should improve services involving future educational planning, college selection and placement.

***Key words**: counselling, school counselling, counsellors, career counselling, career planning*

1.0 INTRODUCTION

Counselling is one of the necessary essential services in school setting for it to discharge the expected functions in the society. Counselling is a helping profession and it is the human characteristics that provide the basis for the profession to contribute its special knowledge and skills. Counselling is a wide selection of services and activities to help people prevent disabling events, focus on their overall development, and remedy existing concerns (Schmidt, 1993).

Within the Counselling paradigm, school counselling is an entity through which counselling needs of students in the school system is addressed. The American School Counsellors Association defined school counselling as a process of helping people by assisting them in making decisions and changing behavior. The rationale of school counselling programme is to provide range of services that facilitates the development of all students. On that bases Meeks (1968) then concluded that 'if the purpose of counselling is to facilitate development, then the counselling process must be a part of educational process from kindergarten through the secondary school'.

Paisley and Borders (1995) stressed that, the major focus of school counselling today is on the acquisition and incorporation into one's system of life adjustment approaches that foster productive rather than self defeating behavior. Therefore, school counselling is proactive and preventive in focus and an integral part of he educational programme as it assists students to obtain and use life-long skills during the development of academic, career, self-awareness and interpersonal communication skills. Hence, Vanzandt and Hayslip, (2001) asserted that the cardinal objective of comprehensive school counselling programme is to provide all students with life success skills and Schmidt (2008) concluded that the preventive and developmental services have the potential to enhance the lives of students in the school.

School counsellors are integral part of the education programme as important to the school as teachers and administrators; as an essential factor to the main function of the school academic success (Sciarra, 2004). Counsellors employ variety of preventive and intervention techniques aimed at preventing losses, avoiding crises and other calamities that slow down progress in education and life of the students. The school counsellor is essentially a change agent who has the goal of facilitating change, growth, healing, empowerment and development of the students, such that the students will be able to establish hale and hearty relationship with self and others and have success in school and beyond. Studer (2005) asserts that no professional is more vital to the lives of students as the professional school counsellor as he creates opportunity to facilitate growth for students, assist parent / or guardians, coordinate opportunities for education in the school and consult with community professionals purposely for creating a meaningful educational experience for students.

In the light of the professional roles of school counsellors, the article examines counselling services delivery in Yobe, Nigeria and to determines whether the service delivery differ among counsellors in boys and girls schools. The study is limited to some fundamental career issues that form the base for students' career development particularly in developing countries like Nigeria. These dimensions include selection of career path ways into science, commercial or arts during transition from lower to upper secondary; self-awareness (strength, abilities and learning styles); goal setting, career planning and career information search. The study is timely as it would provide inputs for gradual and continuous improvement with a view to achieving the overall mission of school counselling.

2.0 CAREER COUNSELLING IN SCHOOL

School counsellors carry out their functions in two main directions. School counsellors assist students in career development process in which variety of activities are accomplished and engage in career counselling. The *first* focuses on the development of the workforce and job search that is reinforced by resources (computer technology) and labour market information. The emphasis is on the economic and placement function. The *second* centres on career and development with emphasis on growth and development to whole human person for work and other roles within the society. This approach is the totality of work and life roles that an individual takes on in life through which the individual expresses himself or herself. Zunker (1997) viewed career development as the interaction of psychological, sociological, economic, and physical as well as chance factor that shape the sequence of jobs, occupations or career that a person may engage in throughout a lifetime.

On the other hand, career counselling is one-to-one process that focuses on what a person can do, what a person like to do and what the person is willing to do (Studer, 2005). However, career counselling facilitates the learning for skills, interests, beliefs, values, work habits and personal qualities that create a satisfying life within a constantly changing work environment (Krumboltz, 1996).

3.0 METHODS

The study employed survey design. The design involves gathering information from respondents on career guidance services being provided in schools as way of addressing the economic recession.

Sample

The participants of the study were 387 (male 186, female 201) students of secondary school across senior secondary 1-3 drawn from the selected 21 secondary schools that were randomly within the 3 education zones in Yobe state. The participants' ages ranged from 14 – 25 years with mean age of 17.73 years (SD = 1.75). However, participants cut across the three career pathways consisting of science, commercial and arts being

offered at school level. The 387 sample was selected out of 37, 564 through stratified random sampling technique.

Procedure

The respondents were selected from senior classes in each of the secondary schools and comprised of both boys and girls. Purposive sampling was employed in the selection of the school while simple random was used in selecting the respondents in each school.
Data were collected through on spot process and were then analyzed using descriptive statistics involving mean and standard deviation.

Instruments

Researcher developed questionnaire was used in the study and it comprises of 15 items designed in 5 point-Likert scale ranging from '1' as strongly disagree to '5' as strongly agree. The internal consistency (reliability) of the instrument was found to be .75. The instrument covers various dimensions of career counselling related functions of school counsellors but for purpose of this study, items of career guidance dimensions were extracted and analyzed.

4.0 RESULTS

Table 1 Frequency Distribution, Mean and SD for Career Guidance Services

		D	N	A	Mean	SD
1	My School Counsellor helps in selecting appropriate career path	12 (33%)	83 (21%)	178 (46%)	3.18	1.40
2	My School Counsellor helps students to learn about strength, abilities and learning styles	92 (24%)	50 (13%)	245 (63%)	3.57	1.38
3	My School Counsellor helps students think about goals after graduation from high school	141 (36%)	63 (16%)	183 (47%)	3.14	1.43
4	My School Counsellor helps students regarding future educational Planning, college selection and placement (career planning)	200 (52%)	54 (14%)	133 (34%)	2.67	1.39
5	My School Counsellor helps in information search about Careers and the world of work	133 (34%)	58 (15%)	196 (51%)	3.29	1.43

Key: D =Disagree N = Neither agree nor disagree A = Agree

Table 1 presents the results for the specified career guidance tasks performed by the school counselors. The result concerning the task of counsellors in assisting students to selecting appropriate career path ways shows that majority of the students 178 (46%) believe that school counsellors discharge their function; 126 (32.5%) believe that counsellors do not meet their expectation while 83 (21.4%) remain neutral

without indicating either agree or disagree. The overall mean 3.18 (SD =1.40) compliment the finding and indicates that school counsellors fulfill the function of assisting students in selecting appropriate career path ways (m=3.18; SD =1.40). This entails that school counselors are playing active role in placement exercise in order to ensure students take appropriate career path ways respectively base on their personality and the implication is that productive students would be realized as matching has been affected between individual personality and that of the environment as put forward by Holland (1992).

Besides that, regarding the counsellor's role in assisting students to get self-awareness about strength, abilities and learning styles, majority 245 (63.3%) of the students agreed that counsellors really help in these aspects; 92 (23.8%) disagree with that while 50 or 12.9% remain at the centre. The overall result reports a mean of 3.57 (SD= 1.38), demonstrating that the school counsellors carry out the task of helping students in identifying strength, abilities and learning styles which are essential ingredients in school life. The result demonstrates that students get substantial level of awareness of their respective potentials and the implication is that they are capable of making informed and rational decision about their educational and future career endeavours.

Similarly, in the area of goal setting, majority of the respondents 187 (47.1%) agreed that school counsellors discharge their role involving goal selection thereby assisting students identify their career goals that compliments values, interests, and skills; 141 (36.4%) do not agree with that while 63 (16.3%) did not indicate their stand. The overall mean 3.14 (SD =1.34) support the finding that school counsellors discharge the function of assisting students in goal selection that are consistent with interest, skills and values portraying students are being assisted to set goals that are attainable taking into consideration variety of other factors within the limit of the students.

However, in terms of career planning, majority of the respondents 200 (51.7%) do not agree that school counsellors play their role of assisting students for future educational planning, college selection and placement; 133 (34.4%) agree with that while 54 (14%) neither agree nor disagree. The overall mean 2.67 (SD =1.39) support the finding that schools counsellors do not execute their role adequately involving assisting students in career planning that entails tasks of preparing students for the job market and job application process in one's field of interest. The result expresses that school cousellors fail to meet up to expectations in the area of assisting students to prepare for further education and job market which are among the cardinal objectives of secondary education. The implication of the deficiency is that there would be continuous production of students without the requirements and skills necessary for further education and employment.

Finally, as regards to the counsellors' role in assisting students with career information

search about careers and the world of work, majority of the respondents 196 (50.7%) agreed that counsellors perform this function, 133 (34.4%) do not agree with that while 58 (15%) remain neutral. The overall mean 3.29 (SD =1.43) support the finding that counsellors perform the function of assisting students in career information search about careers and world of work (providing that school counsellors use career information resources at disposal to help student get information which form the background for any meaningful decision. Therefore, the implication is that students would be acquainted with adequate information as well as existing alternative careers within respective career clusters.

Table 2 Mean, Standard Deviation, t-Values for Counselling services delivery differences among gender

	Gender	N	Mean	Std. Deviation	t	*p*
My School Counsellor has helped me in selecting appropriate career paths	Male	186	3.0591	1.41106	-1.646	.101
	Female	201	3.2935	1.38867		
My School Counsellor has helps students think about goals after graduation from high school.	Male	186	3.0538	1.45836	-1.236	.217
	Female	201	3.2338	1.40714		
My School Counsellor helps students regarding educational Planning, college selection and placement.	Male	186	2.5054	1.33253	2.276	.023
	Female	201	2.8259	1.42987		
My School Counsellor has helps students to learn about strength, abilities and learning styles	Male	186	3.5269	1.48208	-.604	.546
	Female	201	3.6119	1.28789		
My School Counsellor helps in information search about Careers and the world of work.	Male	186	3.2527	1.44657	-.551	.582
	Female	201	3.3333	1.42945		

Table 2 shows an independent t-test for the observed variables between genders. The results depict that a significant difference was found among gender in educational Planning, college selection and placement t (385) = 2.27, $p < .05$ indicating that counsellors in girls schools perform better in assisting female students in educational planning, college selection and placement than counsellors in male schools (m= 2.82 and 2.50; SD =1.42 and 1.33). However, no significant difference was found among gender in the selection of appropriate career path t (385) = -1.46, $p > .05$, goal setting t (385) = -1.23, $p > .05$, self awareness t (385) = -.60, $p > .05$ and career information search t (385) = -.55, $p > .05$ revealing that school counsellors functions is similar in both girls and boys school.

5.0 DISCUSSIONS

The research exposed the degree to which fundamental career aspects are being provided in schools. This reveals that counsellors' task performance in selection of appropriate career path ways among students account for 46 percent which below the average indicating that the school counsellors' role is not adequate enough for effective placement during the transition from lower to upper basic secondary school. This suggests that school counsellor need to improve the approach being used and employ modern ways of assessing and placing student into appropriate career pathways for greater efficiency and productivity of students.

Similarly, self awareness involving strength, abilities and learning styles emerged as best function that school counsellors perform. This indicates that the criteria used by the school counsellors is effective and improving the technique will in no doubt improve the outcome which could be for the best of the students, system and society as whole as students will future educational and career prospects will be produced. Thus, collaboration between school counsellor and teachers as well as other stakeholders should be enhanced thereby making these students actualize their career and educational goals.

Meanwhile, goal selection is also satisfactory indicating that students' capability of setting goals that compliment interest, skills and values is adequate. This further reveals that students set goals that are attainable thereby increasing the tendency of success. This justify that schools counsellors perform the career guidance service in helping students set attainable goals towards a specific direction as it is the only way in which students could be utilized optimally for societal growth in particular, national and global advancement in broader perspective.

In the area of career planning, the outcome indicates that school counsellors under perform in this area. Career planning involves strategy for making the students aware of what is contain and required in the career of one's choice that match interest and abilities. The relevance of career planning in school cannot be under estimated as its cardinal objectives is to provide students with necessary

awareness, knowledge and skills require in the world of work. Herr, Cramer and Niles (2004) asserts that career planning helps students acquire knowledge, skills and awareness necessary for effectively managing their career development, thus, counsellor implement systematic and well-coordinated educational and career planning programme. Therefore, the outcome suggests that career planning in secondary need to be revisited so as to make it functional with a view to achieving high level of awareness, improve knowledge acquisition and skills as ingredient for effective career development.

