



Expert Information for Determining and Ranking of Risk Factors of Drug Use/Abuse

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Abstract

The study attempts to develop an Analytic Hierarchy Process Model using expert's information for identifying and ranking of risk factors of drug use/abuse. The data was obtained using questionnaire from experts on drug use/abuse after a pilot survey was conducted in the study area in order to identify factors that are peculiar to the area, which as a result an additional factor was identified which was not reported in the existing literature that is, almajiri school system. Eight risk factors were compared based on Saaty pair wise comparison by the study groups (NDLEA staff, Drug users/abusers, Health practitioners and parents). The results indicated as follows: Environment (0.217), Individual (0.170), Parents (0.159), School (0.107), Peer pressure group (0.86), Religiosity (0.103), Poverty (0.085), Almajiri System of School (0.075). Both its consistency index and ratio are less than 1, meeting the theoretical requirement of AHP. The study recommends further research to be conducted by varying parameters used in this study to be able to validate the model leading to generalization of the model and incorporating into the model participation through internet and analysis through computer programming/coding is a prospect worth further studies.

Keywords: *Analytic Hierarchy Process, Experts, Almajiri, Drug use/abuse, Peer pressure group*

Introduction

Background of the Study

All human societies are dealing with different problems, these unpleasant problems have forced human's mind to think about how to remove, reduce or control them (Mirzaei, Zamani, and Mousavi, 2011). Today, substance abuse is one of the major problems of all communities and societies around the globe. Our communities also are not free from such problems, therefore the need to also remove, reduce or control them. The history of humanity is also the history of substance abuse and no country is immune to the devastating effects of substance abuse (United Nations Office on Drugs and Crime (UNODC), 2017). Over the past decades, the use of illegal substances spread at an unprecedented rate and reached every part of the world (UNODC, 2017).

Since time immemorial, herbs, roots, bark leaves, and plants were used for pain relief and help to cure and control diseases. Scientifically, any substance that affects the function of living cells used in medicine to diagnose, cure or prevent the occurrence of disease and disorder is called a drug (Maithya, 2009). Therefore, proper drug administration is a medical blessing.

There is no universal agreement on the definition of the term drug abuse.

Generally, drug in positive portion is a certain chemical substance that has a power to treat, diagnose, and cure a disease (Mohammed, 2007). Drug has the ability to change normal body function, moods, perception, consciousness or behavior as a consequence of alteration in the brain. Drug becomes harmful if taken in inappropriate schedule and dose. Abdallahi (2009) viewed drug abuse as the use of drugs to the extent that interferes with the health and social function of an individual.

Drug abuse has caused dramatic social, economic, political and hygienic damages to the country, among which physical and contagious disease such as AIDS, Hepatitis and mental social disease (Mokri, 2002). These ominous phenomenon resulted from many factors.

Drugs of abuse are generally classified within three major groupings: (a) Depressants, such as alcohol, opioid; (b) Stimulants, such as amphetamines and cocaine and (c) Hallucinogens (Akande 2009; APA 2011; Berggley 2010; Borne. 2011; American cancer society; 2009; Teo *et al*; 2009; Zickler, 2008 ; Compton *et al*; 2014). Widely used illegal drug and abuse of marijuana is the most common of all the substance abuse disorder

involving illicit drugs (Compton *et al*; 2014). The drug abuse and addiction causes a lot of damage to human and the societies.

In most of the times, a sequence of factors is influential on incidence of the problems. However, in certain cultural and social contexts and for each individual, specific factor plays a more significant role. Many different personality factors are involved in drug abuse, some act as predictors of addiction probability.

Analytic Hierarchy Process is a commonly used approach for determining weights that can rank factors and alternatives requires pair wise comparison of factors and alternatives for determination of weights. AHP model was applied also in various fields of research among which are. Reynolds and Holsten (1994), examined relative importance of risk factors for Spruce beetle outbreaks using AHP based on a hierarchical model. Yao *et al*; (2009) applied AHP in shipyard project investment risk recognition. Li and Mohamed (2013) explored risk identification and the assessment of modular construction.. Rabihah (2016) used formative evaluation of AHP as risk prioritization tool for risk management.

This research intends to propose a selection decision support model for situations where there is insufficient knowledge about variables to be used as decision factors and this can be accomplished by (i) Identification of probable risk factors through survey of the study area on drug use/abuse. (ii) Prioritization of risk factors on drug use/abuse and using AHP because opinions of drug users, Medical Practitioners, NDLEA officers and parents as well as general public will be sought.

After the probable risk factors have been identified, The AHP was used to prioritize the risk factors, the decision criteria in the hierarchy were the factors identified through the pilot survey. This study also, intends to contribute for a better understanding of the risk factors that affect the occurrence of drug use/abuse and in particular in the study area.

Statement of the Problem

Drug use/abuse has widespread effects on society including victims of homicide and violence, human abuse, motor vehicle accidents and disruption of family life and careers (Zuckerman, 1999). Governments spend billions annually attempting to contain the drug trade and consumptions but, with limited success. A thorough understanding of the problem of drug use/ abuse in terms of

biological, social, psychological and environmental factors is needed in order to address the problem. Youths are the most vulnerable to drug use/abuse and the most productive human resources for a nation. And the high number of them is involved in drug use, as a result they are involved in sexual risk behaviour having multiple partners and a substantial number of them visit Commercial Sex workers. But they do not regularly use condom (Panda *et al* ,1997).This shows a high chance of disease transmission which represents a very serious health problems. A nation can be developed only if it youths are healthy psychologically and physiologically and as result for a nation to strive economically, socially and physically its youths who are the productive sector of human resources must be prevented and protected from drug use/abuse.

