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Nurses Perception towards Determinants of Turnover in Psychiatric and General Hospital, Makkah Province

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Abstract

Background: Nurses leaving the profession are of concern to the government. This turnover can take the form of leakage and waste of both human and financial resources for governments that spend money on training nurses. Little is known about the intention to stay or determinants of job satisfaction among nurses in the Makkah region of Saudi Arabia. **Aims:** The study explores the determinants of intention to stay, job satisfaction, organizational commitment and self-efficacy among nurses. **Methods:** A cross-sectional study was designed, with a total of 175 nurses in the period between March 2017-July 2017. **Results:** No statistically significant differences were identified in intention to stay, job satisfaction, organizational commitment and self-efficacy between the psychiatric and the general nurses. A significant correlation was found between nationality, education and income, and intention to stay, job satisfaction, organization commitment and self-efficacy ($p < 0.05$). **Conclusions:** The study added various determinants of nurse turnover to the existing body of knowledge, relating to the factors concerning intention to stay, job satisfaction, organizational commitment and self-efficacy amongst general and psychiatric nurses.

Keywords

Job Satisfaction, Self-Efficacy, Organizational Commitment, Nursing, Psychiatric Nurse, Intention to Stay

1. Introduction

Nurses are regarded as major participants in healthcare systems, whose shortage might create problems both for organizations and patients [1]. Patients not re-

ceiving the appropriate standard of care, whose lives may be threatened, are one of the problems associated with the shortage of nurses [2]. The issue of nursing dropout/turnover and its detrimental effects has been reflected in numerous studies, whosoever all findings suggest unstable staffing and decreased capacity within individual care teams, in turn severely threatening the quality of care [3] [4] [5]. It is the nurses who ensure a higher level of patient safety and improved treatment [6].

A high level of nursing dropout/turnover proves to be costly for the government, as measures and estimates may vary with the level of treatment standards [7]. Stordeur, D'hoore [8] cited an expense of $42,000 to replace a medical-general nurse and $64,000 in the case of replacing a specialty nurse. The indirect costs of nurse dropout/turnover are particularly significant because of the combined effects of the initial reduction in productivity of a new employee, and a reduction in staff self-esteem in turn reducing group productivity [2] [6].

A study conducted by Yami, Hamza [9] assessed the job satisfaction level and its determinants among health workers employed at Jimma University Hospital in Southwest Ethiopia. The authors performed a cross-sectional study in order to verify the extent and the variables posing an impact on job satisfaction as well as retention of health professionals employed in the hospital. The study found that 46.2% of the health workers were not satisfied with their respective jobs, with specific problems including lack of motivation, insufficient staff, inappropriate salary structure and lack of high-quality training programmes. However, a similar number (41.4%) was satisfied or happy for reasons of professional gratification and receiving help from others during times of need. The respondents provided their individual viewpoints regarding potential ways through which job satisfaction and retention rates could be increased: for example, motivating the staff by offering them distinct forms of incentive such as bonuses and housing allowances, raising salaries, establishing a good management system, and developing the existing facilities and infrastructure of the hospital [9].

A study by Al-Ahmadi [10] stressed the fact that there was no significant statistical indication of guidance on job satisfaction and intention to stay in nursing, as most of the nurses studied were involved in a counselling relationship. The study findings (r = 0.23, p = 0.003) nevertheless demonstrated that job satisfaction is positively correlated with intention to stay. This study also indicated that there was a relationship between job satisfaction and level of income, which positively leads towards the intention to stay. The older Saudi nurses working in psychiatric hospitals and performing different tasks were satisfied with their jobs and intended to stay in their profession, to obtain the maximum income. Correspondingly, another set of Saudi nurses working in various departments but coming from abroad also intended to stay in the hospital for a longer period; their high level of job satisfaction was related to receiving salaries sufficient to meet their requirements and enhance their individual living standards [11] [12].

Organizational commitment refers to the level up to which an employee stays

connected as well as committed towards the business organization in which he/she is employed. It is deemed as one of the most significant determinants of an employee's turnover within an organization [13] [14]. With organizational commitment, the entire workforce feels a "sense of oneness" [15]. Its nature and origin are multidimensional and fall into three categories: affective commitment, continuance commitment and normative commitment [16]. Affective commitment is the sense of attachment towards an organization, associated with work experience, personal traits and organizational structure [15]; for example, an employee who is aware of his/her value to the organization is more likely to stay [17]. Continuance commitment represents the level to which employees feel a need to stay within the organization [18].

Self-efficacy represents an individual's belief in his/her ability to develop behaviours necessary to for achieving specific performance [18]. To be precise, it helps in determining the means by which individuals can feel, think, motivate themselves and behave efficiently to attain any predetermined target within a definite timeframe [19]. Self-efficacy is further recognized as a variable which provides the greatest explanatory power regarding the process and the conduct of human behaviour [19]. As noted by Collini, Guidroz [18], self-efficacy has an important role to play in mediating knowledge application. It offers individuals the ability to influence their own courses of action and to attain the goals expected of them [19] [20]. The turnover intentions of nurses are generally based on the psychological responses associated with negative aspects at work (Takase, 2010).

The literature is particularly limited in evaluation of the determinants of intention to stay and job satisfaction among the healthcare workers in Middle East countries, specifically Saudi Arabia. The current study therefore focuses on analyzing the determinants of nurses' turnover in psychiatric hospitals in the Makkah. It is thus important to analyze the factors that influence their job satisfaction level, documented to form a reference point to develop the quality of care. Better handling of the nurses also has a great impact on their job satisfaction level, which in turn improves their job performance and the quality of healthcare at large. The impact of job satisfaction on the overall performance of healthcare workers can be determined from improvements in operational efficiency, productivity, and quality of the care delivered to patients [10] [11]. Therefore, this study investigates the determinants of job satisfaction and intention to stay that might in turn help to reduce the level of dissatisfaction, thereby improving the delivery of care. Healthcare practitioners are expected to reap significant benefits from these findings by understanding the various determinants of intention to stay among healthcare workers in general and in psychiatric hospitals in Saudi Arabia.

2. Methods

2.1. Research Design

A descriptive explanatory correlational design was used.

2.2. Setting

The present study was carried out in the Al-Amal Mental Health Government Hospital in the main city of Makkah. The hospital consists of eight wards (six male and two female) caring for 600 patients. It has a total capacity of 200 beds.

2.3. Participants and Outcome Measures

The inclusion criteria were staff nurses who had direct contact with patients, experience in their department of more than one year, and were willing to participate in the study. Participants must also be able to read and understand either Arabic or English. General nurse who work in any hospital ward except psychiatric.

Data were collected through a self-administered structured questionnaire, to compare psychiatric and general nurses' intent to stay in the organization/profession(rated by Intent to Stay in the Organization/Profession scale), job satisfaction (assessed by Job satisfaction Index Questionnaire), organizational commitment (scored by Questionnaire relating to Organizational Commitment), and self-efficacy (evaluated by General Self-Efficacy Scale), job satisfaction, organizational commitment and self-efficacy.

Job Satisfaction was assessed by a 20-item index named Minnesota Satisfaction Questionnaire (MSQ) short-form, it was devised by Weiss, Dawis [21] and the Cronbach's alpha is 0.91 (Ben-Bakr *et al*. 1994). The MSQ, a self‑reported instrument scored on Likert scale from 1 to 4, it is an often used and widely researched job satisfaction measure [22] [23].

Organizational commitment was measured by a 23 items index called Organizational Commitment Questionnaire (OCQ) developed by Meyer, Allen [24] with an estimated Cronbach's alpha 0.85 [25].

Self-efficacy is devised by Schwarzer, R., & Jerusalem, M. (1995), it has 10 items with scoring system from 0 to 5. Highest score indicates for high self-efficacy. This scale is already translated in Arabic and has established reliability 0.76.

2.4. Ethical Considerations

Verbal and written consent were sought from the participants after clarifying the procedure. Participants were informed about their right to refuse to participate and to withdraw at any time without any consequences. Confidentiality was assured. Ethical approval was obtained from the Fakeeh College for Medical Sciences (ref: 15486/45) and from the Ministry of Health (ref 17845/65).

2.5. Statistical Analysis

After the collection through the questionnaire survey, the data was analyzed by the Statistical Package for the Social Sciences (SPSS) version 2.0. Frequency distributions were used to explain the proportion of nurses based on certain demographic variables such as sex, marital status, work/professional experience, level

of education and category of units or wards. In order to depict continuous variables such as age, experience in years and satisfaction with salary, some other statistical methods including mean and standard deviation were employed. Pearson correlation analysis and independent-sample t-tests were used to test the relationship between the continuous demographic characteristics of the participants and the main study variables, *i.e.* job satisfaction, self-efficacy, organizational commitment and intention to stay. Two-way ANOVA method was considered to test the association and the differences in work settings with the major study variables. It is thus apparent that the research cannot be considered a comprehensive model to determine the decisions of the nurses to leave their jobs; further research is required to identify the beliefs and attitudes of the nurses towards their profession and the significance of different specific references such as spouse, parents or co-workers that affect their turnover rates. Assumptions of statistical tests were maintained. The sample size was determined according to Cohen table with medium effect size and level of significant 0.05, then the required sample size is 160 with considering attrition rate is 20%.