Finally, the finding involving career information search dimension demonstrates that counsellors perform this function satisfactorily. The finding suggests that counsellors paid attention career guidance service due to its crucial importance so that students would have enough information to informed decision making and during translation of goals into action. Career information search is an integral part in career development process that need to be given attention during the school days so that students can be prepared adequately for development task of exploration.

6.0 CONCLUSIONS AND RECOMMENDATIONS

In conclusion, the study pointed out the degree to which school counsellors perform career guidance services in schools. The outcome provides the ground for improving the performance of the school counsellors so that school can meet up to its expectation of preparing students that are well equipped for life in the competitive 21st century. Therefore, base on the state of tasks delivery.

However, it is recommended that stakeholder should review the process of handling school counselling and school counsellors should under professional training so that they could be able to carry out their duties professionally for better results. Similarly, the school counselling should be designed to meet existing need of students, educational system and labour market so linkage could be established. Needs assessment should be carried out as it forms the basis for which the programmes can be established. One important component at initial stage of conducting a need assessment is to determine rationale, goals and interventions (Herr & Crammer, 1996)

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Bank of Industry (BOI) And SMEs Development in Ikeja Business District, Lagos State, Nigeria

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ABSTRACT

The aim of this study was to establish and assess the contribution of the Bank of Industry towards SMEs development in Ikeja Business District, Lagos state, Nigeria. The study aimed at ascertaining the financial contribution of the Bank towards the economic advancement of the area through provision of financial assistance to SMEs operators in the state. A simple random technique was used to select the respondents who are beneficiaries of the facility within the study area according to BOI directory, 2018. Data were collected through the use of questionnaire. The questionnaire was administered on a sample of one hundred and twenty (120) SMEs operators using a random sampling technique. Ninety two (92) of the questionnaire were correctly filled and returned. Bivariate regression analysis with the help of SPSS version 25 was used to test the formulated hypotheses. Findings from the Analysis revealed that although the identified predictor (BOI's financial contribution) is a good predictor of SMEs development and is statistically significant, its contribution is too minimal and is presented with the coefficient and probability value of ($\beta 1 = 0{,}085$, $p<0.05$) at 5% significance level. This indicates that for every unit of the financial contribution offered by the Bank of Industry towards the development of small and medium scale enterprises in the study area, the effort only produces a paltry 8.5% change in SMEs development. The study recommends among other things that the expansion of the power of BOI as the apex institution for the development and promoting of SMEs in Nigeria should be considered with vigor,so that BOI would perform its statutory mandate of giving assistance to SMEs operators.

Key words: Development, Small and Medium Enterprises, Bank of Industry, Performance

1.0 INTRODUCTION

The place of small and medium scale business enterprises (SMEs) in both developed and developing economies cannot be over-emphasised. This is particularly true, because of the numerous roles they play towards the overall economic and industrial development of the economy. Every effort towards the restructuring of the economy without particular emphasis on the development of small and medium scale business is not likely to be very successful in the long term (2005). Small scale industry orientation is part and parcel of Nigeria. Evidence abound in our respective local communities of what successes our great grandparents made of their respective trading concerns, yam barns, iron smelting, farming, cottage industries and the likes. So the secret behind their success of a self-reliant strategy does not lie in any particular political philosophy, so much as in the people's attitude to enterprise and in the way by which the right incentive is adequate enough to make risk worth taking are provided. Economic history is well stocked with enough insights into the humble beginnings of present day grand corporations. Evidences abound that almost all of the multinational giant corporations were cottage enterprises, growing as their industry grew, and through their own sheer ability either reproduce existing products more cheaply or improve their ability. For example, Coca-Cola, the most popular branded soft drink in the world was invented as a tonic by an Atlanta Pharmacist, John, S. Pemberton in 1886 (Encyclopaedia Bratannica, 1912). Even at the international level, in the early stages of her industrialization, Japan's economy was dominated by traditional industries, cottage firms, and by a large number of small scale firms, drawing their strength not from abundance of capital but rather from her supply of labour (Nduku, 2017).

Governments in developing countries, especially in Nigeria, provide a wide variety of programs to develop and assist SMEs. Despite these programs, it has been observed that their impact on the performance of SMEs has been less than satisfactory. This can be attributed to some factors that governments and policy makers in developing countries have failed to put into consideration in the design and implementation of SME development programs. Most SMEs either remain small, moribund or shut down within few years of operation due to some constraints that hinder their growth, especially finance. Though Bank of Industry has been an initiative of the Federal Government to serve as a partner in progress in the area of giving financial assistance to SMEs owners in the country, the problem is how effective has this been carried out and how it has met and/or satisfy the objectives of its establishment.

It is on record that many writers such as Oputu (2012), Samaila (2015), Aderemi (2010), Allen & Gale (2004) among others have written extensively on this subject matter but the methodologies and the study design adopted were greatly inconsistent and this has reflected in their result and findings. The inconsistencies necessitated this study as the work intends to fill the gap created.

1.1 Objectives of The Study

The main objective of this study was to determine the contribution of Bank of

Industry (BOI) towards SMEs development in Ikeja Business District, Lagos state, Nigeria. Specific objectives was to:

a. assess the financial contribution of BOI towards the development of SMEs in Ikeja Business District, Lagos state.

1.2 Research Hypothesis

Ho: Bank of Industry does not make significant financial contribution towards the development of SMEs in the study area.

Hi: Bank of Industry makes significant financial contribution towards the development of SMEs in the study area.

1.3 Scope of The Study

The scope of the study was the total beneficiaries of the financial assistance offered by the Bank of Industry (BOI) within the Business District of Ikeja, Lagos state, Nigeria between 2015 and 2018.

Conceptual Clarifications

Bank of Industry (BOI)

The Bank of industry (BOI) was created to vigorously pursue this aspiration of the government, which was to promote the growth and development of small and medium scale industries in the country. Bank of Industry has manifestly emerged as the nation's quintessential development finance institution with a several initiatives that have enhanced single digit interest regime in her values-added business operations (Olagunju, 2015).

In its attempts to further enhance the welfare of those at the grass roots, the Bank has developed its micro-credit scheme using the cooperative lending model. This product is aimed at providing finance for enterprises with common interests who individually might not be able to meet the requirement for accessing finance but as a group can pool their resources together so as to raise adequate finance needed.

The emphasis of the Bank's cooperative lending is on value addition and clusters particularly in the agricultural value chain where the country has comparative advantages that can be converted to competitive advantages. The Bank would usually ring-fence its SMEs and Large Enterprises with these clusters to create a linkage between them whereby the cooperative clusters would provide for the raw material needs of the SMEs and Large Enterprises.

To increase the access of BOI assisted SMEs to working capital loans from commercial banks, the bank decided to enter into MOUs with 10 SME friendly commercial banks that have now agreed to lend at negotiated interest rate The commercial banks are: First Bank, United Bank for Africa, Diamond Bank, ECOBANK, Standard Chartered Bank, Fidelity Bank, Stanbic-IBTC, FCMB, Access Bank and Skye Bank. BOI is to have access to the SME data bases of these commercial banks and also leverage their wider branch network across the country to enable BOI reach more SMEs.

Small and Medium scale enterprises (SMEs) in Nigeria

Small and medium scale enterprises (SMEs) in Nigeria have existed before the country's independence in 1960, but since independence, Nigeria has had series of seminars, studies and workshops, each of

which appraise the excellence, importance and need to facilitate the establishment and sustainability of SMEs (Oputu, 2012). As evident in every other part of the world, SMEs have also have a long history in Nigeria following their capability to offer great and alternative means of survival for the people. They, in Nigeria, have managed to save many poor homes that have the innovation to start a unique business though with diverse problems of establishment and/or survival considering the various environmental peculiarities (Sanni, 2009). In Nigeria, there is no generally acceptable definition of SMEs but it varies over time with organization, business and industry. For example, the Central Bank of Nigeria (CBN) defines SME as a business entity in which the asset cannot be more than ₦200 million without the value of its land and working capital. Also, its employees are between 10 and 300 people. Due to the flexible nature, SMEs are quite able to withstand economically diverse situations. In Nigeria SMEs are more likely able to survive in smaller urban and rural areas where they can effectively contribute to the amount of economic activity in many regions, which has helped to reduce migration into larger cities like Lagos, (Adejumo and Olaoye, 2012)

More so, Nigerian SMEs can be categorized into urban and rural enterprises. The urban in a more formal way, can further be classified into *Organized and Unorganized* enterprises. The organized enterprises which some scholars referred to as formal entities, have paid employees with a registered office while the unorganized enterprises also known as informal entities, are direct opposite of the former; they do not have paid employees nor specific office locations as they are just artisans. operating in temporary wooden workshop or structures, the unorganized enterprises rely mostly on apprentices or family members and mostly employ low rate or no salary paid workers. Rural enterprises are made up of family groups, women that are engaged in food production from local farm crops, and individual artisans.

The contribution of SMEs globally is huge and extremely important because they create wealth, employment opportunities and promote entrepreneurial skills, poverty alleviation and stimulate wider prosperity (Mugisha, Wamono & Kikabi, 2012)

Importance of Small Business Enterprises in the Economic Development

Small business enterprise account for substantial part of the total industrial employment, production and value added in an economy business concern.

i. They act as catalyst for technological development
ii. They Provide employment opportunities
iii. They provide training ground for establishment and management of a large firm, over time some of these firms grow in size either by expansion or by merging with other firms.
iv. They encourage and promote private sector initiatives and development.
v. They help to fill the gap left and un-serviced by the large firms.
vi. They help to tab the relatively ignored and other unexploited

resources and areas of production

vii. They said the process of redistribution of incomes in many countries both in pure financial terms and in regional terms.

viii. They act as industrial links between local producers of raw materials and industrial concerns

ix. They have positive implications for improving the standard of living of the citizens and generation of foreign exchange through export

2.0 EMPIRICAL REVIEW

Sama'ila & Tahir, (2012) conducted a research on the Role of Bank of Industry (BOI) in the Development of Small and Medium Scale Enterprises (SMEs) in Bauchi Metropolis. The population of the study was 50 Small and Medium Scale Businesses in Bauchi metropolis. Due to data screening, only responses of forty (40) valid Questionnaires out of the fifty (50) SMEs were analysed. Correlation was used for the analysis. It was found out that Small and Medium Enterprises (SMEs) in Bauchi Metropolis are highly affected by the role the Bank of Industry. Loans collected by the SMEs from the bank are utilized for the purposes they are intended as revealed by the research.

Ács & Virgill, (2009) investigated the impact of bank loans on economic growth in Nigeria over the period of 1992-2013. This study made use of quantitative secondary data from the Central Bank of Nigeria (CBN) statistical bulletin (2013) to carry out this study. The empirical perspective of this study employed the Augmented Dickey-Fuller Unit Root Test, co-integration test, error correction model (ECM) and the parsimonious test. Empirical evidence from the study has shown that the activities of bank loans have the capacity to influence the entire economy if it is well coordinated. The results of the study indicate that bank loans and domestic investment significantly and positively affect the growth of Nigeria's economy based on the magnitude and the level of significance of the coefficient and p-value and, there is a long-run relationship between

Agbaeze & Onwuka, (2014). (2012) examined the impact of finance institution on economic growth of a country, thus using Nigeria as a case study. The study employed the multiple regression analysis given that the data are cross-sectional and time series in nature. Secondary data of all commercial banks were extracted from the Central Bank of Nigeria statistical Bulletin and Annual Reports. Data used in this model are time series secondary data for the period 1992 to 2012.The findings of the study show that bank loans have a significant positive impact on the short run economic performance in Nigeria. Bank loans enhanced consumption per capita in short run with an impressive coefficient, although these bank loans do not have a significant impact on economic growth in the long run.

Idowu (2015) assessed the impact of Bank of Industry (BOI) on Small and Medium Enterprises (SMEs) in Nigeria. Simple random sampling technique was employed

in selecting the 100 SMEs that constituted the sample size of the research. Structured questionnaire was designed to facilitate the acquisition of relevant data which was used for analysis. Descriptive statistics which involves simple percentage graphical charts and illustrations was tactically applied in data presentations and analysis. The findings of the study revealed that significant number of the SMEs benefitted from the BOI financial assistance even though only few of them were capable enough to secure the required amount needed. Interestingly, majority of the SMEs acknowledge positive contributions of the loans towards promoting their market share, product innovation achieving market excellence and the overall economic company competitive advantage.