Literatures indicate that the relationship between such factors as demographic variables, familial characteristics, types of drug abuse and related personality factors are complex and intertwined. The Physical, psychological, social and economic consequences of the drug problems among youth are becoming obviously worrisome and disturbing. Young people who persistently use/ abuse drugs often experience and array of problems including health related problems (including mental health), poor peer relationships and involvement in social vices such as stealing, bullying, secret cult activities which have negative consequences on family members, community and the entire society (King and Chassin, 2014).

Aim and Objectives of the Study.

The aim of this study is the use of expert information for determining and ranking of risk factors on drug use/abuse as a decision support model. The specific objectives shall be to:

1. Identify probable risks factors associated with drug use /abuse using survey method of the study area.
2. Determine the relative weights of the risk factors for ranking/ prioritizing the factors as realised in the four focus groups. (Drug abusers, Medical Practitioners, NDLEA officers and Parents).

Significance of the Study

The findings of this study would be a contribution on the risk factors analysis existing in the literature on drug abuse by identifying the gaps in other similar studies. The study will help to uncover critical risk factors on drug use/abuse

that many researchers did not focus attention more especially in the study area on using other approaches. Crimes that are committed under the influence of drugs include: murder, tribal/communal clashes, rape, robbery, homicide, suicide, kidnapping, insurgency, destruction of lives and properties, violation of traffic regulations leading to accidents, cultism affecting the user and or the people of the society in general. As a result, the findings of this study will redound to the benefits of the security agents in curbing criminal activities, National Drug Law Enforcement Agency in curbing drug distribution and consumptions, community for peaceful co-existence. Parents, drug abusers and Government will also benefit.

Scope and Limitations of the Study

The work focused on Analytic Hierarchy Process Analysis on use/drug abuse using data obtained from (the drug abusers, parents, NDLEA staff, the general public and from the literature) in Numan Metropolis of Adarnawa State, Nigeria and the limitations could be as follows: conducting studies evaluating the frequency of drug use/abuse and influencing factors is difficult since people who use drugs tends to hide it because incidences of drugs use borders on the integrity and the moral standard of the individual within the society; and also it is difficult to approach groups using drugs. Moreover, since most of the data generated for this study were self reporting and therefore vulnerable to deceit, ignorance and biases of the variables and the respondents. It is also possible the outcome of the study may be different if a larger sample size will be used and lastly, the population that are used belongs to a culture where self disclosure of such habit is a problem since individuals hold secrets of what they regard are personal matters, and no law in the country that makes it compulsory for a person to response to questions in a questionnaire.

Definition of Terms

1. *Almajiri* -Is an underage child released by the parent sometime to an unknown person called *Mallam* teaching informal Quranic texts, moving them from one town to another. Their source of living, feeding and others mostly is through begging which is called *Almajiranci*.
2. *Mallam* -Is an Islamic scholar who teaches mostly underage children Quranic texts who moves with them from one town to another. The children mostly are from different people and background.

3. Expert-There is no agreed definition of who is an expert in the existing literature. Many defines expert in a different ways. Fink *et al*; (1984) states that an expert is a representative of their professional group.eg the NDLEA Boss in Numan Area office is considered as an expert in drugs related activities.
- 4 Opinion-this involves experiences and judgments or a panel view point.
5. Youths is are those young people that are within the age of 15-44 years.

Theoretical Framework

Interaction theory

Interactions' view of society is based on interactions as active factors which influence everything in the society. Interactions' theory focuses on family and other relations in the family. Interactions' theory views children by interviewing and observing how they interact with other members of the family. Also interaction's theory is interested on how members of a family understand their role in everyday behavior in a society. Interaction's theory examines the family focusing on how a family plays its role of socialising children, according to the norms and values of a given society. Interaction's theory observes how children act according to the norms and values of their society. By using interaction's theory, the researcher was able to find out how children interact with the members of their respective families and other children in the society.

The researcher investigated how parents and the society at large plan for social interaction among youths from 15 to 44 years in order to leave no leeway for drug use. Concepts used by interaction's theory gave the researcher opportunity to view children and people in society by looking at social changes; social position and communication patterns. The researcher observed the knowledge of children and their parents on drug abuse, and how their parents communicate such knowledge to their children.

The research anticipated to identify the risk factors of drug abuse by youths. . The interaction's perspective presupposes that if a family is ethically, morally and idealistically solid and the family members are accountable to one another and the law of the country pertaining to drug abuse are known among the family members and there is adequate room for social interaction among the family members, there is little chance of having children with drug abuse affinity within such family. This study agreed with this interactionist's assertion and thus took it on board in guiding formulation of research strategy and method, and identification of data collection techniques.

Behaviorism theory

Behaviorism theory is a school of thought that emphasizes environmental control of behavior through learning. It occurs when children observe the behavior of model. Through observation, children learn that by using drugs they can get pleasure out of it, just like an adult who uses the drugs. That means through apprenticeship system that is watching and learning from the master. Observation learning can be highly adaptive by others, by learning through model that uses drugs. Language whether verbal or non-verbal plays a great role in modeling. It plays the role of teaching how to perform various activities. Verbal directions enable drug-abuse-children to learn common language used by drug abusers, so as to avoid being arrested by policemen. For example cannabis is known as stick or leaves, cocaine is known brown sugar, and ecstasy is known as beautiful lady.