3. Results

Of the 200 questionnaires distributed to nurses in surgical, medical, ICU and psychiatric departments in the period between March 2017-July 2017, 175 were returned, giving a response rate of 88%. The socio-demographic features of the participants are displayed in Table 1. Most of the participants belonged to the age group 30 - 39 years; there were slightly more male (51.4%) and 56% of nurses were Saudi nationals. Educational qualifications varied, but 44.6% of participantsheld a bachelor's degree in nursing science. 58.9% of participants were married.

3.1. Job Satisfaction Level

Table 2 shows the average job satisfaction score was 71.4 with 10.5 standard deviation. The result of an independent sample t-test showed that there were no significant differences between the nurses by work setting or department ($p > 0.05$).

3.2. Intention to Stay

There were no statistically significant differences between psychiatric and general nurses with respect to intention to stay in the organization, as described in Table 3.

3.3. Organizational Commitment

Table 4 indicates that there were no statistically significant differences between psychiatric and general nurses in relation to organizational commitment.

3.4. Self-Efficacy

There was no statistically significant difference between psychiatric and general

Table 1. Socio-demographic characteristics of the study participants.

Item	Frequency	Percentage
Age		
20 - 29	70	40%
30 - 39	92	52.6%
40 - 49	10	5.7%
50 - 59	3	1.7%
Gender		
Male	90	51.4%
Female	85	48.6%
Nationality		
Saudi	98	56%
Non-Saudi	77	44%
Marital status		
Single	65	37.1%
Married	103	58.9%
Divorced	7	4%
Education level		
Diploma	67	38.3
High Diploma	22	12.6
Bachelor Degree	78	44.6
Master Degree	7	4
Doctorate Degree	1	0.6
Work status		
Practical nurse	153	87.4%
Supervisor	18	10.3%
Writing assignment	4	2.3%
Experience		
less than one year	32	18.3%
from 1 - 5 years	53	30.3%
from 6 - 10 years	63	36.0%
from 11 - 15 years	17	9.7%
more than 15 years	10	5.7%
Level of income		
less than 9999 SR	97	55.4%
From 10,000 - 14,999 SR	68	38.9%
From 15,000 - 19,999 SR	7	4%
More than 20,000 SR	3	1.7%
Hospital		
Psychiatric Hospital	117	66.9%
General Hospital	58	33.1%
Department		
Psychiatric	117	66.9%
ICU	12	6.9%
Surgical	17	9.7%
Medical	29	16.6%

Table 2. Job satisfaction scores amongst the study participants.

Job Satisfaction	Mean	SD	P value
Psychiatric hospital	71.34	10.5	0.80
General hospital	71.62	10.6	

SD: Standard Deviation.

Table 3. Intention to stay scores of the study participants.

Intention to stay	Mean	SD	P value
Psychiatric hospital	5.11	1.87	
General hospital	4.67	1.71	0.80

SD: Standard Deviation.

Table 4. Organization commitment scores between groups.

Organization commitment	Mean	SD	P value
Psychiatric hospital	39.68	4.95	
General hospital	39.82	4.81	0.80

nurses in terms of self-efficacy, as stated in Table 5.

3.5. Results of Correlation and Regression Analysis

3.5.1. Correlations between Job Satisfaction, Occupational Commitment, Intent to Stay and Demographic Characteristics

The results of Spearman correlation suggested that there was a significant relationship between nationality and job satisfaction ($r = 0.27$, $p < 0.001$), organizational commitment ($r = 0.16$, $p = 0.03$) and self-efficacy ($r = 0.19$, $p = 0.01$). Moreover, there was a statistically significant correlation between education level and job satisfaction ($r = 0.24$, $p < 0.001$), organizational commitment ($r = 0.15$, $p = 0.047$), and self-efficacy ($r = 0.15$, $p = 0.039$). However, the years of experience was observed to be significantly correlated negatively with job satisfaction ($r = -0.13$, $p = 0.06$). Another significant correlation was detected between income level and job satisfaction ($r = -0.14$, $p = 0.06$) along with self-efficacy ($r = -0.13$, $p = 0.07$). Other demographic variables were observed to have an important correlation with independent variables, *i.e.* job satisfaction, organizational commitment and self-efficacy or the dependent variable, *i.e.* intention to stay. These results are presented in Table 6.

3.5.2. Correlations between Job Satisfaction, Organizational Commitment and Intention to Stay

The results of Pearson correlation demonstrated that job satisfaction had a positive correlation with the intention to stay ($r = 0.23$, $p = 0.003$). A positive correlation also existed between job satisfaction and organizational commitment ($r = 0.38$, $p < 0.001$) and self-efficacy ($r = 0.22$, $p = 0.003$), and between organizational commitment and self-efficacy ($r = 0.36$, $p \leq 0.001$). Table 7 presents the overall correlation results with respect to the factors of job satisfaction, organizational commitment and intention to stay. Multiple regression analysis was performed on the demographic data of the sample, job satisfaction, organizational commitment, self-efficacy (predictor variable) and intention to leave (dependent variable). The regression analysis findings revealed that job satisfaction has an association with the intention to stay ($\beta = -0.325$, $p < 0.05$). All the other predictor variables showed non-significant results, as displayed in Table 8.

Table 5. Self-efficacy scores between psychiatric and general nurses group.

Self-efficacy	Mean	SD	P value
Psychiatric hospital	29.93	3.86	0.80
General hospital	30.17	5.42	

SD: Standard Deviation.

Table 6. Correlation between demographic characteristics and job satisfaction, intention to stay, organization commitment and self-efficacy.

	Job satisfaction		Intention to stay		Organization commitment		Self-efficacy	
	r	sig	r	sig	R	sig	r	sig
Age	0.05	0.45	−0.01	0.80	0.019	0.80	−0.10	0.15
gender	0.08	0.27	−0.07	0.32	−0.00	0.92	−0.07	0.35
Nationality	0.27	0.00	0.04	0.52	0.16	0.03	0.19	0.01
Marital Status	−0.08	0.28	0.03	0.70	−0..02	0.76	−0.07	0.34
Education level	0.24	0.00	0.059	0.43	0.15	0.04	0.15	P<0.001
Work task	0.02	0.78	0.00	0.93	−0.00	0.91	−0.10	0.17
Experience	−0.13	0.06	0.12	0.10	0.06	0.40	−0.01	0.17
Level of income	−0.14	0.06	−0.00	0.99	0.01	0.40	−0.13	0.07
Hospital	0.01	0.87	−0.11	0.13	0.01	0.85	0.02	0.73
Department	−0.01	0.85	−0.07	0.35	−0.00	0.95	−0.01	0.82

Table 7. Relationship between intention to stay and job satisfaction, organization commitment and self-efficacy.

	Job Satisfaction		Intention to stay		Organization commitment		Self-efficacy	
	r	sig	r	sig	R	sig	r	sig
Job Satisfaction			0.225	0.003	0.338	0.00	0.221	P < 0.001
Intention to stay	0.225	0.003			0.105	0.16	0.119	P < 0.001
Organization commitment	0.388	0.00	0.105	0.16			0.36	P < 0.001
Self-efficacy	0.221	0.003	0.118	0.11	0.36	0.00		P < 0.001

Table 8. The result of multiple regression.

	Intention to stay		
Job Satisfaction	R^2	Beta standardized	Sig
	0.51	0.325	P < 0.001

4. Discussion

To our knowledge, this is the first study determined the factors influence nurse's decision to leave the profession. The research identified that a strong association exists between job satisfaction and income level, which eventually leads towards the positive intention to stay. The job satisfaction level of the older Saudi nurses employed in psychiatric hospitals and their desire to stay in the job, was high, as they had to perform simple tasks with a minimal work load for the maximum level of income [26]. Similarly, the job satisfaction level of new general nurses working in various departments and their desire to stay in their jobs was also high; this group comes from a broader spectrum of nationalities and is interested in working to reduce economic pressure, albeit for a low salary [11].

Concerning the main aim of this study, no significant difference was found between job satisfaction and the turnover of nurses in either psychiatric or general hospitals ($\beta = -0.325$, $p > 0.05$). Some predictor variables displayed non-significant results; for example, years of experience was significantly but negatively correlated with job satisfaction ($r = -0.13$, $p = 0.06$). This finding agrees with that of Hayes, Douglas [1], that job satisfaction and turnover intention are negatively related. However, Chen, Brown [2] reported a strong positive relationship between behavioural intentions and turnover, and a negative relationship between job satisfaction and behavioural intentions.

Surprisingly, job satisfaction was found to have a significant relationship with intention to stay, and it was a significant predictor for our dependent variable. Chen, Brown [2] and Labrague, Gloe [27] similarly reported a strong positive relationship between behavioural intentions and turnover; a strong negative relationship was noticed between job satisfaction and behavioural intentions. In addition, the analysis of the study findings found a small negative relationship between job satisfaction and turnover. Role perception in nursing practice has been recognized as an important determinant of organizational and individual stress, job satisfaction, organizational commitment and intentions to leave [18] [28]. Several studies support the current study result that only job satisfaction predicts anticipation to leave [29] [30] [31].