3.0 METHODOLOGY

The research is descriptive in nature and relied heavily on the use of a structured questionnaire which was administered on respondents. The study area was the Business district of Ikeja, Lagos state, Nigeria. The population of the study was all the beneficiaries of the financial assistance enjoyed from the Bank of Industry (BOI) according to BOI directory, 2018. The scope of the study was between 2015 and 2018.A total number of 120 copies of questionnaire were administered on respondents using a random sampling technique with the help of market associations in commercial areas of Ikeja (Awolowo road), Computer village, Opebi/Allen, Agidingbi/Secretariat axis. Ninety two (92) copies were correctly filled and returned, representing 77% response rate. The questionnaire consisted of two sections; the profile of the respondents and the main questionnaire that contains questions on Bank of Industry and its contribution towards SMEs performance. All variables in this study were measured using a 5-point Rensis Likert's scale of 5 = Strongly Agree, 4 = Agree, 3= Agree to some extent, 2 =Disagree and 1 = strongly disagree**.** Responses were coded, entered into the Statistical Package Software for Social Sciences (SPSS) version 25 for analysis. Bivariate regression analysis was used to test the hypothesis formulated for the study.

Model Specification

The Linear regression model to empirically test the hypothesis formulated is:

$Y_t = a + \beta_1 Xt_1 + \beta_2 Xt_2 + \beta_3 Xt_3 + \beta_4 Xt_4$ ……..e

Where Y_t =SMEs Development

Xt_1 = Financial contribution

a = Intercept

β = Beta co-efficient of the independent variable

e = Standard error of the estimate

Preliminary Findings

Table 1 **Responses generated in support of objective 1**

RESPONSES	FREQ	PERCENT	VALID PERCENT	CUM. PERCENT
Strongly Agree	14	15	15	15
Agree	17	18	18	33
Disagree	32	35	35	68
Strongly Disagree	29	32	32	100
TOTAL	92	100	100	

Source: Field study, 2018

Table 1 above shows that 15% and 18% strongly agreed and agreed with the statement respectively that BOI contributes significantly to the survival of small and medium businesses in Lagos state, while 32% strongly disagreed with it.

HYPOTHESES TESTING

Test of hypothesis

The only objective of this study was to find out whether Bank of Industry as an agency of the federal government significantly assisted SMEs operators financially within the time frame covered in this study or not.

Ho: Bank of Industry does not make significant financial contribution towards the development of SMEs in the study area.

Table 2a: Model of fit for BOI's financial contribution and SMEs Development

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.233[a]	.041	.061	.31801
a. Predictors: (Constant), BOI's financial contribution				

Source: Data Analysis (2019), SPSS Version 25

Table 2a above shows that BOI's financial contribution has an R^2 co-efficient of 0.041 and adjusted R^2 of 0.061. This reveals that one unit increase in BOI's financial contribution resulted in 6.1% increase in SMEs development holding all other independent variables constant.

Table 2b: ANOVA on BOI's financial contribution

ANOVA[a]						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	.241	1	.321	2.148	.001[b]
	Residual	4.197	36	.118		
	Total	4.438	37			
a. Dependent Variable: SMEs DEVELOP,ENT						
b. Predictors: (Constant), BOI's financial contribution						

Source: Data Analysis (2019), SPSS Version 25

Table 2b presents the result of ANOVA. The result provided an F-test of 2.148 and a $P < 0.05$, an indication that the model is statistically significant going by the result of the p-value above.

Table 2c: Co-efficient of BOI's financial contribution and SMEs development

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	5.103	.413		2.115	.000
	QSD	.085	.106	.143	1.024	.001
a. Dependent Variable: SMEs DEVELOPMENT						

Source: Data Analysis (2019), SPSS Version 25

Table 2c reveals BOI's financial contribution resulted in just 8.5% change in SMEs development. From the analysis, the t-value = 2.115 and p-value<0.05 which indicates that BOI's financial contribution is a significant predictor of SMEs development, although it is just a minimal contribution as seen in the coefficient and probability value of ($\beta 1$= 0,085, p<0.05)

4.0 DISCUSSION OF FINDINGS

This study was conducted to empirically verify the financial contributions of Bank of Industry (BOI) towards the development of small and medium scale enterprises (SMEs) in the Business district of Ikeja, Lagos state, Nigeria.

From the result of the analysis, it can be seen clearly that although the identified predictor (BOI's financial contribution) is a good predictor of SMEs development and is statistically significant, its contribution is too minimal and is presented with the coefficient and probability value of ($\beta 1$= 0,085, p<0.05). This indicates that for every unit of the financial contribution offered by the Bank of Industry towards the development of small and medium scale enterprises in the study area, the effort only produces a paltry 8.5% change in SMEs development.

5.0 CONCLUSION

Based on the results of the regression analysis on the assessment of the financial contributions of the Bank of Industry towards the development of small and medium scale enterprises in the Business district of Ikeja, Lagos state, the study was able to draw a conclusion that, although, the identified predictor (BOI's financial contribution) is statistically significant, its contribution is not significant. As a result of this, we therefore accept the null hypothesis. The findings from this study disagrees with the work of Sama, I and Tahir, H (2015), Oputu (2012) which revealed that there exist significant positive relationship between Bank of Industry's loans and small and medium scale enterprises development in Bauchi metropolis.

6.0 RECOMMENDATIONS

The study recommends among other things that the expansion of the power of BOI as the apex institution for the development and promoting of SMEs in Nigeria should be considered with vigor.

A well-conceived and coordinated scheme aimed at strengthening and improving the information system and counseling services for wider dissemination and greater effectiveness should also be pursued.

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Method of Sewage Disposal as A Catalyst to Environmental Pollution in Damaturu Metropolis of Yobe State.

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ABSTRACT

This study investigated the sewage waste management in Damaturu, Yobe state. The methods employed in this study are critical observation, questionnaires and oral interviews. Analysis of the data reveal that all the functional elements of sewage waste management system in the Damaturu, Yobe state as practiced by existing institution of Damaturu sewage waste management are engulfed by fundamental problems which have been the main reason why institutions are unsuccessful in the efficient management of sewage wastes control and the reason for rapid outbreak of cholera, dysentery ,typhoid fever and vomiting with diarrhea occurring almost every year especially during raining season in the state, the various problems were identified, analyzed and discussed. Pragmatic means of solving problems such as the encouragement of sewage recycling and treatment. The provision of adequate fund and the active participation of the private sectors in sewage wastes management were recommended which if strictly adhered to and properly implemented would provide the much-needed solutions to the problems.

Keywords: sewage disposal, environmental pollution, Yobe State.

1.0 INTRODUCTION

There are changes throughout the urban centers in Yobe state over the years, especially demographic extension has brought about phenomenal increase in the volume and variation of sewage wastes generated daily particularly in Damaturu. 'The rapid declining in quality of the environment increase environmental pollution, the solution of environmental pollution lies not in attempting to eliminate all pollutant but rather in minimizing the production of pollutants and managing their disposal in term of air, water, soil, food and noise pollution. The term environment, according to (Harvey, 1977) means surrounding in which organisms live, which consist of air, water, food etc. The term environment pollution is one of the most horrible ecological crises to which present civilization is subjected today. The disposal of certain kind of waste products as well as

by-products which when infected to an environment in quantities so large that they affect the normal functioning of ecosystem is known as environmental pollution. (Patrick, 2007) domestic sewage includes waste, water and solid waste that is characteristics of the flow from toilet, sinks, showers and tubs in house hold and domestic waste includes water-borne and other wastes by the human body and by flushing water, sewage water from kitchens, bathroom, and other water borne materials discarded as a result of regular house hold and human sanitary activities, as public sewage originates from houses, hotels, institutions, markets, streets and industries. Accumulation of sewage in the vicinity of dwelling and market places is responsible for most offensive odors in some streets. (Ishaku et al, 2021) reported traders in Damaturu Sunday markets expressed their dismay over the Yobe State Television (YTV) news that the unnecessary passing of sewage and dumping of refuse wastes in the vicinity of market areas and some words by some people is affecting their business. This is as a result of terrible odour experienced in the area. There are three (3) categories of sewage wastes which are municipal, Industrial and hazardous sewage wastes. Whatever the category, it is no use to public and it has no intrinsic value to the society, it is therefore discarded and if not disposed off properly will be a source of potential problems to the population that discarded it. However, the satisfactory disposal of sewage wastes requires highly integrated and sound operated system: such a system will include three (3) processes; storage, collection and recycling or treatment

(Werner, 1995) reported that sewage pollution can lead to diseases like vomiting with diarrhea, typhoid fever, bacillary, cholera, paratyphoid fever and centric fever. he added that disposal of sewage into a river can give rise to a condition known as *eutrophication*, which is a situation where an algae that lives in the water multiply at a faster rate than normal. The algae from a thick green mat that prevents light from reaching plants living at the lower part of the river, the submerged plants die inhabitable for animals.

2.0 MATERIALS AND METHOD

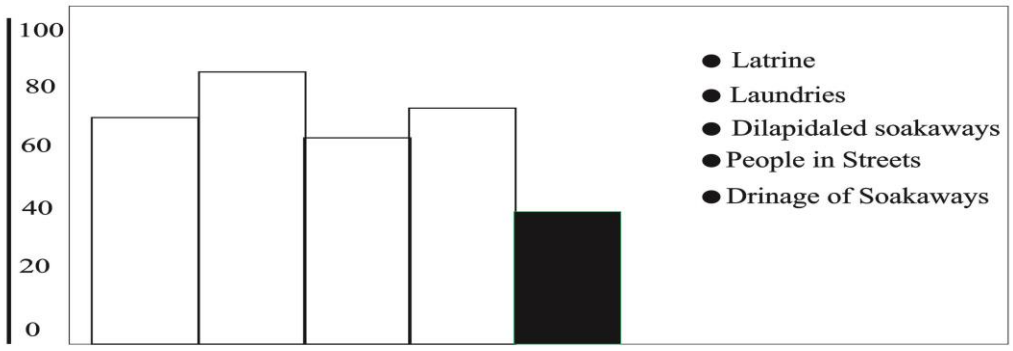
The principal method employed in this study is critical observation, questionnaire and interview, and also organized field tour to major areas of focus in the town, a member of soak-away, gutters, and drainages in Damaturu and the environs particularly, the market place including the road sides and in some congested wards. For the collection of data first, the entire study was classified into residential, market, industries and institutions. secondly, the residential sample was obtained by grouping the areas to five (5) zones based on the criteria of proximity and accessibility, the zones are Nayi-nawa, Gwange, Pompomari, Nasarawa and Dikumari. More so, an average of twenty (20) houses were randomly selected from each zone making a total of hundred (100) houses. Thirdly, (30)

traders were randomly selected mostly from Sunday market. Ten (10) industries were also selected for sampling.

Consequently, questionnaires contrasting of both open and closed ended questions were prepared with sections for each respondent in the market and industries. The purposes of the questionnaires were to obtain information about sewage waste management, storage, collection and disposal as practiced by individual household and institutions, food sellers, traders, etc. Relevant questionnaires were as well prepared for the Yobe State Environmental Protection Agency (YOSEPA) and the local government officials. they were also prepared to obtain information about the problems and ill effects of sewage pollution and also to obtain information about the problems of manpower, professional competence and adequate supervisory management roles in ensuring prompt and efficient collection, disposal and / or recycling and treatment of sewage waste.

3.0 RESULTS:

Fig.1: Sewage waste decomposition in Damaturu town. **Source:** Survey 2009



From the questionnaire returned the responses made in the various sections of the instruments were analyzed using simple percentage. Based on the findings on the method of sewage disposed as a catalyst to environmental problem in Damaturu, the traders, food sellers, households, YOSEPA officials and local government officials agreed that sewage from laundries, sewage from latrines, sewage from dilapidated soak away, sewage from the street and sewage from drainage of soak drays are factors leading to environmental sewage pollution in Damaturu metropolis.