Children belong to the family, they are supposed to abide to the norms and rules of the family, meanwhile the family has some accountabilities to ensure that the child develop and grows with comprehensive education. Failure of the families to send their children to school or poor attendance to school may likely develop deviant behaviors that lead to loss of affection and use of drugs. By using behaviorism theory the researcher was able to see how children learn different behaviors from the environment including the use of drugs. This notion assumes that if family members as well as the other makers of children's behaviour like peers, teachers and guardians are well mannered, morally responsible and accountable, there will very slim chance of coming up with children who abuse drugs. This study combined the two theories to form the stage on which the theoretical frameworks as well as data collection and analysis can be orchestrated

Review of Related Literature

Based on this frame work, several studies have been conducted over the years aiming at identifying factors that may influence both prevalence and severity of risk factors on drug abuse. However as pointed out by Mehdi, Faeze, Sorour and Mahmood, (2018), identified variables on addiction in close friends, dispute within the family, poor economic status of family and number of household members as risk factors of addiction tendency in students and drug addiction in close friends was related to more addiction tendency in students, using multiple linear regression.

Shahriari *et al*; (2013) found a significant negative association between family members' emotional relation and tendency to addiction. Zeinali, (2013); Foroutani and Rezaeian, (2005) identified neglect and lack of parental control as one of the important factors in people tendency to drug abuse. Galea *et al*; (2004) in a review study introduced family adverse conditions as a risk factor for the onset of substance abuse. It is also identified poor economic status and number of household members as other predictive factors of tendency to addiction. In several studies, substance abuse was reported more in people with weak socioeconomic classes (Goodman and Huang, 2002). Probably, the low economic status or big family size, take entertainment and other appropriate opportunities from people and put him at risk for drug use. In contrast some studies found the relationship between Social Economic Status and substance abuse varies according to the type of drug. In a study by Humensky, (2010) high SES was associated with a high intake of cocaine, marijuana, and alcohol while such association was not seen with crystal methamphetamine and other substances. Patrick *et al*; (2012) study, high SES was associated with more consumption of alcohol and marijuana and low SES with higher consumption of cigarettes.

The extensive literature review has been done to highlight the risk factors of drug abuse. The study is designed to fill the research gap. Some of the researches among others conducted on drug use focused only on the consequences of drug abuse and addiction on individual level (Pluddemann *et al*; 2010), house hold/family/school levels (Zulu *et al*; 2004 and Jewkes *et al*; 2010) and society level (Melisa *et al*; 2014)..

Therefore, there is paucity of studies examining the risk factors of drug use from the study area holistically. This is what this study intends to do in order to fill gap using different population (youths) and AHP as most of the works were limited to students of schools.

Methodology

Study Design

In order to capture the risk factors on drug use/abuse both primary and secondary were used. Primary data was collected from drug users/abusers, NDLEA official, Medical Practitioners, Parents and the general public through survey. The secondary was from journals and through the literatures obtained as documented risk factors that were winnowed to get the most influential and

those that are more related to drug use/ abuse in the study area, while at the same time removing those variables which have a lesser impact. After these factors were identified for the model the Analytic hierarchy process procedures was used in combination with survey this enabled us to rank them base on experts pair wise comparison.

Study Population

The populations for this study are the drug abusers/users in Numan Metropolis that were be available during the study as the first group but do not have obvious signs of psychosis. Psychosis is the term use to describe a state of mind in which the individual experiences a distortion or loss of contact with reality. The second group is the staff of Drugs Law Enforcement Agency (NDLEA), the third and the fourth groups are the Medical Practitioner, and parents within the area of the study who agreed to participate in the study. The expected age category of the drug users/ abusers ranges between 15 and 44.

Inclusion Criteria.

Study population were youth between the ages of 15-44 years,(Youth is define as a period of transition from the dependence of child hood to adulthood's independence, African Union(2006),) who uses/ abuses one form of drugs or the other and were residing within Numan Metropolis and were not in psychosis state. The researcher for this study defines youths as those who are within the age of 15-44 years.

Sample Size and sample technique

Sampling Techniques

Purposive and Snowball sampling were applied for recruitment of participants in this group (Drug abusers/users) from the study area. Purposive sampling is a non probability sampling method in which the researcher select the study subjects on the basis of personal judgment about which ones will be the most appropriate to generate data. Snowball sampling is an effective way of generating large sample from a hidden population where no normal sampling frame is available (Van meter, 1990). This sampling technique can be used for a population, where there is no easily available data like their **demographic** information. For example, homeless or list of members of an elite club, whose personal details cannot be obtained easily, People who are difficult to locate,

people who are not willing to be identified and those who are concern with secretiveness about their identity, Snowball sampling is especially useful when one is trying to reach populations that are inaccessible or hard to find. The recruitment of the subjects was done by the researcher with assistant of the respective youth leaders of each ward. The recruitment and the interview were done after through explanation regarding the study was given and the youths who were not in psychotic state had been identified by the youth leader and the principal researcher.

From other population of the study the sample selection was done by expert sampling (seeking expert's opinion).Expert sampling involves the assembling of a sample of persons with known or demonstrable experience and expertise in some area (Anaekwe, 2002). Often, we convene such a sample under the auspices of a "panel of experts." There are actually two reasons one might use expert sampling. First, it would be the best way to elicit the views of persons who have specific expertise. But the other reason one might use expert sampling is to provide evidence for the validity of another sampling approach one has chosen and modal instant sampling (focus on typical people) and a sample of size of four groups of respondents were used.