Maslow's hierarchy of needs and Herzberg's (1966) motivation-hygiene theories were considered and explored for this particular study, to evaluate the determinants of nurse turnover in psychiatric hospitals in the Makkah region. Factors including professional development, recognition, improvement of extrinsic components, developed nursing practice; career advancement and motivation are believed to raise the job satisfaction level of nurses and their retention at large. Most of the findings obtained for this study revealed that job satisfaction has a positive influence on turnover and turnover intention. Nonetheless, one of the studies Holmberg, Caro [32] considered by this research aimed to determine whether factors such as job satisfaction, positivity, good salary and experience have any influence on turnover intention. This particular study obtained data from a healthcare organization in Iceland, during March 2018. The

total number of participants was 64, of whom 48.8% (n = 31) claimed to be male and 34.4% (n = 22) to be female. The overall findings of this study suggested that the turnover intention of the nurses was reduced by having a positive mindset. This result certainly aligns with the present research, whose findings reveal that employees with a positive mindset can reduce turnover intention by a certain level.

According to research conducted by Collini, Guidroz [18], Almalki, FitzGerald [11] and Alghamdi, Topp [31], a weak positive relationship exists between low turnover rate and the job satisfaction level of nurses. The association between job satisfaction and the intention to stay or leave the job was stronger than the relationship between low job satisfaction and turnover. Certain motivational job factors such as achievement, recognition, working environment, autonomy, empowerment and responsibility encourage as well as raise the job satisfaction level of Ministry of Health nurses at large. According to the findings of Spector (1997), the various determinants of job satisfaction and nurse turnover in psychiatric hospitals in the Makkah region were identified as organizational structure along with policies, appreciation, personal advancement, communication and fringe benefits such as vacations, insurance and pension plans. The other determinants encompass the working environment, remuneration, the work itself, development prospects, supervision and security.

4.1. Intention to Stay

The regression result obtained for this study *i.e.* (r = 0.23, p = 0.003) clearly indicated that there exists a positive correlation between job satisfaction and intention to stay; this is the strongest relationship recorded, significantly greater than that between low job satisfaction and turnover. The evidence suggests that job satisfaction is indirectly affected by a wide assortment of demographic, organizational and ecological factors, which help in predicting turnover intention at large. The intention of the older Saudi nurses to stay in their respective jobs or profession and their job satisfaction were identified as high because of their higher level of income and their routine simple tasks. Similarly, the job satisfaction level and the desire to stay among the new general nurses in different departments were a result of their accepting the low salary in order to reduce economic pressure. The overall findings of this study highlighted that 38.8% of the participants are less likely to remain in their respective jobs or profession. However, in a study conducted by Al-Ahmadi [10], 37% of the nurses intended to leave their individual job or profession. In another study it was stated that job satisfaction was an important antecedent of turnover in the nursing profession ([33]. Job satisfaction was indirectly influenced by a variety of organizational, demographic and environmental components [12] [34]. The more nurses are satisfied with their job, the less likely they will be to leave. Job satisfaction was said to be a crucial antecedent of nurse turnover intention, although it is not yet known which the most important predictor of turnover intention is [9] [31].

4.2. Organizational Commitment

Similar to job satisfaction and intention to stay, organizational commitment was measured to address the issues identified in this particular study. Similar results for the average of organizational commitment were observed between the psychiatric and general nurses. An independent sample t-test evaluated the differences between the groups, confirming that organizational commitment is not statistically significantly different between psychiatric and general nurses (p > 0.05), nor was it a significant predictor of intention to stay. The regression result (r = 0.38, p < 0.001) indicated a positive correlation between job satisfaction and organizational commitment. Therefore, organizational commitment cannot be considered as a significant predictor of intention to stay. Similar results can be traced in the study conducted by Mahmoud [13] and Cumbey and Alexander [35], in which the variables of organizational commitment including vertical and horizontal participation are positively correlated with the job satisfaction of public health nurses. Chiok Foong Loke [36] and Chang, Shyu [29] agree that role clarity, rules, and standard practices lead to higher job satisfaction, affecting both nurses' personal development and organizational performance.

4.3. Self-Efficacy

At p > 0.05, the results showed no statistically significant differences in self-efficacy between the psychiatric and the general nurses. Nonetheless, job satisfaction has a positive association with self-efficacy, as the regression result stood at r = 0.22, p = 0.003. Most studies, including Judge and Bono (2001), revealed that employees' knowledge and personal development contribute to higher levels of self-efficacy, which in turn raise job satisfaction and job performance at large. Self-efficacy is deemed an important factor in nursing practice as it results in developing the quality of care for individuals [37]. Le and Ko (2010) concluded that nurses' self-efficacy has a connection with increased job satisfaction and better-quality nursing care. Based on the observation made by Bandura and Ramachaudran [19], Social Cognitive Theory portrays the association existing between the turnover intention of nurses and the intervening role of self-efficacy. According to this particular theory, individuals can develop new behaviours by modelling the activities performed by others. Social Cognitive Theory tends to determine the significance of self-efficacy, which mediates the relationship between environmental characteristics (e.g. supervisory feedback) and employee behaviour (Wood and Bandura, 1989). However, these results encourage further discussion and explanation of Bandura's theory that nurses' turnover intentions usually follow from psychological responses to negative aspects at work (Takase, 2010). The theory Bufford [20] can explain and predict the relationship between the quality of feedback and turnover intentions and the intervening role of self-efficacy.

The sample of nurses, restricted to those employed only in government psychiatric hospitals in Makkah province, can be considered as one of the limita-

tions of this study. It is therefore difficult to draw valid inferences from the results.

5. Conclusion

Based on the overall research findings, it can be concluded that a strong and direct relationship exists between job satisfaction and turnover intention of nurses who work in psychiatric hospitals. From the secondary data and regression results, the various determinants of nurse turnover in psychiatric hospitals were identified as including organizational commitment, professional advancement and job satisfaction.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

Relevance Statement

✓ This study has adequate sample size with high response rate.
✓ This is the first study conducted in Arab Speaking countries in psychiatric setting.
✓ This is one of the few studies examined the relationships between these variables by using reliable and valid outcome measures.
✓ It is important because such knowledge can guide possible changes, within working environment and identify area for future research.

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Correlates of Anxiety Disorder among Patients with Seizure Disorders in a Neuropsychiatric Hospital in Nigeria

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Abstract

Background: Anxiety may complicate epilepsy as is often the case out of the various psychiatric comorbidities patients can suffer from when they are suffering from epilepsy. The aim of this study was to estimate the prevalence of anxiety among patients that had epilepsy and also to examine the associated socio-demographic and clinical factors that are associated with and eventually predictive of this psychiatric comorbidity. **Materials and Method:** This study was a descriptive cross-sectional study that involved the use of General Health Questionnaire, version 28 (GHQ-28) and the Composite International Diagnostic Interview (CIDI), which were used independently to investigate each of the 400 consecutive participants in this study over a period of 24 weeks. The diagnosis of epilepsy was based on the International Classification of Diseases (ICD10) diagnostic criteria and all participants with anxiety were diagnosed using CIDI. A proforma Questionnaire was used to assess the socio-demographic and some clinical variables among patients. Logistic regression was done to determine the predictors of anxiety in the study participants. **Results:** When screened with GHQ-28, 71 people (17.8%) met criteria for caseness. When all the participants were examined using CIDI, 12 (3%) were diagnosed with generalized anxiety disorder. The variables found to be the predictors of anxiety were family history of psychiatric disorders ($p = 0.045$), fear of having seizure ($p = 0.036$) and GHQ caseness ($p = 0.002$). **Conclusion:** The study showed the existence of anxiety disorders among patients with seizure disorder. This is an important association with seizure disorders which is often overlooked. It will be beneficial to these patients if this co-morbidity is actively looked out for. Patients suffering from seizure disorder that have a family history of mental illness should be considered for an assessment of anxiety disorder. Psychological intervention for anticipatory fear of seizure should be employed by mental health professionals.

Keywords

Epilepsy, Anxiety, Correlates, Nigeria

1. Introduction

Epileptic seizures as an entity can be traced back to about 2000 B.C. in the ancient region of Mesopotamia. The word "epilepsy" was coined from Latin and Greek words and it means "seizure" or "to seize upon". It is believed to be brought about by the god of the moon and that is why anyone afflicted is termed a lunatic. Ancient Indian Ayurveda describes different kinds of diseases that resemble epilepsy with a special reference to one that results in a momentary loss of memory [1]. One of the biblical mentions of epilepsy was in the book of Mark 9:17-22, where the value of spiritual healing in treating epilepsy was emphasized [2]. Epilepsy occurs in all mammalian species, and seems to be more frequent with increased complexity of mammalian brains [3]. It is one of the most common and serious neuropsychiatric disorders in the world [4] [5]. It is also the most common non-infectious neuropsychiatric disease in developing African countries like Nigeria [4]. Also, it affects at least 50 million people in the world and about 100 million people will have at least one epileptic seizure at some time in their lives. Epilepsy affects all ages with about 10 million people being directly affected in Africa. It is responsible for an enormous amount of suffering. Epilepsy in African rural and urban communities is often attributable to supernatural causes such as witchcraft and it is often treated by traditional healers [6]. Persons with epilepsy are disadvantaged as they are often shunned and discriminated against in education, employment and in marriage. This is due to the fact that epilepsy is seen as a highly contagious and shameful disease in Africa [7]. Some studies have shown that about 50% of patients with epilepsy develop psychiatric disorders, with the most common being depression, anxiety and psychotic disturbances. The psychiatric symptomatology is often classified according to how they relate in time (temporality) to seizure occurrence; they are thus classed as ictal, pre-ictal/prodromal, post-ictal or inter-ictal [8].