4.0 DISCUSSION

From the results obtained and analyzed on the methods of sewage disposal as a catalyst for environmental pollution in Damaturu, it has shown that indiscriminate passing of sewage from latrines, soak away, streets and laundries are vectors leading to sewage pollution in Damaturu town. On method of sewage disposed in Damaturu however, household sewage such as sewage from pit latrines constructed without soak ways is one of the common wastes generated, the sewage of such system flow directly into the street as there is no reservoir constructed for that purpose. One of the unfortunate attitudes practiced Some people of deliberately establishing food hotels and fast food in an unhealthy environment in Damaturu, this reflects devastated outbreak of diarrhea with vomiting in the state, poor environmental and personal hygiene are some of the possible factors.

5.0 RECOMMENDATION

(Bajah, 1998) sewage pollution can be solved by recycling and treatment whereby people will have the services of central sewage system (C.S.S) in those town however, the sewage from all households is carried through large pipes laid underground to central location where the sewage is treated before the water is emptied into nearby lake, river, ocean, etc. (Ramalingam 2005) also stated that There is the need therefore, to involve an efficient sewage waste management based on the skill of engineering management taking into consideration the problems associated with poor sewage disposal. (Bhatia, 2005), had the view that government should pass an environmental legislative power that is the constitutional protection to environmental laws. These laws have to be made by the national assemblies against sanitation.

Public enlightenment campaign: The enlightenment of people at different levels/class to be aware of their responsibility for nurturing and wisely utilizing the environment and taking urgent steps toward restoring environmental balance where such is observed will also reduce the menace of pollution. People should be educated on issues like identification of sewage management in collaboration of Yobe State Environmental Protection Agency YOSEPA. They should sensitize the public about the ill effect of environmental pollution. The private sector should also be actively involved in the campaign.

According to (Muduegbuna, 2004) approach to environmental problem is to tax the value of negative externality which solution he referred to as internalizing

externality. It is strongly recommended that government should always provide an appropriate adequate funds in its annual budgets to cater for the construction of modern gutters and drainages through which the waste could be effectively and efficiently disposed. In most cases, the problem of lack of adequate funding constitutes the cardinal problem of poorly disposed sewage wastes.

Table1: Waste sources and disposal. Sources**: (Bhatia, 2005)**

Sources	**Method recently**	**Method of future consideration**
Municipal	Landfill (80%) incineration	Compaction, composting, recycle and reclamation chemical processing
Industrial	Landfill incineration	Recycle and reclamation chemical processing
Demolition	Dump open burning	Incineration
Construction	Dump	Reclamation
Sewage	Landfill, dump	Incineration and composting
Agriculture	Landfill (plough back) incineration open burning dump	Compost and chemical processing

NB: Sanitary landfill is the most widely tested method of waste disposal, if perfectly operated. There are many unauthorized dumps but unfortunately only few are considered to be truly sanitary, the remainders are unauthorized ones.

Table 2: Reported cases of cholera in Damaturu as a result of effect of sewage pollution. **Source**: Yobe state statistical Year Book.

YEARS	Number of cases
2018	451
2021	883

Table 3: Yobe state cholera outbreak situation report

Source: Govt. Nigeria, Health Cluster WHO.

YEARS	Number of cases
2019	1762
2021	3750
2022	4016

CONCLUSION

The issue of environmental pollution should be tackled head on not only in Yobe state but national and international levels. Reduction of environmental pollution improve healthy condition of man and animal. This can lead to a desirable life expectancy because the food we eat, the water we drink, the fish we eat, the air we breathe, etc. will all be free from sewage pollution and other poisonous substance which works against development and decent living within our environment.

Pollution like many other today's big health problems is a community affair. It cannot be solved by individual but rather through team effort. There is however a great need for public understanding of the complex preambles created by the air water soil and food pollution in Damaturu particularly and Nigeria in general. Life on this planet depends upon the hazards of pollution, national and world action to minimize the hazards of pollution.

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An Investigation into Some Negative Socio-Economic Effects of Desertification On Youth of the Ten Desertification Prone Local Government Areas of Jigawa and Yobe States

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Abstract

In every society youth are the backbone of its socio-economic development. Therefore, any effort to make the youth comfortable and law abiding in the society to make up to expectation in discharging their national development duty is a welcome idea. Against this background an empirical survey research was conducted in the study area which derived its respondents by random sampling technique and analyzed the result obtained using frequency and percentage, which revealed among other things that, the best way to fight desertification in developing nations is by afforestation and sustainable forest management,40.47% percent of the respondents are between the age brackets of 18-38, 96.27% are male, 82% are married, and 65.34% are farmers, 56.80% do not have up to secondary school educational qualification, 47% opined that decision on new issues are taken by the community as a whole, 71%of the youths move to Lake TChad area after harvest for off-farm economic activities, 45.60% of the respondents are of the opinion that reduction in agricultural output in the area is caused by the sin committed by the leaders, the people of the study area showed that there are different government intervention in their areas in order to manage the problem of poverty and hunger. The research work concluded that, there is reduction in crop and livestock production and absent of off-farm economic activities in the area leading to high degree of poverty and hunger. Desertification hinders the economic activities in Lake TChad region adding to the economic hardship on youth of the area making them easy target for recruitment by cash awarding insurgents. There is also masculine dominance in the area and low level of Western education further exacerbated the problem of indolence. Though decision on new issues is unanimously taken by the community minimizes introduction of undesirable idea into the area but absence of off-farm economic activities send the youth outside the study area and return back home with such undesirable ideas into the community. The work also recommends government provision of off-farm economic activities to keep the youth at home and to strengthen the idea of unanimous decision taken, provide knowledgeable extension workers and effective education in the area to keep the youth busy in the area and participate fully in its development. Encourage a forestation to increase soil fertility and check desertification.

1.0 INTRODUCTION

This research is conducted in semi-arid zone of Jigawa and Yobe states of northern Nigeria. Semi-arid area is the region which receives average annual rain fall of about 200-500mm (Heathcote,1983). The region comprises of part of Benin, Cameroon, Gambia and Nigeria (Salako, 2016). Desertification threaten agriculture which is the main occupation of the people of the study area, the term desertification is the process by which a geographic region becomes a desert. It can cause major drought that last for several decades during which the vegetation change more drastically and permanently resulting in for example drying off of trees (Sands, 2005)

According to Sands 2005, among the causes of desertification include overgrazing and deforestation. A part from stabilizing area for agric purpose, forest provide wealth of benefits to humanity but in the study area due to poverty, lack of awareness, top down approaches in forests management compelled the people of the study area to subject the forests to heavy pressure and unsustainably modified them to non forest use such as farmland oblivious of that can be derived from the forest resource.

Forest ecosystems refer to an area which beside trees, include soils, water and the multitude of assorted animals, micro organisms and other plants (Mortimore, 2004).

Forest also help to derive the general precipitation pattern and distribute heat to temperate zones (Sands, 2005). They are highly diverse ecosystems; supporting millions of species and supplying range of resources; lumber, veneer, pulpwood, and firewood in addition to these forests yield large number forage, animals and plants, medicine, non-wood fibres, furs, and skins, essential oils, Gums, waxes, latexes, and resin (IUCN, 1991). Thus forests provide substantial income and employment by providing conducive environment for crop production. The study area is curved out of Jigawa and Yobe because it is prone to desertification due high degree of deforestation of the area's scanty trees and high degree of over utilization of the resource as firewood for cooking and space heating during hamatan period (Yobe State Ministry of Environment, 2002,)

According to Hassan 2000, though actual extent and magnitude of desertification in Nigeria is still under investigation however, it is known to be affecting the country's eleven northern states and is regarded most pressing environmental problem in these states. A World Bank report put desertification to account for 73% of the $5.1 billion Nigeria loses annually to environmental degradation problems (Mohammed, S. 2004)

The research was purposively conducted in the rural part of the study area in order to get the target respondents. Over 65% of the people are peasant farmers and live in rural areas. The consequences of desertification manifested in the study area include drastic loss of agricultural produce, irregular annual rainfall variability, poor soil moisture retention, communal conflict and low soil fertility (Mortimore, 1989). Overdependence

on raining season for farming activities by the people of the study area results in serious food insecurity and poverty (Sabo, 2014). These conditions are further exacerbated by lack of opportunity for off-farm income generating activities lack of access to qualified agric extension workers to educate the farmers on suitable farming methods and unfavorable government policies on rural development are the problems that make the youth of the study area desperately looking for alternative source of income and consequently become easy target for recruitment by insurgents (Boone, 2002)

2.0 OBJECTIVES OF THE STUDY

The specific objectives of the study are to:

i. Identify socio-economic characteristics of the people of the study area;

ii. Examine the effect of desertification on crop and livestock production and youth recruitment by insurgents in the area;

iii. Examine the pattern of migration cause by lack of off-farm economic activities in the area;

iv. Explain the role education can play in reducing the rate of poverty and hunger and recruitments by insurgents;

v. Examine the causes of Lake TChad dryness;

vi. Examine the undesirable effects of over exploitation of forests resources and

vii. Examine the various government effort employed to mitigate desertification and its effects in the area.

3.0 METHODOLOGY

The study was conducted in semi-arid region of Jigawa and Yobe States. Ten local governments area from the two states with population of 1, 266, 615 according to 2006 head count (Wikipedia, 2017) were purposively selected.

The choice of these local government areas was based on the degree of visible environmental degradation caused by desertification on them and their youth than any other part of the two states where the research activity is possible. The local government areas are Bade, Geidam, Yunusari, Nguru, Yusufari, Karsuwa, Machina, Gumel, Maigatari and Kirikasamma. The study area is characterized by low amount of annual rain fall of less than 400mm with about sixty (60) days growing period starting from early July to late September (Mortimore, 1989). The major crop grown in the area are millet and guineacorn generally inter-cropped with cow pea, ground nut and sesame.

Sample and Sampling Technique

Data of the research was derived from the respondents using simple random sampling technique in which every individual from the study area of the 18 years and above is an eligible sample of the research work regardless of educational background, sexs or socio-economic status. Total of 386 questionnaire was administered to the

respondents based on Krejie and Morgan table of sample size determination (Wikipedia, 2017).The entire questionnaire was administered by self-administered method of questionnaire administration by the research However, only 375 questionnaire is used for data analysis by the study work due to their completeness.

Analytical Technique

The data of the research was analyzed by frequency and percentage. The research estimated livestock enterprises; cattle, sheep, and goat were considered the same and only their increase or decrease were used during the analysis by the research. A ten year period (2011-2021) was considered in the research data study.

Significance of the Study

According to Maslow's hierarchy of organism need in Adesanya, 1989, food occupy position number one on the hierarchy and also Julius Nyerere of Tanzania in FAO, 1978 suggested that only well-fed society is expected to contribute reasonably to the societal development, thus importance of food in the day to day life cannot be over emphasized. Also worth to be put into consideration is the saying that poverty, hunger and diseases are the pressing problems that can push individual to commit a lot of .wrongs which are avoidable in their absence (Convery, 2007). More than half of the people of the study area are subsistence farmers and depend entirely on rainfall for their livelihood (Sabo, 2014). Desertification reduces the amount of expected rainfall seriously in the area. A World Bank report put desertification to account for 73% of the $5.1 billion Nigeria loses annually to environmental degradation management (Mohammed, S. 2004). Reduction in crop and livestock production in the area due desertification make which the youths who are the families breadwinners in the area become desperately unstable to perform their role of putting food on the family's table as well as other expected responsibilities as such look for alternative means of survival including joining the cash awarding insurgents to get money for survival.

This research is hoped to inform the stakeholders in agriculture and public policy personnel sector of the economy in the area the sustainable way to properly manage desertification cause of environmental degradation problems, reduce over dependence on rain for food production by the farmers in the area, provide off-farm economic activities and acquire rescannable education for day to day life processes to the people of the area.