Survey Instrument

A questionnaire was prepared to collect the data but pre test/pilot survey was conducted among 150 drug users and some experts to get an insight on the reasons why they take drugs. As a result of this pre-test, necessary corrections were made in few questions that made them simple and comprehensible. The time taken for an interview was also estimated between 20 to 40 minutes on each participant. The questionnaire was carefully structured by the researcher in relevance to the objectives of the study. Content of the tool was compared with available literatures on the topic, and as a result other factor that was not in the literature was identified. Items in the questionnaire, appropriateness of language and instructions to the respondents were reviewed and corrected.

This pre-testing revealed a factor that was not in the extant of literature and also it was found that: Feeling of domination among peer and undeniability behaviuor (difficult to say 'no' to a friend),Carry your back and go home(as a result of non-payment of school fees),For sexual strength (married couples are using drugs to satisfy mates desire), Fear of beating by *Malams*(makes *almajiris* stay away from school),to avoid feeling pains as a result of beating by

Malams (almajiri may decide to go back and face the beatings), Over pampering of children by parents (giving their children money above their needs). These are also introduced as risk factors which were not reported in the literature and some were considered as sub criteria.

Two set of questionnaires were constructed to elicit data from the respondents. One is base on level of importance of Saaty scale for the purpose of pair wise comparison and the other during pre-test. All the questionnaires consisted of socio-demographic variables and the potential risk factors identified within the study area and these are: Environmental factor, Individual factor, Parental factor, School factor, Peer pressure group factor, Religiosity factor and *Almajiri* system of school and many others but these were considered more important.

Data Collection

The data was collected through questionnaire. The study collected both qualitative and quantitative data. The qualitative data were the information and views of the experts collected through the administration of series of questionnaires and (feed backs) by the researcher, while the socio demographic data such as sex, marital status etc were collected.

The first drafted of questionnaire was done to contain questions using conventional AHP methodology of deriving criteria weights using the nine-point Saaty scale (Saaty, 2006).

Validity of the instrument.

Some of the measures taken to enhance the validity of the questionnaire are: use of standard scales, use of pre-tested questionnaire, giving sufficient time to remember and respond to a question, confidential one to one interview and more than one question in some cases asked for the same information. To ensure validity of the data used in this study, the researcher had so much engagement with an expert (NDLEA Boss, Numan Zone) drug users/abusers, Medical practitioner and some parents at every stage of the study according to the rules of validity of qualitative data, while embedded consistency checks in AHP was used to ensure that experts opinions were consistent. Also a Professor in the university in the field of OR validated the questionnaire. The filled questionnaires were then carefully edited for completeness, consistency and accuracy. On the basis of the data collected the analysis was carried out with appropriate software's AHP Excel solver,

Research process

The Proposed Research Process (Figure 1) consist of two modules (i) Identification of probable risk (decision) factors using existing literature and pilot survey (ii) Prioritization of alternatives a cross risk factors using AHP.

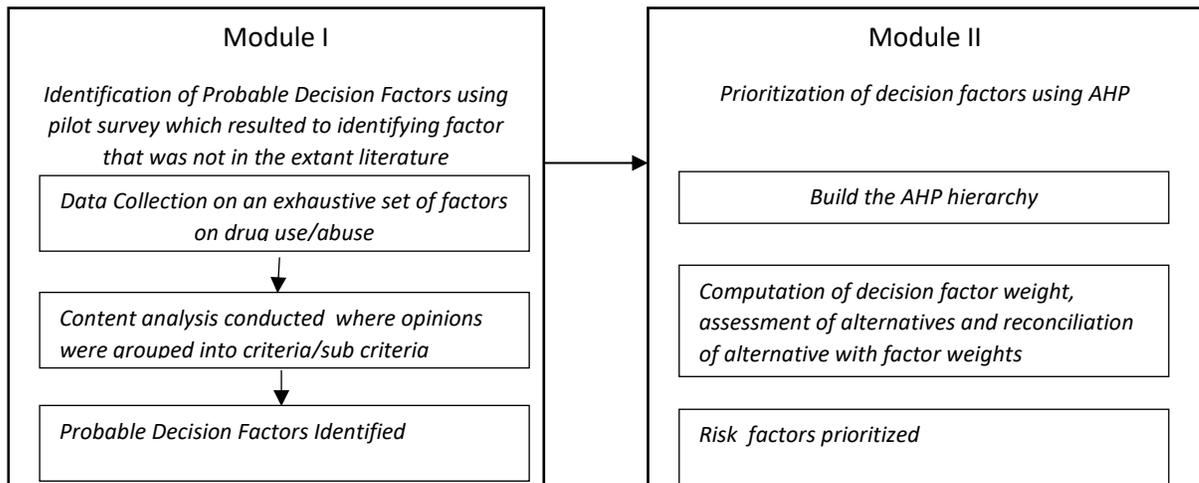


Figure 1

Module I: Identification of Probable Decision Factors through survey

Variables pertaining to socio economic aspects such as Environment, Individual, Parental, School, Per pressure group, Religiosity, Poverty and *Almajiri* school system that were perceived as the drivers of the risk to drug abuse were collected. Due to the high number of variables that were identified in extant literature as possible risk factors to drug abuse were considered as criteria and sub criteria that are used in AHP.

Module II: Prioritization of Risk Factors using Analytic Hierarchy Process.