Comorbidity is a condition in clinical practice where several diseases coexist within the same patient at the same time [9]. Psychiatric comorbidities in epilepsy seem to be a common occurrence and among them anxiety disorders are highly frequent and have a profound influence on the quality of life of epilepsy patients [10]. Anxiety as a psychiatric disorder affects about 18 percent of the population and lasts at least six months. It must be treated promptly else it can get worse [11]. Anxiety is an experience of fear or apprehension in response to anticipated internal or external danger, accompanied by some or all of the following signs: muscle tension, restlessness, sympathetic hyperactivity, and cognitive signs and symptoms like: confusion, alertness, decreased concentration, or fear of losing control. Anxiety in patients with epilepsy can be ictal, postictal, or

interictal [12]. Though stress and anxiety do not cause seizure they may be a trigger [13]. Fitch has shown that the rate of anxiety in epilepsy ranges from 10 to 32% in people already living with epilepsy [14]. It could be quite difficult separating the anxiety that is as a result of a chronic disease from pathologic anxiety as studies investigating anxiety in epilepsy have been relatively few compared to depression in epilepsy [12]. There have been challenges in treatment as some of the medications used in treating anxiety disorder in epilepsy cause lowering of seizure threshold or they inadvertently interfere with metabolism of antiepileptics [15]. Anxiety disorders are very frequently under diagnosed which result in delay in intervention. Many at times such patient are not treated at all thus leaving a wide treatment gap [16]. Anxiety disorder is expected to be on the increase in coming years as performance expectation from patients with epilepsy is likely to increase the anxiety and apprehension in these patients [9]. A 2006 case control study was done by Fatoye *et al.* about interictal anxiety and depressive symptoms among 52 patients with epilepsy as compared to 52 healthy control groups. The Hospital Anxiety and Depression Scale (HADS) were used to screen participants. The result shows significant association between polytherapy and anxiety and illness longer than 10 years and depression [17]. Adewuya and Bola also did a study on 102 patients on the prevalence and the risk factors of anxiety and depressive disorders among adolescents with epilepsy. They got a prevalence of 31.37% for all types of anxiety disorders and 28.43% for depressive disorder. This study deviated from their study in that they did their study among adolescents while this was done among adults. They also used Diagnostic Interview Schedule for Children (DISC-IV) to assess for anxiety while this study used both GHQ and CIDI to assess for anxiety.

The psychosocial variables associated with Anxiety in epilepsy are: The stress of being labeled as having seizure disorder which has a lot of impact on the development of anxiety. Studies have also found similar association with depression and the development of psychotic symptoms in epileptics [18]. Also, performance expectation put a lot of patients suffering from seizure disorder under anxious states [9]. Polytherapy is a major clinical variable that is associated with anxiety in patients with seizure disorder [17]. Other generalized factors will be female gender and age of more than 40 years [19].

2. Objective

To determine socio-demographic and clinical factors that are associated with the occurrence of anxiety among patients with seizure disorders at Federal Neuropsychiatric Hospital, Kware Sokoto.

3. Methodology

The study was carried out at the outpatient department of the Federal Neuropsychiatric Hospital, Kware Sokoto, Nigeria. The sample size of 400 was derived using the sample size estimate for proportion [20] [21]. In an earlier study con-

ducted by Longe and Osuntokun in 1989, the prevalence of epilepsy in the general population was 6/1000, while Gureje in 1991 reported a prevalence of 37.3%. Using the sample size estimate for proportion:

$$n = Z^2 pq / d^2$$

where n = desired sample size,

Z = 1.96 (95% confidence interval),

p = Estimated prevalence of the variable,

q = 1 − p,

d = degree of accuracy at 0.05.

To allow for attrition, 10% of the calculated sample size is added. This gives a sample size of 394. Thus an approximated sample size of 400 was used in this study.

The Clinical (bedside) diagnosis that was used to define epilepsy was the International Classification of Diseases (ICD-10) codes for Epilepsy and Seizures. While the Anxiety module of the Composite International Diagnostic Interview (CIDI) was used to define Anxiety disorder.

Adults diagnosed with seizure disorder for at least 6months prior to participation, that utilize the healthcare facility and that accepted to participate in the study were recruited consecutively. The exclusion criteria were: 1) Participants that are below 18 years or above 60 years, 2) Non epileptic patients, 3) Patients that declined to participate or withdrew consent at any point, 4) Patients with status epilepticus, active psychotic symptoms which could not allow probable interview or other life threatening conditions. Approval for the research was obtained from the Research and Ethical committee of the Federal Neuropsychiatric Hospital, Kware, Sokoto.

Participants were interviewed using a semi-structured socio-demographic questionnaire designed by the researchers using relevant literatures. The questionnaire detailed the socio-demographic variables of the respondents like age, gender, marital status, ethnicity, employment status, place of residence, educational status, and religion. This was the introductory aspect of the questionnaire.

The Psychological and Clinical variables documented were the duration of illness, frequency of seizure, age at illness onset, previous substance use disorder, presence of recurrent/uncontrolled seizure, any current use of antiepileptic(s), presence of previous hospital admission, recurrent presence of fear of having seizure, level of social support, change in lifestyle and family history of mental illness. The socio-demographic questionnaire and the English or Hausa version of the General Health Questionnaire (GHQ) questionnaire (A self-administered validated screening instrument that was developed in the 1970s aimed at detecting psychiatric disorders in the general population) was then administered on all the participants. All patients were further assessed using the Anxiety module of Composite International Diagnostic Interview-CIDI {A fully structured validated instrument developed in 1990 for the assessment of psychiatric disorders according to the diagnostic criteria of International Classification of Diseases

(ICD) and Diagnostic and Statistical Manual of Mental Disorders (DSM)}.

3.1. Study Design

It was a cross-sectional descriptive study.

3.2. Data Analysis

Data collected was collated and entered into the computer using the Statistical Package for Social Sciences (SPSS) version 20. Scattered numerical data like age of participants in year, age at seizure onset and the duration of seizure disorder in months were recoded into groups with specific group intervals. The numerical (continuous) data were subjected to means and standard deviations (S.D) and the means were compared using t-test. For categorical variables, descriptive statistics included frequency distributions and cross tabulations in each category. The proportions were compared using chi-square (χ^2) test. All the variables were examined for their relationship to the overall clinical psychopathologies of anxiety. The data was represented in tables to differentiate the demographic, psychological and clinical data for generalized anxiety disorder. All tests of significance was set at $p < 0.050$. Variables that were statistically significant were further subjected to logistic regression analysis to determine the predictors of the Generalized Anxiety disorder in seizure disorder.

Study Period was from September, 2017 to March, 2018.

4. Results

4.1. Sociodemographic Characteristics of Participants That Had Anxiety

Among the 400 participants, 12 (3.0%) had Anxiety. Among which 8 (3.0%) were males and 4 (3.0%) were females. A large proportion of the subjects, 153 (96.2%) in the Unemployed/Social class V group had no anxiety, while the remaining 6 (3.8%) were having anxiety. The majority of the subjects, 174 (43.5%) were married, out of which 168 (96.6%) had no anxiety disorders leaving only 6 (3.4%) with the disorder. Only 150 (37.5%) subjects had western education out of which 3 (2.0%) were suffering from anxiety disorder. This is shown in Table 1.

4.2. Psychological Characteristics of Participants That Had Generalized Anxiety Disorder

Table 2 showed psychological variables when cross-tabulated between those with anxiety disorder and those without. Among the 12 patients with anxiety disorder, 9 (75.0%) always have the fear of having seizure as compared to 3 (25.0%) who did not have the fear ($\chi^2 = 19.554$, $p = 0.000$). There were also significant differences between those with anxiety disorders and those without as it related to change in their lifestyles; 9 (75.0%) vs. 3 (25.0%) ($\chi^2 = 4.188$, $p = 0.041$) and family history of mental illnesses; 7 (58.3%) vs. 5 (41.7%) ($\chi^2 = 9.517$, $p = 0.006$).

Table 1. Comparison of the sociodemographic characteristics in participants that had anxiety and those without anxiety (N = 400).