4.0 RESULT AND DISCUSSION

The study revealed that 67.47% of the respondents are at their productive age bracket of 18 to 38 (Fielder, 2006) this indicates that the society is in its active and productive age, adequately structured with able youth who are the backbone of the society's socio-economic development (Wilkins, 1970). Youth are also good recipient of every positive economic and social change in the environment (Sue, G. 1991). The practice of acquiring farmland

by inheritances retards the process of continuity in the farming process because as the time goes by the land inherited by individuals cannot sustain and support them in farming profession farm land per. Thus any intervention to provide for alternative means of livelihood is expected to be welcomed idea in the study area (Schole, 2003). The study also identified other means of economic survival to constitute about 34.66% only. One of the farming problems in Africa is acquisition of farmland through inheritance due the number of children lined to inherit land from the single polygamous parent (Wilkins, 1970) Etc.

Table 1: Socio-Economic Characteristic of the Respondent

Parameter	Frequency	Percentage
Age		
18-28	102	27.20
29-38	151	40.27
39-48	67	17.87
49-58	44	11.73
59 and above	11	2.93
Total	**375**	**100**
Sex		
Male	361	96.27
Female	14	3.93
Total	**375**	**100**
Marital status		
Married	327	87.27
Single	48	12.80
Total	**375**	**100**

Occupation		
Farming	245	65.34
Trading	12	3.25
Civil servant	59	15.73
Artisan	59	15.73
Total	**375**	**100**

Sources: Field Survey 2021

Educational Qualification		
Below secondary school	213	58.90
Secondary	121	32.27
Above secondary	41	10.93
Total	**375**	**100**
Farmland Acquisition		
Inheritance	296	79
Purchasing	23	06
Government Allocation	52	14
Other means	04	01
Total	**375**	**100**

Sources: Field Survey 2021

Table 2: Reduction in agricultural product (2011-2021)

Product Crop	**Responses**	**Frequency**	**Percentage**
	Yes	312	83.20
	No	63	16.80
	I don't know	0	
	Total	**375**	**100**

Livestock	Responses	Frequency	Percentage
	Yes	286	76.37
	No	87	23.73
	I don't know	0	0
	Total	**375**	**100**

Sources: Field Survey 2021

Table 2 indicates the reduction in crop and livestock production in the area from 2011 t0 2021, crop is the major food item in the study area. The table further shows that 83.20% of the respondents say there is reduction in crop production in recent years in the area and 76.27% say there is reduction in livestock number in the study area. Crop is categorized into food and cash crop. The food crop is for the family daily food requirement while the cash crop is for revenue generation to covers the food crop deficit or any other day to day cash requiring activities.

Due absence of the revenue generating off-farm economic activities or any other means of supporting livelihood in the study area it is customary for the able youth to go to places where there are off-farm economic activities after harvest to be able to generate cash to Prepare for next farming season actively and other money requiring activities.

Table 3: Youths Movement After Harvest

Description of movement	Frequency	Percentage
Lake Tchad	267	71.20
Other Cities	108	28.80
Total	**375**	**100**

Sources: Field Survey 2021

Table 3 indicates the able youth movement out of the study area in dry season after harvest in search of cash to support live. The table further showed that 71.20% of the respondents have notice movement of youth to Lake TChad area and 28.80% have seen the youth movement to other cities generally in southern part of the country for additional revenue to support farm work and other money requiring domestic issues. Despite the large number of youth migrating to Lake TChad region, one of the problems they encountered in lake area TChad is that water body for economic activities is narrowed by

the day due desertification, causing high and violent competition on the resource between the indigenous people and the immigrants.

Table 4: Respondents Perception of the cause of Reduction in Agric Product

Perception	Frequency	Percentage
End of The World	61	18.27
Sin Committed by the Leader	171	45.60
Sin Committed by the Society	131	43.97
Change of Weather	12	34.2
Total	**375**	**100**

Sources: Field Survey 2021

Only 34.20% of the respondents associated the cause to the change of weather according to table 4. Looking at the low level of the respondents western education background (table 1), it become imperative for the authorities in the study area to give adequate environmental education to the young ones in the area to learn to master the art of sustainable use of the environment and its resources while the adults are to be effectively mobilized on environmental issues. (NEAZDP, 2002).

Table 5: Decision on new issue in the area

Decision Makers	Frequency	Percentage
Authorizes	98	26
Elders only	60	16
Community	176	47
Elites	41	11
Total	**375**	**100**

Table 5 reveals who decide to accept or reject to be included new issue into the community. The table further revealed that 47% of the respondents opined that decision to accept or to reject introduction of any new issue in the community is decided by the community as a whole including rulers, elders, youths and elites. The importance of such unanimous decision taken procedure to the community is that before anything is introduced into the community it must have the blessing of the general members of the community. This could be the reason why despite the high poverty level and the urge

to get money by the youths of the area, insurgents cannot not recruit them at home; they have to wait until they to go to Lake TChad area before recruiting the youth of the study area into their group.

Table 6: Youth Returning to the area for next agricultural activities

Sex	Frequency	Percentage
Male	361	96.27
Female	14	3.93
Total	**375**	**100**

Sources: Field Survey 2021

Table 6 showed the percentage of the respondents who are of the opinion that some youth are not returning to the area after leaving for off-farm economic activities during the dry season. The table further shows that 96.27% are of the opinion that they have seen male youths who do not return to the area during the raining season and 3.73% have seen female youths who do not return to the area for next growing season. This may means that some youth do leave the area for greener posture or join insurgents.

Table 7: Ownership of the forest

Owner of forest	Frequency	Percentage
Government	301	80.00
Endearment	46	12.27
Community	29	7.73
Total	**375**	**100**

Sources: Field Survey 2021

Table 7 shows that 80% of the respondents are of the opinion that forests are government property. This problem is further compounded by the fact pointed out that; People with little or no education are very difficult to govern (Wilkins, 1970). The best way to manage forest in a community with low income and education such as the

study area is by participatory approach forest management (Sands, 2005)

Table 8: firewood use for cooking in my house

Responses	Frequency	Percentage
Yes	346	92.3
no	27	7.2
I don't know	2	0.5
Total	**375**	**100**

Sources: Field Survey 2021

In the above table 8 shows that 92.3% of the people of the study area are using firewood for domestic cooking and space heating. This is a clear indication of unsustainable over use of forest. Over collection of wood for use as firewood is enough cause deforestation in sub-Saharan Africa (Sands, 2005). Generally the nature of family in sub-Saharan Africa is dependent and extended type in which large number of individuals feed from one pot (Adesanya, 1989) Therefore choice of source of energy for cooking must be considered both in term of economy and availability (Sabo, 2014)

Table 9: some small and medium scale industries that are using firewood in my area

Responses	Frequency	Percentage
Yes	374	99.7
No	0	00
I don't know	01	0.3
Total	**375**	**100**

Sources: Field Survey 2021

In the study area as seen by 99.7% of the respondents, small and medium scale industries such as bakeries, beans cake sellers, pizza, roasted; charcoal broiled fried and cook meat seller set care using firewood for their business. This indicates high use of firewood as source of energy

.

Table 10: Government establishments that are using firewood

Responses	Frequency	Percentage
Yes	301	80.27
No	12	3.2
I don't know	62	15.53
Total	**375**	**100**

Sources: Field Survey 2021

Table 10 indicates that in addition to over use of firewood by homes for cooking and space heating and small and medium scale industries that are over using forests resource for energy in the study area, table 10 also show that, 80.27% of the respondents have seen some government establishments such as prison, schools, hospitals etc that, are using firewood for their energy requirement these together increase up the over utilization of this forests resources which cause deforestation especially in the area like the study area .

Table 11: Tracks are seen loaded with log

Responses	Frequency	Percentage
Yes	368	98.14
No	02	0.53
I don't know	5	1.33
Total	**375**	**100**

Table 11 shows that 98.14% of the respondents use to see tracks loaded with log of woods transported to towns for use as firewood. This will cause problem to the forests in the area.

Table 12: Large amount of wood is seen in the area for sale

Intervention	Frequency	Percentage
Yes	372	99.2
No	03	08
I don't know	0	00
Total	**375**	**100**

Sources: Field Survey 2021

Also table 12 shows 99.2% of the respondents have seen large quantity of wood unsustainably collected from the forests and display for sale to building and construction workers and firewood users. Poor environmental knowledge kills because individual receives little to the detriment of their community future including parent, and family unknowingly (Sue, G. 1991).

Table 13: Benefits that community derives from forest and their resources

Responses	Frequency	Percentage
Yes	294	78.40
No	46	12.27
I don't know	35	9.33
Total	**375**	**100**

Sources: Field Survey 2021

Table 13 shows that over 78% of the respondents are of the opinion that wealth of benefits can be derived from forests and their resources by people, plants and animals Tree planting and reforestation as well as sustainable forest management is the most affordable ways of fighting desertification in places like the study area (Sands, 205). With this results it only take little enlightenment education to incorporate the people to sustainable forest establishment.

Table 14: Government intervention to manage the environment degradation problems in the area

intervention	Frequency	Percentage
Three planting	29	7.73
Support irrigation farming	103	27.47
Agric loan	82	21.87
Poverty alleviation programme	70	18.66
Enlightenment	91	24.27
Total	**375**	**100**

Sources: Field Survey 2021

Table 14 revealed that government is aware of the environmental degradation problem in the area caused by desertification as such come out with number of interventions to manage this menace said the respondents. One of the interventions identified by 27.47% of the respondents is supported irrigation farming known as 'kadada' in the study area, the government provide support and train farmers in this type of rice irrigation farming . Also in support of this programme government establishes bodies like rice farmer association who assist farmers in rice production and marketing it in the area. Such programme keep the youth in the area at home and prevent them from leaving the area and improve their revenue generation 7.73% of the respondents have seen intervention in form of tree planting to fertilize the soil and stabilize the environment to fight desertification (Nwanna, 2000) Provision of sustainable mean of economic support to livelihood reduces pressure on forests (Sands, 2005)

CONCLUSION

The research work concluded that there is alarming reduction in crop and livestock production in the study area which brings about hunger and poverty. The research have noticed that the respondents are of the opinion that reduction in the agric output is caused by sin committed by the leaders and people of the area Poverty. The hunger and poverty level in the area compelled the youths to migrate to Lake TChad area in search of off farm economic activities where some of them get lured by the insurgent and join them. Also the work discovered that lack of proper education contributes to the deterioration of life in the study area and believed that reforestation and sustainable forests management are the best and affordable methods of fighting desertification in the study area. Forest and its resources in the area are believed to be owned by government, this encourage abuse of forests and their resources Another problem discovered by the research is acquisition of farmland by inheritance, this practice easily put youth of the study area out of farming business due reduction in farmland size inherited by the individual. People
of the area have notice government's positive workable intervention to tackle the environmental degradation problems and decision on new issues are unanimously taken by the community as this will go a long way in minimizing hunger, unrest and poverty and subsequent in evolvement in insurgency by youth.

5.0 RECOMMENDATION

The research work recommended the following to serve as the management strategies to curb down the pressing problems of poverty, hunger and unrest in the area. These recommendations are:

i. Provision of able extension workers to study the situation and recommend the appropriate farming method and crop that can thrive in the area

ii. Plant trees and manage them sustainably to improve the soil condition and allow the crop to thrive

iii. Give the children appropriate education with emphasis on environmental education and effective mass mobilization for the adult to learn the art of sustainable use of environment and its resources;

iv. Provision of means of off-farm economic activities to give the youths chance to stay at home in peace and help in developing their area;

v. Educate the people of the area on the importance of forest and its resources and mobilize them to learn its management by participatory forest management approach in which everyone is involved in the for estrangement;

vi. Government should develop and allocate farmland to the people of the area especially the youth to enable them acquire farmland and continue with the farming profession in a way other than inheritance and

vii. Forest should to be sustainably protected and utilize to benefit farmers and rearers because both of them like to be in forested area or a place close to forest, simply because reduction in forests size cause both parties to compete for available limited spaces and this may also force some of the rearers to migrate to places where there are forests and complete with their indigenous farmers and lead to conflicts and

viii. Encourage the provision of off farm means of generating income.