Analytic hierarchy process is of the extensively used multi-criteria decision making methods. The key advantage of this method is the relative ease with which evaluation of alternatives is handled across multiple decision criteria. The AHP structure for this study includes goal (drug use/ abuse), decision criteria (domain of risk factors) and choice alternative (levels of individual domain) ordered into a hierarchy and the model was used through pair wise comparison.

The Analytic Hierarchy Process AHP

The *Analytic Hierarchy Process* (AHP), introduced by Thomas Saaty (I980), is an effective tool for dealing with complex decision making, and may aid the

decision maker to set priorities and make the best decision. By reducing complex decisions to a series of pair wise comparisons, and then synthesizing the results, the AHP helps to capture both subjective and objective aspects of a decision. In addition, the AHP incorporates a useful technique for checking the consistency of the decision maker's evaluations, thus reducing the bias in the decision making process.

Features of the AHP

The AHP is a very flexible and powerful tool because the scores, and therefore the final ranking, are obtained on the basis of the pairwise relative evaluations of both the criteria and the options provided by the user. The computations made by the AHP are always guided by the decision maker's experience, and the AHP can thus be considered as a tool that is able to translate the evaluations (both qualitative and quantitative) made by the decision maker into a multi criteria ranking. In addition, the AHP is simple because there is no need of building a complex expert system with the decision maker's knowledge embedded in it. On the other hand, the AHP may require a large number of evaluations by the user, especially for problems with many criteria and options. Although every single evaluation is very simple, since it only requires the decision maker to express how two options or criteria compare to each other, the load of the evaluation task may become unreasonable..

Computing the vector of criteria weights

In order to compute the weights for the different criteria, the AHP starts creating a *pairwise comparison matrix* A. The matrix A is a $m \times m$ real matrix, where m is the number of evaluation criteria considered. Each entry a_{jk} of the matrix A represents the importance of the j th criterion relative to the k th criterion. If $a_{jk} > 1$, then the j th criterion is more important than the k th criterion. while if $a_{jk} < 1$, then the j th criterion is less important than the k th criterion. If two criteria have the same importance, then the entry $a_{jk} = 1$. The entries a_{jk} and a_{kj} satisfy the following constraint:

$$a_{jk} a_{kj} = 1.$$

Obviously, $a_{jj} = 1$ for all j . The relative importance between two criteria is measured according to a numerical scale from 1 to 9, as shown in Table I. where it is assumed that the j th criterion is equally or more important than the k th criterion. The phrases in the 'interpretation' column of Table 1 are only

suggestive, and may be used to translate the decision maker's qualitative evaluations of the relative importance between two criteria into number.

it is also possible to assign intermediate values which do not correspond to a precise interpretation. The values in the matrix **A** are by construction pairwise consistent, see equation 22. On the other hand, the ratings may in general show slight inconsistencies. However these do not cause serious difficulties for the AHP (Saaty, 1980).

Table1. Table of Relative Score

| Value of a_{jk} | Interpretation |
|-------------------|---|
| 1. | J and k are equally important |
| 3. | j is slightly more important than k |
| 5. | j is more important than k |
| 7. | j is strongly more important than k |
| 9 | j is absolutely more important than k |

Source: Saaty, 1980

Once the matrix **A** is built, it is possible to derive from **A** the *normalized pairwise comparison matrix* A_{norm} by making equal to 1 the sum of the entries on each column. i.e. each entry of the matrix A_{norm} is computed as:

$$\alpha_{jk} = \frac{\alpha_{jk}}{\sum_{j=1}^m \alpha_{jk}}$$

Finally, the *criteria weight vector* w (that is an m -dimensional column vector) is built by averaging the entries on each row of A_{norm} , i.e

$$w_j = \frac{\sum_{k=1}^m \bar{\alpha}_{jk}}{m}$$

Checking the consistency of a pair wise matrix

When many pair wise comparisons are performed, some inconsistencies may typically arise. Assume that 3 criteria are considered, and the decision maker evaluates that the first criterion is *slightly* more important than the second criterion, while the second criterion is *slightly* more important than the third

criterion. An evident inconsistency arises if the decision maker evaluates by mistake that the third criterion is equally or more important than the first criterion. On the other hand, a slight inconsistency arises if the decision maker evaluates that the first criterion is also *slightly* more important than the third criterion. A consistent evaluation would be, for instance, that the first criterion is more important than the third criterion (Saaty, 1980).

The AHP incorporates an effective technique for checking the consistency of the evaluations made by the decision maker when building each of the pair wise comparison matrices involved in the process, namely the matrix **A** and the matrices **B**⁽ⁱ⁾. The technique relies on the computation of a suitable *consistency index*, and will be described only for the matrix **A**. It is straightforward to adapt it to the case of the matrices **B** by replacing **A** with **w** with **s**- and in with **n**. the *Consistency Index (CI)* is obtained by first computing the scalar **x** as the average of the elements of the vector whose **7**th element is the ratio of the **7**th element of the vector **A.w** to the corresponding element of the vector **w**. Then,

$$CI = \frac{x - m}{m - 1}$$

A perfectly consistent decision maker should always obtain $CI=0$, but small values of inconsistency may be tolerated. In particular, if

$$CI < 0.1$$

RI

The inconsistencies are tolerable, and a reliable result may be expected from the AHP (Saaty, 1980). *RI* is the *Random Index*, i.e. the consistency index when the entries of are completely random. The values of *RI* for small problems ($m \leq 10$) are shown in Table 2.