Variable	No anxiety group (No./%) (N = 388)	Anxiety group (No./%) (N = 12)	X^2/t	D.F	P
Age group in years					
18 - 40	349 (97.7%)	8 (2.3%)	T = −1.592	11.267	0.139
41 - 60	41 (91.1%)	4 (8.9%)			
Mean (S.D)	28.74 (9.06)	35.50 (13.12)			
Gender					
Male	258 (97.0)	8 (3.0)	X^2 = 0.00	1	0.630
Female	130 (97.0)	4 (3.0)			
Occupation by Social Class					
Unemployed/Social classV	153 (96.2)	6 (3.8)	X^2 = 0.543	1	0.553
Others	235 (97.5)	6 (2.5)			
Marital Status					
Married	168 (96.6)	6 (3.4)	X^2 = 0.213	1	0.645
Others	220 (97.3)	6 (2.7)			
Educational Status					
Western Education	147 (98.0)	3 (2.0)	X^2 = 0.825	1	0.547
Nil/Islamic	241 (96.4)	9 (3.6)			
Ethnicity					
Hausa	341 (96.6)	12 (3.4)	X^2 = 1.647	1	0.218
Others	47 (100.0)	0 (0.0)			
Religion					
Islam	382 (97.0)	12 (3.0)	X^2 = 0.188	1	0.664
Christianity	6 (100.0)	0 (0.0)			

Table 2. Comparison of the psychological characteristics of the study participants in the anxiety and non-anxiety group (N = 400).

Variables	No anxiety group (No./%) (N = 388)	Anxiety group (No./%) (N = 12)	X^2	D.F	P
Fear of having seizure					
No	307 (97.1)	3 (25.0)	19.554	1	<0.001
Yes	81 (20.9)	9 (75.0)			
Seizure worry					
No	215 (55.4)	5 (41.7)	0.889	1	0.258
Yes	173 (44.6)	7 (58.3)			
Change in lifestyle					
No	213 (54.9)	3 (25.0)	4.188	1	0.041
Yes	175 (45.1)	9 (75.0)			
Social support					
Reduced	46 (11.9)	2 (16.7)	0.562	2	0.755
No change	174 (44.8)	6 (50.0)			
Increased	168 (43.3)	4 (33.3)			
Family history of mental illness					
No	307 (79.1)	5 (41.7)	9.517	1	0.006
Yes	81 (20.9)	7 (58.3)			

4.3. Clinical Characteristics of Participants with Generalized Anxiety Disorder

Table 3 illustrated that those subjects with physical complications were more likely to be have anxiety disorder 7 (8.5%) compared to those without 5 (1.6%) (χ^2 = 10.865, p = 0.004). Patients that had a short duration (<100 days) of last seizure occurrence were more likely to be having anxiety disorders 12 (4.2%) when compared to those without anxiety disorder 0 (0%) (T = 12.689, p = 0.000). Also those that had a previous history of hospitalization due to seizure disorder were more likely to have anxiety 4 (8.9%) when compared to those without 8 (2.3%) (χ^2 = 6.043, p = 0.035).

4.4. Multivariate Logistic Regressions for Predictors of Anxiety

Shown in Table 4, all variables that were significant on chi square were recruited to determine the predictors of anxiety among seizure patients.

The following variables were thus used for anxiety disorder: Seizure fear, Change in lifestyle, family history of psychiatric illness, duration since last seizure, physical complications, previous hospitalization and GHQ caseness. Only fear of having seizure (p = 0.036), family history of mental illnesses (p = 0.045) and GHQ caseness (p = 0.002) were significant predictors of anxiety.

5. Discussion

Psychiatry morbidity is an important accompaniment of seizure disorder to the extent that some researchers anticipated the inclusion of such comorbidities in seizure diagnostic criteria [22]. The focus of this study was the correlates of anxiety disorder in people already having seizure disorder which is a common comorbidity with seizure disorder [23] [24]. In this study, not only the prevalence but the predictors of anxiety in seizure patients were examined.

Twelve participants (3%) of the study population had generalized anxiety. This is similar to the finding of Christian Brandt *et al.* (2010) where they found a diagnosis of generalized anxiety disorder among patient suffering from epilepsy of 3.1% [25]. It was also similar to the result gotten by Tunde-Ayinmode *et al.* when the result was converted to percentage within the study population of 63 respondents [19]. A similar study in Bauchi got an anxiety prevalence of 4.1% [26]. However, this rate is lower than many studies with reported rate of between 9% - 39% [16] [18] [27]. These differences in rates may be due to the different socio-cultural situations of the study populations as the quoted studies were all done outside Sokoto State and also most of the studies used different instruments for the assessment of the participants. More also, this study population was stabilized on drugs for six months prior to data collection. This might have helped them to be able to institute better coping mechanisms to combat some of the anxiety they may have had.

When patients were presented with the question asking them about the psychological state of having a fear that is directed to the seizure that they are having,

Table 3. Comparison of the clinical characteristics of the study participants in the anxiety and non-anxiety group (N = 400).

Variables	Noanxiety group (No./%) (N = 388)	Anxiety group (No./%) (N = 12)	X²/t	D.F	P
Seizure Diagnosis					
Grand Mal	294 (97.4)	8 (2.6)	X² = 0.522	1	0.335
Others	94 (95.9)	4 (4.1)			
Age at seizure onset (yrs)					
0 - 9	92 (95.8%)	4 (4.2%)			
10 - 19	163 (98.2%)	3 (1.8%)			
20 - 29	90 (96.8%)	3 (3.2%)			
30 - 39	35 (100.0%)	0 (0.0%)	T = −0.632	11.233	0.540
40 - 49	5 (83.3%)	1 (16.7%)			
≥50	3 (75.0%)	1 (25.0%)			
Range: >1 - 59					
Mean (S.D)	16.3153 (10.25)	18.5417 (17.59)			
Duration of seizure (months)					
0 - 99	155 (97.5%)	4 (2.5%)			
100 - 199	125 (97.7%)	3 (2.3%)			
200 - 299	77 (97.5%)	2 (2.5%)			
300 - 399	23 (92.0%)	2 (8.0%)	T = −1.026	11.299	0.326
400 - 499	5 (83.3%)	1 (16.7%)			
≥500	3 (100.0%)	0 (0.0%)			
Range: 6 - 510					
Mean (S.D)	145.36 (100.06)	190.50 (157.36)			
Duration since last Seizure (Days)					
0 - 100	274 (95.8)	12 (4.2)			
≥101	144 (100)	0 (0.0)	T = 12.689	387	<0.001
Range: 1 - 5475					
Mean (S.D)	215.58 (558.70)	19.67 (31.31)			
Physical complications					
No	313 (98.4)	5 (1.6)	X² = 10.865	1	0.004
Yes	75 (91.5)	7 (8.5)			
Seizure in the last one month					
No	192 (98.5)	3 (1.5)	X² = 2.793	1	0.083
Yes	196 (95.6)	9 (4.4)			
Hard drug prior seizure					
No	345 (97.0)	11 (3.0)	X² = 0.003	1	0.717
Yes	34 (97.1)	1 (2.9)			
Current hard drug use					
No	360 (97.0)	11 (3.0)	X² = 0.022	1	0.600
Yes	28 (96.6)	1 (3.4)			
Seizure Drug					
Monodrug	350 (97.0)	11 (3.0)	X² = 0.28	1	1.000
Multiple Drugs	38 (97.4)	1 (2.6)			
Medical disorder					
No	351 (97.5)	9 (2.5)	X² = 3.093	1	0.108
Yes	37 (92.5)	3 (7.5)			
Previous Hospitalization					
No	347 (97.7)	8 (2.3)	X² = 6.043	1	0.035
Yes	41 (91.1)	4 (8.9)			

Continued

Maternal Pregnancy complications					
No	276 (96.8)	9 (3.2)	$X^2 = 0.233$	2	0.890
Yes	6 (100.0)	0 (0.0)			
Not reported	106 (97.2)	3 (2.8)			
Delivery related complications					
No	273 (96.8)	9 (3.2)	$X^2 = 0.337$	2	0.845
Yes	9 (100.0)	0 (0.0)			
Not reported	106 (97.2)	3 (2.8)			
GHQ Caseness					
No	327 (99.4)	2 (0.6)	$X^2 = 36.447$	1	<0.001
Yes	61 (85.9)	10 (14.1)			
EEG Report					
Negative	157 (97.5)	6 (2.5)	$X^2 = 0.438$	1	0.353
Positive	231 (96.3)	6 (3.7)			

Table 4. Logistic regression analysis for the predictors of generalized anxiety disorder in the participants.