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Modelling and Simulation as Simulation for Technology Advancement

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Abstract

This introductory tutorial is an overview of simulation modelling and analysis. Many critical questions are answered in the paper. What is modelling? What is simulation? What is simulation modelling and analysis? What types of problems are suitable for simulation? How to select simulation software? What are the benefits and pitfalls in modelling and simulation? The intended audience is those unfamiliar with the area of discrete event simulation as well as beginners looking for an overview of the area. This includes anyone who is involved in system design and modification – system analysts, management personnel, engineers, military planners, economists, banking analysts, and computer scientists. Familiarity with probability and statistics is assumed.

KEYS
Modelling is the process of producing a model
Simulation of a system is the operation of a model of the system
Model is a representation of the construction and working of some system of interest
Machine shop contains two drills, one straightener, and one finishing operator

1.0 WHAT IS MODELING?

Modelling is the process of producing a model; a model is a representation of the construction and working of some system of interest. A model is similar to but simpler than the system it represents. One purpose of a model is to enable the analyst to predict the effect of changes to the system. On the one hand, a model should be a close approximation to the real system and incorporate most of its salient features. On the other hand, it should not be so complex that it is impossible to understand and experiment with it. A good model is a judicious trade-off between realism and simplicity (Banks 2007). Simulation practitioners recommend increasing the complexity of a model iteratively. An important issue in modelling is model validity. Model validation techniques include simulating the model under known input conditions and comparing model

output with system output. Generally, a model intended for a simulation study is a mathematical model developed with the help of simulation software. Mathematical model classifications include deterministic (input and output variables are
fixed values) or stochastic (at least one of the input or output variables is probabilistic); static (time is not taken into account) or dynamic (time-varying interactions among variables are taken into account). Typically, simulation models are stochastic and dynamic (Fishwick 2005).

2.0 WHAT IS SIMULATION?

A simulation of a system is the operation of a model of the system. The model can be reconfigured and experimented with; usually, this is impossible, too expensive or impractical to do in the system it represents. The operation of the model can be studied, and hence, properties concerning the behaviour of the actual system or its subsystem can be inferred. In its broadest sense, simulation is a tool to evaluate the performance of a system, existing or proposed, under different configurations of interest and over long periods of real time (Bratley2008). Simulation is used before an existing system is altered or a new system built, to reduce the chances of failure to meet specifications, to eliminate unforeseen bottlenecks, to prevent under or over-utilization of resources, and to optimize system performance. For instance, simulation can be used to answer questions like: What is the best design for a new telecommunications network? What are the associated resource requirements? How will a telecommunication network perform when the traffic load increases by 50%? How will a new routing algorithm affect its performance? Which network protocol optimizes network performance? What will be the impact of a link failure? The subject of this tutorial is *discrete event simulation* in which the central assumption is that the system changes instantaneously in response to certain discrete events. For instance, in an M/M/1 queue – a single server queuing process in which time between arrivals and service time are exponential - an arrival
causes the system to change instantaneously (Hogg 2012). On the other hand, continuous simulators, like flight simulators and weather simulators, attempt to quantify the changes in a system continuously over time in response to controls. Discrete event simulation is less detailed (coarser in its smallest time unit) than continuous simulation but it is much simpler to implement, and hence, is used in a wide variety of situations. Figure 1 is a schematic of a simulation study. The iterative nature of the process is indicated by the system under study becoming the altered system which then becomes the system under study and the cycle repeats. In a simulation study, human decision making is required at all stages, namely, model development, experiment design, output analysis, conclusion formulation, and
making decisions to alter the system under study. The only stage where human intervention is not required is the running of the simulations, which most simulation software packages perform efficiently. The important point is that powerful simulation software is merely a
hygiene factor - its absence can hurt a simulation study but its presence will not ensure success (Montgomery 1997). Experienced problem formulators and

simulation modellers and analysts are indispensable for a successful simulation study.

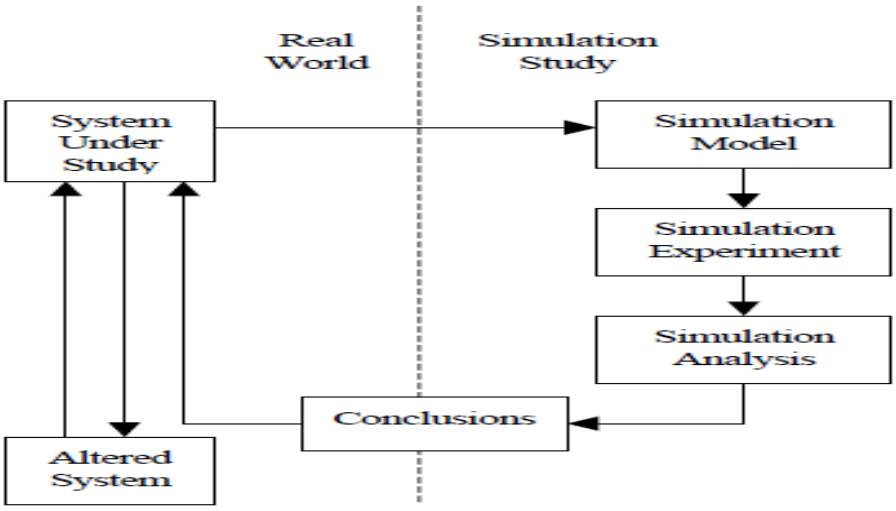

Figure 1: Simulation Study Schematic

The steps involved in developing a simulation model, designing a simulation experiment, and performing simulation analysis are:

Step1. Identify the problem.

Step2. Formulate the problem.

Step3. Collect and process real system data.

Step4. Formulate and develop a model.

Step5. Validate the model.

Step6. Document model for future use.

Step7. Select appropriate experimental design.

Step8. Establish experimental conditions for runs.

Step9. Perform simulation runs.

Step10. Interpret and present results.

Step11. Recommend further course of action.

Although this is a logical ordering of steps in a simulation study, many iterations at various sub-stages may be required before the objectives of a simulation study are achieved. Not all the steps may be possible and/or required. On the other hand, additional steps may have to be performed. The next three sections describe these steps in detail.

3 HOW TO DEVELOP A SIMULATION MODEL?

According Law 1998, simulation models consist of the following components:

system entities, input variables, performance measures, and functional relationships. For instance in a simulation model of an M/M/1 queue, the server and the queue are system entities, arrival rate and service rate are input variables, mean wait time and maximum queue length are performance measures, and 'time in system = wait time + service time' is an example of a functional relationship. Almost all simulation software packages provide constructs to model each of the above components. Modelling is arguably the most important part of a simulation study. Indeed, a simulation study is as good as the simulation model. Simulation modelling comprises the following steps:

Step1. Identify the problem. Enumerate problems with an existing system. Produce requirements for a proposed system.

Step2. Formulate the problem. Select the bounds of the system, the problem or a part thereof, to be studied. Define overall objective of the study and a few specific issues to be addressed. Define performance measures - quantitative criteria on the basis of which different system configurations will be compared and ranked. Identify, briefly at this stage, the configurations of interest and formulate hypotheses about system performance. Decide the time frame of the study, i.e., will the model be used for a one-time decision (e.g., capital expenditure) or over a period of time on a regular basis (e.g., air traffic scheduling). Identify the end user of the simulation model, e.g., corporate management versus a production supervisor. Problems must be formulated as precisely as possible.

Step3. Collect and process real system data.

Collect data on system specifications (e.g., bandwidth for a communication network), input variables, as well as performance of the existing system. Identify sources of randomness in the system, i.e., the stochastic input variables. Select an appropriate input probability distribution for each stochastic input variable and estimate corresponding parameter(s).

Software packages for distribution fitting and selection include Expert Fit, Best Fit, and add-ons in some standard statistical packages. These aids combine goodness-of-fit tests, e.g., $\chi 2$ test, Kolmogorov-Smirnov test, and Anderson-Darling test, and parameter estimation in a user friendly format. Standard distributions, e.g., exponential, Poisson, normal, hyper exponential, etc., are easy to model and simulate. Although most simulation software packages include many distributions as a standard feature, issues relating to random number generators and generating random variants from various distributions are pertinent and should be looked into. Empirical distributions are used when standard distributions are not appropriate or do not fit the available system data. Triangular, uniform or normal distribution is used as a first guess when no data are available. For a detailed treatment of probability distributions see Maria and Zhang (1997).

Step4. Formulate and develop a model. Develop schematics and network diagrams of the system (How do entities flow through the system?). Translate these conceptual models to simulation software acceptable form. Verify that the simulation model executes as intended. Verification techniques include traces, varying input parameters over their acceptable range and checking the output, substituting constants

for random variables and manually checking results, and animation.

Step5. Validate the model. Compare the model's performance under known conditions with the performance of the real system. Perform statistical inference tests and get the model examined by system experts. Assess the confidence that the end user places on the model and address problems if any. For major simulation studies, experienced consultants advocate a structured presentation of the model by the simulation analyst(s) before an audience of management and system experts. This not only ensures that the model assumptions are correct, complete and consistent, but also enhances confidence in the model.

Step6. Document model for future use. Document objectives, assumptions and input variables in detail.

4 HOW TO DESIGN A SIMULATION EXPERIMENT?

A simulation experiment is a test or a series of tests in which meaningful changes are made to the input variables of a simulation model so that we may observe and identify the reasons for changes in the performance measures. The number of experiments in a simulation study is greater than or equal to the number of questions being asked about the model (e.g., Is there a significant difference between the mean delay in communication networks A and B?, Which network has the least delay: A, B, or C? How will a new routing algorithm affect the performance of network B?). Design of a simulation experiment involves answering the question: what data need to be obtained, in what form, and how much? The following steps illustrate the process of designing a simulation experiment.

Step7. Select appropriate experimental design. Select a performance measure, a few input variables that are likely to influence it, and the levels of each input variable. When the number of possible configurations (product of the number of input variables and the levels of each input variable) is large and the simulation model is complex, common second-order design classes including central composite, Box-Behnken, and full factorial should be considered. Document the experimental design.

Step8. Establish experimental conditions for runs. Address the question of obtaining accurate information and the most information from each run. Determine if the system is stationary (performance measure does not change over time) or non-stationary (performance measure changes over time). Generally, in stationary systems, steady-state behavior of the response variable is of interest. Ascertain whether a terminating or a nonterminating simulation run is appropriate. Select the run length. Select appropriate starting conditions (e.g., empty and idle, five customers in queue at time 0). Select the length of the warm-up period, if required. Decide the number of independent runs - each run uses a different random number stream and the same starting conditions - by considering output data sample size. Sample size must be large enough (at least 3-5 runs for each configuration) to provide the required confidence in the performance measure estimates. Alternately, use common random numbers to compare alternative configurations by using a separate random number stream for each sampling

process in a configuration. Identify output data most likely to be correlated.

Step9. Perform simulation runs. Perform runs according to steps 7-8 above.

5 HOW TO PERFORM SIMULATION ANALYSIS?

Most simulation packages provide run statistics (mean, standard deviation, minimum value, maximum value) on the performance measures, e.g., wait time (non-time persistent statistic), inventory on hand (time persistent statistic). Let the mean wait time in an M/M/1 queue observed from n runs be W1,W2 ,...,Wn . It is important to understand that the mean wait time W is a random variable and the objective of output analysis is to estimate the true mean of W and to quantify its variability (Naylor 1997). Notwithstanding the facts that there are no data collection errors in simulation, the underlying model is fully known, and replications and configurations are user controlled, simulation results are difficult to interpret. An observation may be due to system characteristics or just a random occurrence. Normally, statistical inference can assess the significance of an observed phenomenon, but most statistical inference techniques assume independent, identically distributed data (Kleijnen 1997). Most types of simulation data are auto correlated, and hence, do not satisfy this assumption. Analysis of simulation output data consists of the following steps.

Step10. Interpret and present results. Compute numerical estimates (e.g., mean, confidence intervals) of the desired performance measure for each configuration of interest. To obtain confidence intervals for the mean of auto correlated data, the technique of batch means can be used. In batch means, original contiguous data set from a run is replaced with a smaller data set containing the means of contiguous batches of original observations. The assumption that batch means are independent may not always be true; increasing total sample size and increasing the batch length may help. Test hypotheses about system performance. Construct graphical displays (e.g., pie charts, histograms) of the output data. Document results and conclusions.