Table 2: Values of the Random Index (RI) for small problems

| M | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|-----------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|
| RI | 0 | 0.58 | 0.90 | 1.12 | 1.24 | 1.32 | 1.41 | 1.45 | 1.51 |

Source: Saaty, 1980

AHP in Group Decision Making

Decision making often several persons, and also the standard AHP can be applied as group decisions. Consulting several experts can minimize bias that may be present when the judgments are considered from a single expert. There

are four ways to combine the preferences into a consensus rating Ishizaka and Labib (2011). This is presented in table 3.

Table 3.Four ways to combine preferences

| | | Mathematical aggregation | |
|-----------------|------------|--|------------------------------|
| Aggregation on: | | Yes | No |
| | Judgment | Geometric mean | Consensus vote judgment |
| | Priorities | Weighted arithmetic mean on priorities | Consensus vote of priorities |

Source: Ishizaka and Labib (2011)

The consensus vote is used, when we have a synergistic group and not a collection of individuals. In this case, the hierarchy of the problem must be the same for all decision -makers. On the judgments level, this method requires the group to reach an agreement on the value of each entry in a matrix of pair-wise comparisons. A consistent agreement is usually difficult to obtain with increasing difficulty with the number of comparison matrices and related discussions. In order to bypass this difficulty, the consensus vote can be postponed after the calculation of the priorities of each participant. O’Leary (1993) recommends this version because an early aggregation could result in a meaningless average performance measure. An aggregation after the calculation of priorities allows to detect decision-makers from different boards and to discuss further any disagreement.

If a consensus is difficult to achieve (e.g. with a large number of persons or distant persons), a mathematical aggregation can be adopted. Two synthesizing methods exist and provide the same results in case of perfect consistency of the pair -wise matrices (Saaty &Vargas. 2005). In the first method, the geometric mean of individual evaluations is used as elements in the pair-wise matrices and then priorities are computed. The geometric mean method (GMM) is suitable because it preserves the reciprocal property (Aczél &Saaty, 1983) ofAHP.

Van den Honert and Lootsma, (1997) asserted that this violation (Pareto optimality not satisfied with GMM) could be expected because the pair-wise assessments are a compromise of all the group members’ assessments and therefore it is a compromise that does not represent any opinion of the group

member. Madu and Kuei (1995), Bryson (1996) and Saaty and Vargas (2007) introduced a measure of the dispersion of the judgments (or consensus indicator) in order to avoid this problem (Pareto Optimality). If the group is not homogenous, further discussions are required to reach a consensus.

Research Models

The study used analytic hierarchy process (AHP).

AHP Model

Analytic hierarchy process is one of the extensively used multi criteria decision making method. The key advantage of this method is the relative ease with which evaluation of alternatives is handled across multiple decision criteria. AHP involves complex decision to be structured into a hierarchy descending from overall objective to various criteria, sub criteria till the lowest level. The overall goal of the decision is represented at the top level of the hierarchy. Saaty (2000), opined that a hierarchy can be constructed by creative thinking, recollection and using peoples perspectives. AHP involves the principles decomposition, pair-wise comparisons, priority vector generation and synthesis in a very simple manner (Sacity 2006). We propose to build the AHP hierarchy in the following manner.

- i. Clustering: Clustering of the long list opinions (text/qualitative) which are generated through pilot survey were analyzed through content analysis where text were grouped into themes using thematic analysis. The thematic analysis involves grouping/classifying text under heading that encapsulates the meaning of the several texts (statements). The result of this thematic analysis takes care of the first step in the AHP analysis. Each cluster contains criteria to reduce or eliminate high inconsistencies resulting from comparison matrix with more than criteria; in our case we have eight criteria.
- ii. Comparison and weighting: In this stage two forms of comparison will be done in the study, there is comparison within and between the clusters using saaty's 9-point scale of importance. This results in local and global weighting of alternative opinions. The highest global weight is the most important preference within a cluster or sub-cluster. The result of this phase is ranking of the alternative opinions (stakeholders preference).

- iii. Group Decision Making: Two important issues in group decision making are how to aggregate individual judgment in a group into a single representative judgment for the entire group and how to construct a group choice from individual choices. It has been proved that the geometric mean not the frequently used arithmetic mean is the only way to do that (Saaty,2008).If the individual are expert, they may not wish to combine their judgment but only their final outcomes obtained by each from their own hierarchy (Saaty,2008).In that case one takes the geometric mean of the final outcomes if the individual have different priorities of importance ,their judgment are raised to the power of their priorities and then the geometric mean is formed (Saaty,2008).

AHP Model structure

To meet the study aim the experts in the field of drug use/abuse were involved in listing the criteria having possible influence as risk factors of drug use/abuse and also from the existing literatures. After structural integration and the questionnaires filled by the experts provided relevant suggestions and explanations which come up with the criteria and sub criteria which are given in the figure below :



Figure 2: Analytic hierarchy framework diagram for pair wise comparison

Data presentation, results and discussion

In this the data collected is presented. Data were collected and processed in response to the problems, aim and objectives presented and discussed in the part of this study. The data which is qualitative in nature but coded according to their nature and importance were used for the first step of the analysis in order to identify the factors/criteria describe the data and ranking of the criteria and sub-criteria (themes and sub-themes)/factors through pair wise comparison matrix

Response Rate

Socio demographic and qualitative data were collected through the distribution of questionnaire. The information and views of the experts, participant were collected and feedback by the researcher. All the data collected and usage are contained in the table below in phases.