Predictor Variable	B	P Value	Exp(B)	Exp(B) (95% CI) Lower	upper
Fear of Having Seizure	−1.559	0.036	0.210	0.049	0.901
Life style Change	0.462	0.589	1.587	0.297	8.482
Family History of MI	−1.395	0.045	0.248	0.064	0.967
Duration since last seizure	0.023	0.153	1.024	0.991	1.057
Seizure Complication	1.390	0.056	4.013	0.965	16.680
Previous Hospitalization	−1.124	0.153	0.325	0.069	1.520
GHQ Caseness	−2.710	0.002	0.067	0.012	0.364
Constant	−0.260	0.754	0.771		

MI = Mental Illness.

more patients that came with the diagnosis of anxiety disorder had higher reported feelings of seizure fear when compared to those without anxiety (p = 0.036). This shows that the feeling of fear of having seizure may not just be narrowly for seizure but a broader hidden anxiety disorder. About two-third (75.0%) of patients that had anxiety had recurrent fear of having seizure; this only shows an association between those that proclaim their fear of having seizure and the broader generalized anxiety disorders. Due to the scope of this study, it is rather difficult to delineate if anxiety disorder triggers seizure or that seizure is the cause of anxiety disorder but what it shows is that having seizure fear is a predictor of having anxiety disorder. It is understandably so that the fear of having seizure is akin to anxiety and it is no surprise that people that professed their fear had more anxiety disorder when compared to those without. The mere thought of being embarrassed by a sudden manifestation that is out of one's control can elicit an anticipatory feeling in people suffering from epilepsy, making them to always be on the edge [10]. An example where seizure was a

trigger for anxiety disorder was the WHO report by Kenjiro Fukao where it was noted that fear of having seizure can metamorphosize to generalized anxiety disorder through amygdala dysfunction. This may result in anxiety symptoms due to persistent firing of the amygdala and the surrounding regions [28]. The amygdale performs a primary role in the processing of memory, decision-making and emotional responses like fear, and aggressive behaviours. The amygdala is considered part of the limbic system and it is at very close proximity to the temporal lobe; so it has the features of both limbic and temporal lobe epilepsy. The limbic system is the locus of emotion and since anxiety is a form of emotion, abnormal firing of the limbic system can present as anxiety. Steimer (2002) also reported that the locus coeruleus may be the locus of abnormal neuronal firing in some epilepsy. Since this is the nucleus for adrenaline, discharge from the locus coeruleus can present with features similar to anxiety disorder due to excessive sympathetic discharge. Furthermore, neurons in this area may project to the paraventricular nucleus in the hypothalamus thus leading to the activation of the Hypothalamus-Pituitary-Adrenal (HPA) axis. The triggering of this axis gives an anxiety response by the massive release of sympathetic neurotransmitters [29].

Another major predictor of anxiety disorder was family history of psychiatric illness ($p = 0.045$). When patients were asked about the history of psychiatric illness among their family members, those that answered "yes" were more likely to be diagnosed with anxiety disorder when compared to those that said "no". Adewuya and Ola (2005) included "parents psychopathology" which is a narrower form of family history of mental illness as one of the significant variables in people with anxiety disorder in their study [30]. This is in keeping with most studies in psychiatry in particular and in medicine in general where a family history of a disorder is a pointer to the heritability of such disorder. The closely linked the proband is with an affected relative the more the risk of having anxiety disorder [10] [31]. A research done by McGregor (2014) suggested the following novel susceptibility genes among which were: MMP9, EGR2, EGR4, NTF4, and ARC, as candidates for anxiety pathogenicity [32]. Patients that carried defective aforementioned genes were more susceptible to anxiety disorders. The suggestion that discernable genes were involved in the pathogenesis of anxiety disorder in seizure lays claim to the likelihood of anxiety disorder being genetic as suggested by the presence of family history of psychiatric illness.

6. Conclusion

This study found the prevalence of anxiety in seizure disorder patients to be 3%. This is relatively low compared to some studies but high and even in consonance with others. The low findings may be due to the fact that each of the participants was diagnosed and had been on medication(s) at least six months prior to this study. Family history of mental illness and fear of having seizure are the predictors of having generalized anxiety disorders in people living with epilepsy. Ef-

forts targeted at managing epilepsy should also be channeled at asking appropriate questions about associated anxiety disorder with focus on adequate and timely management.

Limitations

The study was a cross-sectional one and thus may not be sensitive to changes in the levels of the measurements over time.

It is a hospital based study and may not represent entirely what obtains in the community.

Lastly, a brain Computed Tomography scan or Magnetic Resonance Imaging in addition to the Electroencephalogram should have been one of the parameters for assessing the participants but this was not possible due to inability of patients to afford the cost the brain imaging investigations.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

Disclosure

The authors have nothing to disclose.

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Statement of Authorship

AO, NOM, conceived the study; NOM, ASA, SS, designed the study protocol; NOM, SS, collected the data; NOM, AO, IAD, drafted the manuscript; SS, ASA, TOB revised the manuscript.

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Social Cognition in Schizophrenia: A Review Study

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Abstract

Social cognition includes all operations encountered in the process of perceiving, understanding & production of appropriate reactions while confronting with others. These include: social awareness, theory of mind, attributive style, and emotion processing. Social cognition skills have been recognized as a vital component in the rehabilitation process for schizophrenic persons, its strong contributors in social function among individual suffering from schizophrenia. The purpose of this review is to appraise various researches about social cognition and its correlates in addition to evaluating various cognitive interventions targeted toward improving social cognition function among patients group and to find the best techniques to ameliorate social cognitive deficits in schizophrenia. Databases were searched from the period from the year 2000 to October 2018. The search terms used were "Social cognition", emotional management program, schizophrenia. A total of 85 articles were identified and those who meet inclusion criteria including 27 articles. Finding indicates the efficacy of social intervention that targets cognitive aspect in functional abilities of schizophrenic patients and also emotion processing which are significant mediators of social performance aptitudes in patients group.

Keywords

Social Cognition or Social Cognitive Training (SCT), Emotional Management Program or Training and Schizophrenia

1. Introduction

Social cognition (SC) is a mental assembles which includes all operations encountered in the process of perceiving, understanding & production of appropriate reactions while confronting with others. The amounts of elements in-

cluded in social cognition domain are varied but in general it ranges from 3 to 5 areas. These include: social awareness, theory of mind, attributive style, and emotion processing. Social awareness means making inferences about social situations in a specific social circumstances & applying this knowledge, comprehension in producing suitable response; while theory of mind (ToM) is related to the talents of understanding, comprehension of other's thoughts, opinions, intuitions & to differentiate between it and one's own; attributive style (AS), which is concerned with how people tend to attribute and explain causes of situations that they are encounter in their life either caused by the misconduct of others or by themselves and lastly emotion processing which concerned with recognizing of different emotions, expressions and management process [1] [2].

Social cognition skills have been recognized as a vital component in the rehabilitation process for schizophrenic persons, its strong contributors in social function among individual suffering from schizophrenia [3] [4]. The purpose of this review is to appraise various researches about social cognition and its correlates in addition to evaluating various cognitive interventions targeted toward improving social cognition function among patients group and to find the greatest methods to eliminate social cognitive deficits in schizophrenia.

1.1. Search Strategy (Figure 1)

Guidelines for preferred reporting items for systematic review were utilized. The following databases were searched: Pub Med, science direct, internet, and Midline from the period from the year 2000 to October 2018. The search terms used were "Social cognition", emotional management program, schizophrenia.

A total of 85 articles were identified and those who meet inclusion criteria including 27 articles.

1.2. Inclusion Criteria

We set out the following inclusion criteria:
1) Target group had a diagnosis of schizophrenia.
2) Systematic review was conducted up to May 2018.
3) Focused on empirical study or systematic review.
4) Focused on evidence based intervention program.
5) Focused on recommendation of authenticate source.

1.3. Exclusion Criteria

1) Not a peer-reviewed original research article, e.g. commentary, editorial, letter, report, guidelines or conference or meeting proceedings.
2) Not published in English.