Step 11. Recommend further course of action. This may include further experiments to increase the precision and reduce the bias of estimators, to perform sensitivity analyses, etc.

6 AN EXAMPLE

A machine shop contains two drills, one straightener, and one finishing operator. Figure 2 shows a schematic of the machine shop. Two types of parts enter the machine shop.

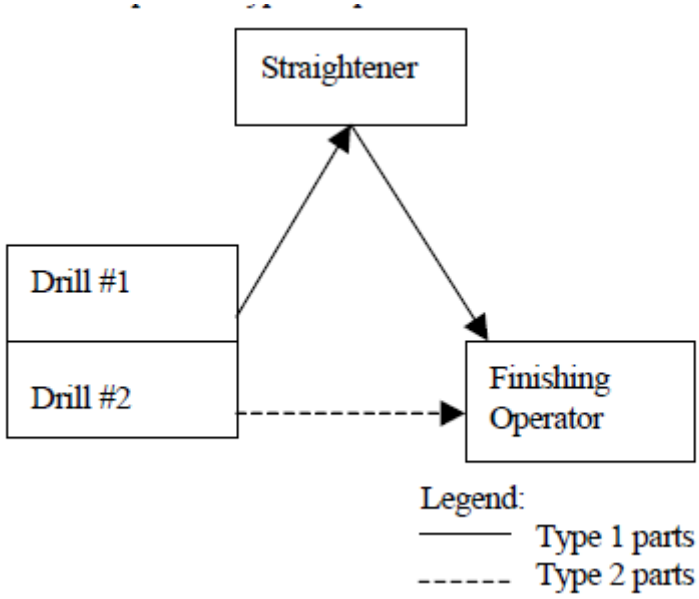

Figure 2: Schematic of the Machine Shop

Type 1 parts require drilling, straightening, and finishing in sequence. Type 2 parts require only drilling and finishing. The frequency of arrival and the time to be routed to the drilling area are deterministic for both types of parts.

Step1. Identify the problem. The utilization of drills, straightener, and finishing operator needs to be assessed. In addition, the following modification to the original system is of interest: the frequency of arrival of both parts is exponential with the same respective means
as in the original system.

Step2. Formulate the problem. The objective is to obtain the utilization of drills, straightener, and finishing operator for the *original system* and the *modification*. The assumptions include:

- The two drills are identical
- There is no material handling time between the three operations.
- Machine availability implies operator availability.
- Parts are processed on a FIFO basis.
- All times are in minutes.

Step3. Collect and process real system data. At the job shop, a Type 1 part arrives every 30 minutes, and a Type 2 part arrives every 20 minutes. It takes 2 minutes to route a Type 1 part and 10 minutes to route a Type 2 part to the drilling area. Parts wait in a queue till one of the two drilling machines becomes available. After drilling, Type 1 parts are routed to the straightener and Type 2 parts are routed to the finishing operator. After straightening, Type
1 parts are routed to the finishing operator. The operation times for either part were determined to be as follows. Drilling time is normally distributed with mean 10.0 and standard deviation 1.0. Straightening time is exponentially distributed with a mean of 15.0. Finishing requires 5 minutes per part.

Step4. Formulate and develop a model. A model of the system and the modification was developed using a simulation package. A trace verified that the parts flowed through the job shop as expected.

Step5. Validate the model. The utilization for a sufficiently long run of the original

system was judged to be reasonable by the machine shop operators.

Step6. Document model for future use. The models of the original system and the modification were documented as thoroughly as possible.

Step7. Select appropriate experimental design. The original system and the modification described above were studied.

Step8. Establish experimental conditions for runs. Each model was run three times for 4000 minutes and statistical registers were cleared at time 1000, so the statistics below were collected on the time interval [1000, 4000]. At the beginning of a simulation run, there were no parts in the machine shop.

Step9. Perform simulation runs. Runs were performed as specified in Step 8 above.

Step10. Interpret and present results. Table 1 contains the utilization statistics of the three operations for the original system and the modification (in parentheses).

Table 1: Utilization Statistics

	Drilling	Straightening	Finishing
Mean Run #1	0.83 (0.78)	0.51 (0.58)	0.42 (0.39)
Mean Run #2	0.82 (0.90)	0.52 (0.49)	0.41 (0.45)
Mean Run #3	0.84 (0.81)	0.42 (0.56)	0.42 (0.40)
Std. Dev. Run #1	0.69 (0.75)	0.50 (0.49)	0.49 (0.49)
Std. Dev. Run #2	0.68 (0.78)	0.50 (0.50)	0.49 (0.50)
Std. Dev. Run #3	0.69 (0.76)	0.49 (0.50)	0.49 (0.49)

Mean utilization represents the fraction of time a server is busy, i.e., busy time/total time. Furthermore, the average utilization output for drilling must be divided by the number of drills in order to get the utilization per drill. Each drill is busy about 40% of the time and straightening and finishing operations are busy about half the time. This implies that for the given work load, the system is underutilized. Consequently, the average utilization did not

change substantially between the original system and the modification; the standard deviation of the drilling operation seems to have increased because of the increased randomness in the modification. The statistical significance of these observations can be determined by computing confidence intervals on the mean utilization of the original and modified systems.

Step11. Recommend further course of action. Other performance measures of interest may be: throughput of parts for the system, mean time in system for both types of parts, average and maximum queue lengths for each operation. Other modifications of interest may be: the

flow of parts to the machine shop doubles, the finishing operation will be repeated for 10% of the products on a probabilistic basis.

7. WHAT MAKES A PROBLEM SUITABLE FOR SIMULATION MODELING AND ANALYSIS?

In general, whenever there is a need to model and analyse randomness in a system, simulation is the tool of choice. More specifically, situations in which

simulation modelling and analysis is used include the following:

♦ It is impossible or extremely expensive to observe certain processes in the real world, e.g., next year's cancer statistics, performance of the next space shuttle, and the effect of Internet advertising on a company's sales.

♦ Problems in which mathematical model can be formulated but analytic solutions are either
impossible (e.g., job shop scheduling problem, high order difference equations) or too complicated (e.g., complex systems like the stock market, and large scale queuing models).

♦ It is impossible or extremely expensive to validate the mathematical model describing the system, e.g., due to insufficient data. Applications of simulation abound in the areas of government, defence, computer and communication systems, manufacturing, transportation (air traffic control), health care, ecology and environment, sociological and behavioral studies, biosciences, epidemiology, services (bank teller scheduling), economics and business analysis.

8. HOW TO SELECT SIMULATION SOFTWARE?

Although a simulation model can be built using general purpose programming languages which are familiar to the analyst, available over a wide variety of platforms, and less expensive, most simulation studies today are implemented using a simulation package. The advantages are reduced programming requirements; natural framework for simulation modeling; conceptual guidance; automated gathering of statistics; graphic symbolism for communication; animation; and increasingly, flexibility to change the model (Charnes 2012). There are hundreds of simulation products on the market, many with price tags of N800,000 or more. Naturally, the question of how to select the best simulation software for an application arises. Metrics for evaluation include modelling flexibility, ease of use, modelling structure (hierarchical v/s flat; object-oriented v/s nested), code reusability, graphic user interface, animation, dynamic business graphics, hardware and software requirements, statistical capabilities, output reports and graphical plots, customer support, and documentation. The two types of simulation packages are simulation languages and application-oriented simulators (Table 2). Simulation languages offer more flexibility than the application-oriented simulators. On the other hand, languages require varying amounts of programming expertise (Nelson 1995). Application-oriented simulators are easier to learn and have modeling constructs closely related to the application. Most simulation packages incorporate animation which is excellent for communication and can be used to debug the simulation program; a "correct
looking" animation, however, is not a guarantee of a valid model. More importantly, animation is not a substitute for output analysis.

Table 2: Simulation Packages

Type Of Simulation Package	Examples
Simulation languages	Arena (previously SIMAN), AweSim! (previously SLAM II), Extend, GPSS, Micro Saint, SIMSCRIPT, SLX *Object-oriented software*: MODSIM III, SIMPLE++ *Animation software*: Proof Animation
Application -Oriented Simulators	*Manufacturing*: AutoMod, Extend+MFG, FACTOR/AIM, ManSim/X, MP$IM, ProModel, QUEST, Taylor II, WITNESS *Communications/computer*: COMNET III, NETWORK II.5, OPNET Modeler, OPNET Planner, SES/Strategizer, SES/workbench *Business*: BP$IM, Extend+BPR, ProcessModel, ServiceModel, SIMPROCESS, Time machine *Health Care*: MedModel

9. BENEFITS OF SIMULATION MODELING AND ANALYSIS

According to practitioners, simulation modelling and analysis is one of the most frequently used operations research techniques. When used judiciously, simulation modelling and analysis makes it possible to:

♦ Obtain a better understanding of the system by developing a mathematical model of a system of interest, and observing the system's operation in detail over long periods of time.

♦ Test hypotheses about the system for feasibility.

♦ Compress time to observe certain phenomena over long periods or expand time to observe a complex phenomenon in detail.

♦ Study the effects of certain informational, organizational, environmental and policy changes on the operation of a system by altering the system's model; this can be done without disrupting the real system and significantly reduces the risk of experimenting with the real system.

♦ Experiment with new or unknown situations about which only weak information is available.

♦ Identify the "driving" variables - ones that performance measures are most sensitive to - and the inter-relationships among them.

♦ Identify bottlenecks in the flow of entities (material, people, etc.) or information.

♦ Use multiple performance metrics for analyzing system configurations.

♦ Employ a systems approach to problem solving.

♦ Develop well designed and robust systems and reduce system development time.

10 WHAT ARE SOME PITFALLS TO GUARD AGAINST IN SIMULATION?

Simulation can be a time consuming and complex exercise, from modelling through output analysis, that necessitates the involvement of resident experts and decision makers in the entire process. Following is a checklist of pitfalls to guard against.

♦ Unclear objective.

♦ Using simulation when an analytic solution is appropriate.
♦ Invalid model.
♦ Simulation model too complex or too simple.
♦ Erroneous assumptions.
♦ Undocumented assumptions. This is extremely important and it is strongly suggested that
assumptions made at each stage of the simulation modelling and analysis exercise be documented thoroughly.
♦ Using the wrong input probability distribution.
♦ Replacing a distribution (stochastic) by its mean (deterministic).
♦ Using the wrong performance measure.
♦ Bugs in the simulation program.
♦ Using standard statistical formulas that assume independence in simulation output analysis.
♦ Initial bias in output data.
♦ Making one simulation run for a configuration
♦ Poor schedule and budget planning.
♦ Poor communication among the personnel involved in the simulation study.

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The comparative Study of the Effective Performance of Wireless Sound Transmission in five selected devices

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ABSTRACT

The comparative performance of five selected sound transmission devices has been achieved through successful installation of microphone, Bluetooth, headphones, live video transmitter and voice transmission in a multipurpose lecture hall (500 seaters capacity). A pop ulation of fifty (50) students was sampled out of five hundred (500) during the study, the analysis was prolonged up to one week with a view to obtain efficient data and result. It has been confirmed that microphone is found to have higher sound transmission efficiency while headphones with lower sound transmission efficiency compared to the rest of the other selected devices.

Keywords: Wireless, Sound, Transmission, Communication, Network, System.