| Phase | Method | Description | Data type utilized |
|----------------|--|--|---|
| Phase 1 | Literature review | Risk factors on drug use/abuse were identified through literature review | Information, insight, change of perspectives |
| Phase 2 | Conduct of pilot survey | To identified other factors not existing in the literature | Additional factor identified to the existing literature |
| Phase 3 | Collected data from experts on criteria/factors, sub criteria on drug use/abuse. | To be analysed using AHP via pair-wise comparison. | To rank the factors criteria/sub-criteria for decision making, and relationship between and among variables |

Table 4 Return rate of distributed questionnaire

| Respondents | No of questionnaire distributed groups | Questionnaire to returned | Questionnaire appropriately filled | Return rate | Rate of proper filling | % returned for analysis |
|-----------------------------|--|---------------------------|------------------------------------|-------------|------------------------|-------------------------|
| Drug user/abuse | 1 | 1 | 1 | 100% | 100% | 100 |
| NDLEA | 1 | 1 | 1 | 100 | 100 | 100 |
| Medical practitioner | 1 | 1 | 1 | 100 | 100 | 100 |
| Parents | 1 | 1 | 1 | 100 | 100 | 100 |
| | 4 | 4 | 4 | | | |

Results

The interviewees mentioned many risk factors as drivers to drug abuse/use among youth which the researcher decided to classify them into criteria and sub-criteria. The complete data set includes youths aged 15-44 years, who are drug user/abuser, NDLEA staff, Medical practitioner, parents and the general public.

AHP model structure

To meet the research objectives, experts were involved in listing the criteria and sub criteria having possible influence on drug use/abuses. After that, the AHP was formed as shown in figure for follow-up analysis. Expert filled the questionnaire and provided relevant suggestion on drug use/abuse, relevant explanation of which are given below;

Table 4 Overall Criteria and Sub criteria of drug use/abuse

| Environment | Access to drug | | Domination of friends |
|---------------------|--|---------------------------|---|
| | Low cost of drugs | | Undesirability of attitude |
| | Social conformity | | Street gangerism |
| Individual | Teenager curiosity | | |
| | Mental disorder | Religiosity | Lack of family religiosity |
| | Lack of knowledge of drug abuse | | Lack of religiosity |
| | Sexual strength | | Lack of religiosity knowledge |
| | Depression | Poverty | Thuggery |
| | Poor performance in school | | Self medication |
| Parental | Single parent | | |
| | Present of addicted member in a family | Almajiri system of school | Fear of beating by <i>mallams</i> |
| | Parental drug use | | To avoid feeling pains as a result of beating by <i>mallams</i> |
| | Over crowded family | | Compulsory tax on <i>almajiri's</i> by <i>mallams</i> |
| | Improper parenting | | |
| | Over pampering of children by parents | | |
| School | Academic failure | | |
| | To be intelligent | | |
| | Carry your back and go home | | |
| | Intervention of parents in school discipline | | |
| Peer pressure group | Friend's offer | | |

Source: Author's pilot survey result

Discussion

- a. **Environment:** was identified as one of the criteria for drug use/abuse and the sub criteria under it are given as;
1. Access to drug, that is availability drug can be found at will.
 2. Low cost of drugs that is, is affordable at a minimum cost.
 3. Social conformity that is to be part and parcel of the society of the environment.
- b. **Individual:** That has to do with personal feelings is also considered as criteria and that also has the following as sub criteria:
1. Teenager's curiosity that is youth trying to test and feel what others feel by taking drugs.
 2. Mental disorders this is as a result mental problem of an individual.
 3. Lack of knowledge about danger of drug abuse that is lack of knowledge about the negative effect of taking drugs.
 4. Sexual strength, some individual involved in drugs in trying to satisfy the sexual desire of his/her mate as a result, the user becomes drug abuser.
 5. Depression some youth as a result of hopelessness in life they involve themselves in drugs use/abuse.
 6. Poor performance in school, make one frustrated, to take care of this frustration leads to drug use/abuse.
- c. **Parental:** This is one of the criteria identified as a driver to drug use/abuse, under this there are a lot of reasons as sub criteria such as;
1. Single parent, where a child is under either mother or father parental monitoring will be inadequate more especially under mother as a result a child may go into drug use/abuse.
 2. Present of addicted member in a family, most youth copy from their elders, if there is anybody in the family that is into drug, a child may feel as if such attitude is allowed.
 3. Parental drug use/abuse, if parents are into drugs, their children will quickly copy from them, thinking as if it is a good habit or accepted norms.
 4. Over crowded family, if a house does not accommodate its members adequately, there is possibility of sending other members to be spending their nights anywhere. As a case of girls who confessed she was into drugs because she is grown up and cannot sleep in a single room will her parents as a result, she was sent to be putting up in the neighboring house.