2. Results

Twenty seven articles have been recognized to meet inclusion criteria were categorized into two parts:
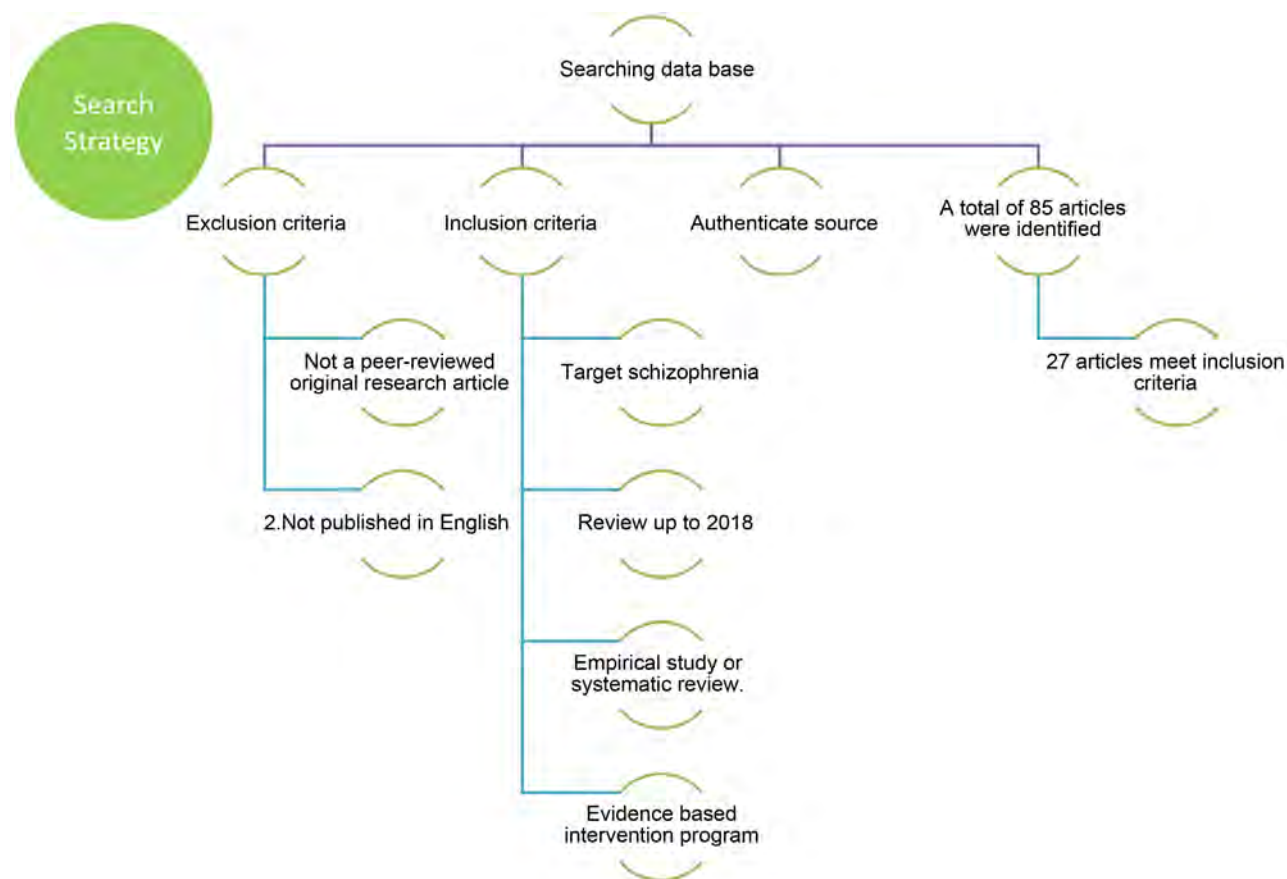
Figure 1. Search strategy.

- PART I: -DESCRIPTIVE STUDIES (Table 1)

Twelve descriptive studies were drawn to provide data about natures of social cognition deficit, organic origin for social cognition insufficiency in schizophrenic persons and relation between social cognition and social function among schizophrenic patients.

Zhua LX *et al.* (2013) compare between nearly one hundred schizophrenic patients & one hundred healthy subjects regarding eye movement while recognizing of different emotions and expression. They found that patients with schizophrenia have limited ability in emotion recognition process especially for negative faces. They attribute this to the presence of -ve symptoms which may influence patient ability in visual scrutinize stricture [5].

Regarding organic origin for social cognition insufficiency in schizophrenic persons; Akara SA *et al.* (2015) monitor recorded EEG (Electroencephalogram) data to examine neural network in the left fronto-temporal area during emotional processing task [6]. They record EEG in 2 circumstances. First one while latent period and second one during hearing stimulation using white noise. Results indicating the presence of abnormality in the left fronto-temporal area.

While Razafimandimby A *et al.* (2016) uses Magnetic Resonance Imagine to examine the neural activity under two different conditions. First condition is to

Table 1. Summary of descriptive studies.

STUDY AUTHORS	APPLICATION OF TREATMENT	INTERFERENCE METHOD	SAMPLE/ DESIGN	SIGNIFICANT FINDING	OTHER OUTCOMES/NOTES
Fiszdon, J. M., & Reddy, L. F. (2012)	literature search target social cognitive interventions in schizophrenia	Present data on nearly fifty researches assess a variety of social cognitive interference	review study	A variety of interference have been initiated that aim improving recognizing emotions, including Mind theory, social awareness, Affect recognition attempt have been the most frequent interference but there is no attempt have specifically directed to improve attributional style, social knowledge, or emotional intelligence.	Almost all of the interferences remained helpful in enhancing methods of emotion recognition, indicative of that affect awareness is flexible
Vita A *et al.* (2018)	Reviewed researches by revising various pharmacological cognitive enhancers supposed to enhance cognition in schizophrenia and mood disorders.	Provide information on various drugs targeting neuroplasticity improving for schizophrenia	review study	Medications can proper modify neuro chemical discrepancies that trigger neuroplasticity alterations in the brain, while cognitive exercise may make the creation of more adaptive neural circuits	The future studies should examine the durability effects of enhancing plasticity-using drugs alongside with cognitive teaching to bring the configuration of more steady neural circuits
Tabak, N. T *et al.* (2015)	Examined emotional Intelligence & its relation to clinical and social factors among studied groups. Thirty five schizophrenia or Bipolar I & thirty eight matched corresponding group were included	Studied subject in both groups finished society performance and symptom presentation	descriptive correlation design	Results reveal that both groups show considerable poorer perceived emotional Intelligence Trait than corresponding group, but did not change from each other. Higher emotional intelligence traits associated with elevated levels of self-governing living in both groups.	The results propose that perceived EI is making worse and connected to social performance in both groups

Continued

Lehmann A *et al.* (2014)	55 clients with schizophrenia, mainly paranoid and fifty five corresponding group applying empathy Test (the Multifaceted, Interpersonal Reactivity Index, in addition to the inner experience using Emotional Contagion Scales.	Test the Multifaceted, Interpersonal Reactivity Index, in addition to the inner experience using Emotional Contagion Scales.	descriptive correlation design	Schizophrenic Persons showed disturbance in cognitive empathy, but have normal level of emotional empathy. They describe considerably extra harmful emotional contagion, devastating emotions, deficiency in of emotions, and imagination capacity, but fewer self-power of emotional expression than corresponding group	It can be expected that elements of emotion handling are important mediators of empathic aptitudes in schizophrenia
Vogel B *et al.* (2016)	Question the manner in which schizophrenic disorders impact the patient ability to assimilate both oral expression and others nonverbal cues.	For this reason Different video shows were offered to twenty one patients versus 21 control subject	The studied subject evaluates the effect of the presenter emotional condition on a four-point range as of extremely negative to extremely positive. The relative influence of nonverbal cues as contrast to verbal cues on these ratings was appraised	Patients tend to stand their choice fewer on nonverbal cues and extra on verbal data than corresponding group	It can be assumed that variables of integrative capacity should be considered in management plan
Ahmeda OH (2018)	Ahmeda OH (2018) investigate the relation between aggression traits & cognitive impairment taken into consideration how negative emotions affect cognitive deficit	Seventy eight schizophrenic and schizoaffective patients Were employed from a state hospital. Applicants were classified based on their history of Intense offending.	Descriptive correlation design	aggressive patients displayed larger impairments in the majority cognitive area particularly operational memory & verbal learning. as well have larger destructive emotionality, agitation, and occurrence of verbal and physical aggression.	They found that cognitive insufficiency raise the liability of reckless violence in schizophrenia by means of incompetent control of negative emotional condition.

Continued

Akara SA *et al.* (2015)	Monitor recorded EEG data to examine neural network in the left fronto-temporal area. They record EEG in 2 circumstances. First one while latent period and second one during hearing stimulation using white noise	To study the original brain mechanism during emotional arousal condition through investigating EEG cues in schizophrenia patients investigated	Descriptive design	Results indicating the presence of abnormality in the left fronto-temporal area. where by minor values at the left frontal (L1), parietal and right central regions throughout entire process contrast to corresponding group who have a considerably elevated D2 merely in the F3 and the P4 area through the CTM practice	It denoted that schizophrenic brain has fewer malleable neural-networks in the left fronto-temporal area.
Ferrara AL *et al.* (2012)	Literature search target searching the association between emotional processing insufficiency and hallucinations mainly auditory verbal (AVH).	the association between hallucination and emotional prosody understanding in have stayed inspected among schizophrenic patients	review study	Results of researches are contrary. a number of inquiries did not discover a relation involving emotional process deficits & hallucinations. While others indicate presence of relation	In conclusion, auditory hallucinations & emotional process in schizophrenia appear to be foundation on corresponding neural networks, in which the training seems to occupy an essential role. Remarkably, targeting the training has been shown to decrease the intensity of hallucination
ZhuaLX *et al.* (2013)	Examined eye behavior changes throughout facial emotion recognition involving one hundred schizophrenic clients versus one hundred corresponding group.	Eye behavior changes throughout facial emotion recognition involving one hundred schizophrenic clients versus one hundred corresponding group. were examined	Descriptive design	Considerably extra straight fixations that long-lasting to noticed areas such as the mouth, eyes, nose, The sum fixation numeral, duration, and whole duration were considerably augmented in schizophrenia.	These outcomes show that facial handling competence is significantly decreased in schizophrenia. Patients with schizophrenia may have specific inadequacy in indulgence negative faces, & negative symptoms may affect conclusion & analyze parameter.