1.0 INTRODUCTION

Wireless communication plays a significant role in day to day life. Besides communication, wireless technology has become an integral part of our daily activities. The transmission of data or information from one place to another witlessly is referred as wireless communication. This provides an exchange of data without any conductor through RF and radio signals. The information is transmitted across the devices over some meters to hundreds of kilometres through well-defined channels. The term wireless refers to communication without wires. In order to transmit information (voice or data) using wireless communication we need antenna. The antenna is the device which couples RF energy from one medium (i.e. wave guide, transmission line, etc.) to the other medium (i.e. air). We require two systems viz. transmitter and receiver to complete end to end wireless link. Wireless communication uses electromagnetic waves as medium for carrying the information through the channel between transmitter and receiver (Prashant, 2009). The term wireless refers to communication without wires. In order to transmit information (voice or data) using wireless communication we need antenna. The antenna is the device which couples RF energy from one medium (i.e. waveguide, transmission line etc.) to the other medium (i.e. air). We require two systems viz. transmitter and receiver to complete end to end wireless link. Wireless communication uses electromagnetic waves as medium for carrying the information through the channel between transmitter and receiver. The wireless communication revolution is bringing fundamental changes to data networking, telecommunication, and is

making integrated networks a reality. By freeing the user from the cord, personal communications networks, wireless LAN's, mobile radio networks and cellular systems, harbour the promise of fully distributed mobile computing and communications, anytime, anywhere. Focusing on the networking and user aspects of the field, Wireless Networks provides a global forum for archival value contributions documenting these fast growing areas of interest. The journal publishes refereed articles dealing with research, experience and management issues of wireless networks. Its aim is to allow the reader to benefit from experience, problems and solutions described. The primary and important benefit of wireless communication is mobility. Apart from mobility, wireless communication also offers flexibility and ease of use, which makes it increasingly popular day – by – day. Wireless Communication like mobile telephony can be made anywhere and anytime with a considerably high throughput performance (Linebaugh and Kate, 2013). Another important point is infrastructure. The setup and installation of infrastructure for wired communication systems is an expensive and time consuming job. The infrastructure for wireless communication can be installed easily and low cost. In emergency situations and remote locations, where the setup of wired communication is difficult, wireless communication is a viable option.

Communication in its simplest form is the transmission of information from one point to another via a medium either wired or wireless and is a bidirectional process (Anokh and Chhabra, 2007). Wired networks establish connection between various devices through connecting media such as cables and routers. Whether wired or wireless communication systems, all have network topology, which is the schematic form of switching elements, transmission links, routers and other peripherals. Network topologies are categorized into two distinct classes namely: physical network layout and logical network layout (Rajput, 2009). Wireless local area networks are commonly implemented using the Institute of Electrical and Electronic Engineers (IEEE) 802.11 standard. Wider area coverage is made possible by utilizing General Packet Radio Service (GPRS) the existing mobile phone infrastructure for the transmission. The integration between packet use and voice communication further evolved with the deployment of Third Generation and Universal Mobile Telecommunications Service (3G/UMTS), (Keren, 2011). This system is specially designed to carry packet data, video and voice communication with much higher capability, than previous wide area coverage networks. With the adoption of network technologies for the purpose of, education, business, banking and defence etc., these interconnected set of computer systems permits interactive resource sharing between connected pair of systems (Sharma, 2007). Rapid advances have taken place in the field of wired and wireless networks. The traditional wired transmission medium provides high speed connectivity but poses constraints like immobility and extensive cabling. Wireless communication is a flexible data communication system implemented as an extension to or as an alternative to wired communication (Randhawa and Hardy,

2002). The wireless technologies employ infrared, spread spectrum and microwave radio transmission techniques with varying data rates. Though wireless technology provides convenience and advantages like ease of mobility, scalability and flexibility, it has certain drawbacks like speed, range, reliability, security, bit error rate (BER) and hidden terminal problems (Tamar, 2000). The Wireless Local Area Network (WLLAN) is based on IEEE 802.11 standard using Carrier Sense Multiple Access with Collision Avoidance (CSMA/CA) MAC protocol as access method. The wired Local Area Network (WDLAN) is based on IEEE 802.3 (Ethernet) standard with carrier sense medium access with collision detection (CSMA/CD) MAC protocol, as access method. In this research work the performance analysis of wired and wireless communication networks was carried out using some performance metrics, such as throughput, Packet Delay, Bit Error Rate (BER) and Signal to Noise Ratio (SNR) as a basis for comparison. In more recent times most researches on network performance were centred on TCP. A holistic view encompassing both throughput, delay and bit error rate in TCP, IPV4 and IPV6 remained relatively unstudied and this motivated this work. Several works have been done in different aspects of performance characterization of the IEEE 802 Standards. High quality services in both wired and wireless networks environment, accurate tracking and location prediction is one of the ways to significantly improve the performance and reliability of networks protocols and infrastructure. (Satish, 2012) compared wired and wireless networks in the area of installation, cost reliability and performance.

The performance parameters evaluated were throughput, data dropped, traffic received and collision counts. The authors analysed the wired and the wireless networks using OPNET simulator but, no physical measurement were made. (Rahul, 2011), the author cantered his performance analysis of wired and wireless computer networks on congestion control mechanism. The congestion control mechanism, is an important issue in designing any good network. The congestion control involves two factors that measures the performance of networks, i.e. delay and Throughput and the author analysed the two performance metrics using OPNET simulator. This work was purely simulation. Traffic patterns have significant impact on network performance. Analytical models for the performance evaluation of wired interconnection networks and integrated wireless network have been widely reported. However, most of these models are developed under simplified assumption of non-bursty poison process with uniform distributed message destinations. In light of the above, the author developed analytical model and propose it to evaluate end to end delay and throughput of wired and wireless local area networks under traffic patterns exhibited by real word applications. (Yulei and Dhobale, 2014), investigated the performance of wired and wireless networks. The performance of both networks were evaluated on the basis of a common parameter, throughput, to know how both networks behaves.

The evaluation analysis was done using OPNET simulation environment. In (Rahul, 2010), the authors carried out performance analysis of IEEE802.11b wireless and IEEE802.3 wired LANs standards using soft computing techniques for their performance comparison by varying the attributes of network objects such as traffic loads, file size, RTS/CTS, customizing the physical characteristics to vary BER, slot time to determine their impact on throughput and delay. In (Salam, 2007), the authors evaluated the performance of IEEE 802.116 wireless LAN applied in E-learning classroom. They used OPNET IT 9.1 simulator in their simulations to study E-learning classroom area network scenario. They build a model of browsing behaviour of E-learning and web client and investigated the performance of ELearning classroom area network based on these performance metrics, delay, throughput and web object size. And their results showed that IEEE 802.11b WLAN have a minimum delay, high throughput and can support up to 50 clients. In (Abdul, 2006), the authors carried out performance comparison of TCP and UDP over wired and wireless LAN. They used DSDV routing protocols to evaluate their performance. They compared TCP and UDP in terms of throughput using network simulator-2. Their results showed that the wired network has better performance than the wireless network in terms of throughput. The objective of this paper is to evaluate the performance of wired and wireless communication systems by carrying out measurement of throughput, delay and bit error rate in both networks

2.0 MATERIALS AND METHODS

Design of Study

The design used in this research work is the descriptive/correlative research design using the correlation study type, so as to find out the most effective wireless sound transmission out of the five selected devices: (Wireless microphone, wireless Bluetooth, wireless headphones, wireless line video transmitter, wireless voice transmission). All the five selected wireless sound transmission devices have been installed in multipurpose lecture hall, the data collected is used for comparative analysis.

Area of the Study

The research work is carried out in Mai Idriss Alooma polytechnic, Geidam by choosing a multipurpose. Fifty (50) people has been sample for this study.

Population

A population of 500 students has been researched on, 50 students from the study area i.e. multipurpose hall.

Sample and sampling procedure

The students sampled is done using the simple random sampling method.

Students sampling

The sample is drawn from a multipurpose hall.

Instrument for data collection

The instrument used for collecting data in this research study is questionnaires through network modelling.

3.0 RESULTS AND DISCUSSION

The result of network modelling of Throughput (T), Delay (D) and Bit Error Rate(BER) are presented in Table 1, 2 and 3. The wireless devices has a Throughputs values of $15*10^2$ Kbps with overall average of $52*10^2$ Kbps.

Table 1: Average values of Throughput for the five sound transmission devices (Wireless network)

		Device Name					Sound Transmission efficiency				
Hall Name	**Number of Days**	**D1**	**D2**	**D3**	**D4**	**D5**	**D1**	**D2**	**D3**	**D4**	**D5**
Multipurpose Hall	1	Microphone	Bluetooth	Headphones	Line video transmitter	Voice Transmission	$28*10^2$	$79*10^2$	$33*10^2$	$26*10^2$	$43*10^2$
	2						$44*10^2$	$13*10^2$	$27*10^2$	$48*10^2$	$12*10^2$
	3						$14*10^2$	$21*10^2$	$28*10^2$	$33*10^2$	$62*10^2$
	4						$12*10^2$	$30*10^2$	$18*10^2$	$48*10^2$	$40*10^2$
	5						$95*10^2$	$19*10^2$	$11*10^2$	$76*10^2$	$22*10^2$
	6						$84*10^2$	$15*10^2$	$64*10^2$	$80*10^2$	$29*10^2$

Table 2: Average values of Delay for the five sound transmission devices (Wireless network)

		Device Name					Delay in Sound Transmission efficiency				
Hall Name	**Number of Days**	**D1**	**D2**	**D3**	**D4**	**D5**	**D1**	**D2**	**D3**	**D4**	**D5**
Multipurpose Hall	1	Microphone	Bluetooth	Headphones	Line video transmitter	Voice Transmission	3	9	5	3	58
	2						2	5	4	4	20
	3						3	3	5	10	31
	4						5	4	5	15	55
	5						4	8	6	42	26
	6						4	5	0	80	28

Table 3: Average values of Bit Error Rate for the five sound transmission devices (Wireless network)

		Device Name					Bit Error Rate Sound Transmission efficiency				
Hall Name	**Number of Days**	**D1**	**D2**	**D3**	**D4**	**D5**	**D1**	**D2**	**D3**	**D4**	**D5**
Multipurpose Hall	1	Microphone	Bluetooth	Headphones	Line video transmitter	Voice Transmission	$14*10^{-3}$	$57*10^{-7}$	$61*10^{-7}$	$28*10^{-7}$	$11*10^{-4}$
	2						$23*10^{-3}$	$16*10^{-3}$	$25*10^{-7}$	$54*10^{-7}$	$68*10^2$
	3						$8*10^{-4}$	$16*10^{-3}$	$44*10^{-7}$	$15*10^{-4}$	$62*10^{-6}$
	4						$19*10^{-3}$	$20*10^{-3}$	$89*10^{-7}$	$31*10^{-6}$	$22*10^{-6}$
	5						$1*10^{-4}$	$17*10^{-6}$	$94*10^{-6}$	$66*10^{-6}$	$32*10^{-6}$
	6						$23*10^{-3}$	$10*10^{-6}$	$40*10^{-7}$	$24*10^{-4}$	$17*10^{--6}$

From table 1 above, D1 (microphone) is said to have higher sound transmission efficiency compared to the rest of the selected sound transmission devices. While, D3 (headphones is found to have lowest sound transmission device.

With regard to delay from table 2, D5 (voice transmission) is found to be higher delay in terms of sound transmission compared to the rest of four sound transmission devices. While D1 (microphone) is found to have less delay in terms of sound transmission.

Finally, from table 3 i.e. Bit Error rate (BER), D3 (headphones) is confirmed to record higher frequency compared to the other four selected sound transmission devices. While, microphone estimated to have lower Bit Errow Rate compared to the rest of wireless sound transmission.

Wired networks establish connection between various devices through connecting media such as cables and routers. Whether wired or wireless communication systems, all have network topology, which is the schematic form of switching elements, transmission links, routers and other peripherals. Network topologies are categorized into two distinct classes namely: physical network layout and logical network layout (Rajput, 2009). Wireless local area networks are commonly implemented using the Institute of Electrical and Electronic Engineers (IEEE) 802.11 standard. Wider area coverage is made possible by utilizing General Packet Radio Service (GPRS) the existing mobile phone infrastructure for the transmission. The integration between packet use and voice communication further evolved with the deployment of Third Generation and Universal Mobile Telecommunications Service (3G/UMTS), (Keren, 2011). This system is specially designed to carry packet data, video and voice communication with much higher capability, than previous wide area coverage networks. With the adoption of network technologies for the purpose of, education, business, banking and defence etc., these interconnected set of computer systems permits interactive resource sharing between connected pair of systems (Sharma, 2007).

4.0 CONCLUSION

In a nutshell, in this study the application of wireless technology in academia (Teaching and learning) has been analyse using five selected wireless sound transmission devices such as Wireless microphone, wireless Bluetooth, wireless headphones, wireless line video transmitter, wireless voice transmission with a view to ascertain their efficiency, effectiveness and durability through a comparative analysis. Results obtained from this investigation will be beneficial to academicians, press and media.

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