5. Improper parenting, I don't care attitude of parents on their children by allowing every child to do whatever he feels like doing in the name of freedom.
 6. Over pampering of children by parents. Some parents give their children freedom of doing whatever they like doing, they give them whatever they request including money in excess this also leads drug use/abuse by young children.
- d. *School*: Is also identified as breeding place for drug use/abuse under it, there are sub criteria such;
1. Academic failure where a child is not performing well and always failing examination may lead him to drug use/abuse because he will be feeling hopelessness in life.
 2. To be intelligent, some youths are being deceived by saying, taking drug will make one to be remembering what he reads as result many are victims of drug use/abuse.
 3. Carry your bag and go home. Some school more especially private schools do send their students home as a result of nonpayment of school fees by the parent, instead of going home some may hang around with bad eggs within the community. This also leads to drug use/abuse.
 4. Intervention of parents in school discipline, some parents don't see any fault in whatever the children are doing. If their children are being punished by the school authority they go to that school and sometimes even fight with the teachers of their children because of punishing their children. This also opens door for drug use/abuse by the youths.
- e. *Peer pressure group*: This one of most influential criteria identified by experts under it we have;
1. Friend's offer, some youth have no confidence to say no to their friends, this also results to the use of drugs.
 2. Domination of friends, where majority of the friends are into drug, make the minority to also go with the majority who are drug users.
 3. Undeniability attitudes of some youth, some youth whatever offer to them by friends is welcome, they don't have the gut to say no this also lead to drug use/abuse.
 4. Street gangerism involving in any form of crime need the use of drugs, if one is engage in such attitude must be involved in drug use/abuse otherwise can fit into the group.
- f. *Religiosity*: In a community where religion play an important in the life of people like the study area where both religions prohibit intake of any intoxicant, be it alcohol or any form of intoxicant under it we have;
1. Lack of family religiosity make youths to fall victims of drug use/abuse. That is where the whole family members did not give

- religion the importance it desired, so they can do whatever they want including drugs taking.
2. Lack religiosity of the youth.
 3. Lack of religion knowledge is also one of the sub criteria of drug use/abuse.
- g. *Poverty*: Is also one of the criteria identified by the experts. Among sub criteria are;
1. Thuggry, more especially political thuggry, it cannot be possible without use of drugs. As a result many are into drug use because of that.
 2. Self medication, some due to poverty cannot afford the expenses of treatment in health facilities like hospitals, clinics etc, they prescribed drugs by themselves, this also leads drug use/abuse and addiction..
- h. *Almajiri* school system: Is also identified by experts as one of the drivers of drug use/abuse. This is because of the following reasons as sub criteria.
1. Fear of beating by *mallams*, this make them to hangout around with bad people within the community as some them are found sleeping in markets and motor parks and wherever they are not expected.
 2. To avoid feeling pains as a result of beatings by *mallams*, some *almajiri* if they feel they committed offence and that can lead to beating; they take some drugs that can avoid them from feeling the pains. This also results to drug use/abuse.
 3. Compulsory tax on *almajiris* by *mallams*. In some *almajiri* school, their *mallams* put tax on each to pay either on weekly or daily basis and this can push them to do whatever comes to their way. This also consider as sub criteria to drug use/abuse.

Pair wise comparison of the top factors criteria of drug use/abuse base on the expert's judgments were computed and presented as given below starting with NDLEA, Health practitioners , Parents and Drugs users/abusers via AHP.

Table 5 Average weight for the 1ST to 4TH Group and the Ranking

| Criteria | NDLEA | Health practitioner | Drug users/abusers | Parent | Average weight | Ranking |
|----------|-------|---------------------|--------------------|--------|----------------|---------|
| ENV | 0.218 | 0.211 | 0.207 | 0.232 | 0.217 | 1 |
| IND | 0.174 | 0.160 | 0.157 | 0.187 | 0.170 | 2 |
| PAR | 0.143 | 0.171 | 0.168 | 0.153 | 0.159 | 3 |
| SCH | 0.119 | 0.098 | 0.105 | 0.106 | 0.107 | 4 |
| PPG | 0.089 | 0.085 | 0.085 | 0.083 | 0.086 | 6 |
| REL | 0.106 | 0.102 | 0.102 | 0.100 | 0.103 | 5 |

| | | | | | | |
|------------|-------|-------|-------|-------|-------|---|
| PVT | 0.084 | 0.086 | 0.088 | 0.083 | 0.085 | 7 |
| ASS | 0.066 | 0.087 | 0.087 | 0.058 | 0.075 | 8 |

Source: Author's result of Saaty Pairwise Comparison

Note CR<0.1 for all comparisons that is the level of consistency is accepted.

Both its consistency index and ratio are less than 1 meeting the theoretical requirement of the AHP.

After drugs use/abuse experts completed the evaluation criterion questionnaire, the results computed using AHP excel solver which was verified by a software AHP-Khaskia developed by Eng/Mohamed Ali Khaskia are shown in table4. The priority value for evaluation criteria is respectively the Environment (0.217), Individual (0.170), Parents (0.159), School (0.107), Peer pressure group (0.86), Religiosity (0.103), Poverty (0.085), *Almajiri* System of School(0.075). Both its consistency index and ratio are less than 1, meeting the theoretical requirement of AHP.

Conclusion and Recommendation

Analytic Hierarchy Process is very useful and simple to adopt for factors ratings. It is capable to convert the qualitative data into quantitative to make comparison among various criteria The study adopted the Analytical Hierarchy Process Approach .The model was tested with data obtained from experts on drug use/abuse in Numan metropolis through and yielded a number of key results among which are a decision support model is developed that can help decision makers more especially within the study area to tackle the menace of drug use/abuse where key criteria were identified as drivers to drug use/abuse. The results showed that, the priority level of evaluation criteria is as following, Environment, Individual, Parents, School, Religiosity, Peer pressure group, Poverty and *Almajiri* School System.

The study recommends further research to be conducted by varying parameters used in this study to be able to validates the model leading to generalization of the model and incorporating into the model participation through internet and analysis through computer programming/coding is a prospect worth further studies

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