Continued

Tso F I *et al.* (2010)	Investigating the input of emotional skill, social cognition & neurocognition, in functional outcome in schizophrenia	Thirty nine patients from outpatient's clinic accidentally allocated to three groups intervention. First group involve training on facial affect recognition, Second group involve training on attention-training, third group involve treatment as usual. Noticing that twenty four healthy subject harmonized for oldness and schooling, were allocated to one of the two interventions.	Descriptive correlation	Patients and corresponding group show signs of good quality inner dependability on all self-report measures, except for negative affect severity. Patients describe evenly intense but fewer frequent positive emotions, more intense and frequent negative emotions, and additional anhedonia	Study found improved in affect recognition training group following the intervention targeting FAR this progress was marked more in terror recognition. Furthermore neurocognition and social cognition, emotional experience made exclusive influences to social outcome in schizophrenia.
Razafimandim by A *et al.* (2016)	Examined the neural activity under two different conditions. First condition is to examine neural base while producing emotional sentences. Second condition is to examine neural base while producing grammatical composition	twenty one patients and twenty five corresponding subject undergo magnetic resonance imaging prototype include two tasks: First condition is to examine neural base while producing emotional sentences. Second condition is to examine neural base while producing grammatical composition	descriptive study	1-patients demonstrate elongated response period throughout the emotion ascription Assignment. 2-Patients demonstrate decrease of stimulation in two-sided auditory areas nevertheless of the presence of emotions. 3-during emotional sentences ascription, patients demonstrate fewer triggering in the cortex praefrontalis.	Abnormality observed in the m PFC during the emotion ascription assignment could give a biological foundation for social cognition insufficiency in patients with schizophrenia mainly in the cortex praefrontalis while producing emotional sentences.
Zou MY (2018)	Administrate deposit of checklists cover different aspect including emotional expression and regulation, experiential pleasure plus assessing anhedonia, depressive symptoms & negative symptoms.	Subject of study included one hundred forty six in-patients with schizophrenia versus seventy three corresponding group.	descriptive study	Results show three-groups group 1 differentiate by a shortage in experiential enjoyment and emotional regulation, Cluster 2 differentiate by a universal shortage in experiential enjoyment, emotional parameter and emotion expression, and group 3 differentiate by a shortage in emotion expression.	Patients in group one displayed Inadequate reassessment approaches. those in group two displayed Inadequate reassessment and unnecessary repression; while those in group three displayed extreme suppression aggravating factors in to faulty of emotion control.

Continued

Edit Vass *et al.* (2018)	Compare interference methods in sequence to observe how efficient they are in the remediation of ToM, and to discover the most excellent techniques to improve deficits in schizophrenic patient's cognitive function.	Discover the most excellent techniques to improve deficits in schizophrenic patient's cognitive function	descriptive study	According to findings targeted ToM intervention produced more advance in ToM tasks, while data regarding non-ToM interventions showed opposing consequences with restricted effects on ToM	Targeted ToM intervention is intended to advance the patients' skill to attribute mental states to others. They employ scenarios, comic strip assignment or short video scene as teaching resources to nearby social interactions, where the patients are requested to recognize and examine the characters' mental states

examine neural base while producing emotional sentences. Second condition is to examine neural base while producing grammatical composition [7]. Results shows irregularity observed in cortex praefrontalis while producing passionate sentences. This indicates an organic origin for social cognition insufficiency in schizophrenic persons. In general, many studies revealed abnormality in neural activity in schizophrenia using theory of mind tasks.

From another aspect Vogel B *et al.* (2016) investigates the ability of the patients to associate between both verbal & nonverbal cues [8]. Different video shows were offered to twenty one patients versus 21 control subject. Results indicate that patients be inclined to stand their choice fewer on expressions cues and depend more on verbal statement than matched group.

There was much focus from research on emotional processing as one of essential elements of social cognition. Tabak, N. T *et al.* (2015) examined emotional intelligence (EI) trait in manic and schizophrenic patients versus corresponding control group. The purpose of study was to examine emotional intelligence trait & its relation to clinical and social factors among studied groups [9]. Results reveal that both clinical groups show considerable poorer perceived emotional intelligence trait than corresponding group, but did not change from each other. Higher total emotional intelligence traits associated with elevated levels of self-governing living in both groups. The result proposed that emotional intelligence disturbance affecting community functioning in both groups.

Moreover, Zou MY (2018) administrate deposit of checklists cover different aspect of emotional processing including emotional expression and regulation, experiential pleasure plus assessing anhedonia, depressive symptoms & negative symptoms. Subject of study included one hundred forty six in-patients with schizophrenia versus seventy three corresponding group. Results show three-groups. Group 1 differentiate by a shortage in experiential enjoyment and emotional regulation, group 2 differentiate by a universal shortage in experiential enjoyment, emotional regulation and emotion expression, and group 3 differentiate by a shortage in emotion expression [10]. literature study was done by

Fiszdon, J. M., & Reddy, L. F. (2012) which target social cognitive interventions in schizophrenia, finding indicate that there was a variety of interference have be initiated to target ToM, affect recognition, social perception, affect recognition but there is no attempt have particularly embattled ascription bias, emotional intelligence or social knowledge [1].

Edit Vass *et al.* (2018) compare intervention method to observe to what extent useful they are in the remediation of ToM, and to find the best techniques to ameliorate ToM deficits in schizophrenia. Findings indicating that best interference was that directed ToM, produce more advance in ToM tasks [11].

Vita *et al.* (2018) provide more information about various drugs enhancing neuroplasticity for schizophrenia alongside with intervention targeted social cognitive deficit. Second Generation Antipsychotics (SGAs) stated to be partially improving cognitive dysfunction, due to their relatively high attraction for serotonin 5HT2A receptors. Dysfunction of Geaba led to cognitive insufficiencies. The properties of Geaba produce improvement on cognition of a group of amino acids that act as glutamate agonists by tie to the glycyl site on The N-methyl-D-aspartate receptor receptors.

It was discovered that the administration of muscarinic antagonists potentiated the cognitive impairments, and the *α*7 nicotinic acetylcholine receptors have been shown to play an important role in cognition with potential therapeutic effect in schizophrenia. A number of studies regarding drugs targeting neuroinflammation and oxidative stress to advance cognitive deficits appeared [12].

Furthermore, a lot of researchers attempt to address relation between elements of social cognition and social function among patients. For example, Lehmann A *et al.* (2014) investigate empathy, inner experience of emotion, emotional contagion among 55 with paranoid schizophrenia versus fifty five control subject using Interpersonal Reactivity Index, Experience of Emotions and Emotional Contagion tools. Finding indicate that patients have considerably more negative emotional contagion, devastating feelings, deficiency in feelings, and imagination capacity than control group [13].

Whereas, Ahmeda OH (2018) investigate the relation between aggression traits & cognitive impairment taken into consideration how negative emotions affect cognitive deficit. They found that cognitive insufficiency raise the liability of reckless violence in schizophrenia by means of incompetent control of negative emotional condition [14].

Ferrara *et al.* (2012) investigated literature for the association between emotional processing insufficiency and hallucinations mainly auditory verbal (AVH). The relation between hallucination and emotional prosody understanding has stayed inspected among schizophrenicpatients. Results of researches are contrary a number of inquiries did not discover a relation involving emotional process deficits & hallucinations. While others indicate presence of relation. Author concluded that auditory hallucinations & emotional process in schizophrenia appear to be foundation on corresponding neural networks, in which

the training seems to occupy an essential role. Remarkably, targeting the training has been shown to decrease the intensity of hallucination [15].

- PART II: INTERVENTION STUDIES (Table 2)

Fifteen intervention studies were drawn in this review. It was found that most of provided intervention was targeting emotions & affect recognition training. For example, Sachs, G *et al*. (2012) investigates the impact of an affect recognition computer-based training on recognizing of different emotions & on patients' life feature & quality. Training sessions on recognizing emotions was employed. An assessment was done before & after intervention regarding recognizing of different emotions, patients' life quality and clinical condition. Results show considerable progress especially in recognize gloomy expressions and, in addition, in the excellence of life area societal joining [16].

Moreover, Drusch K *et al*. (2014) examined the effect of emotions recognition teaching on emotions recognition by calculating numbers of right response & eye look behavior (amount & period of fixation into salient or non-salient facial regions) was assessed using 2 × 2-design 16 patients & sixteen corresponding group carry out a facial affect recognition task .Results showed that at beginning patients demonstrate fewer facial affect recognition than matched group but after training session they was be better [17]. The same findings have been replicated by Bechi *et al*. (2012) and Prova *et al*. (2014) [3].

Tsotsia S *et al*. (2017) randomly assigned thirty nine patients from outpatient's clinic in three groups intervention. First group involve training on facial affect recognition, Second group involve training on attention-training, third group involve treatment as usual. Noticing that twenty four healthy subject harmonized for oldness and schooling, were distributed to one of the two interventions. Study found improved in affect recognition training group following the intervention targeting Facial Affect Recognition (FAR) this progress was marked more in terror recognition [18].

Others researches focus on Emotion management skills. For example Won, M *et al*. (2012) implement Emotion management training program for I hour per week for sum of 2 months. The statistics were gathered from twenty two patients in intervention group & thirty subjects in corresponding group [4].

Patients undergoing training session demonstrate a considerable distinction in interpersonal relationship, emotional expression, emotional behavior and social behavior scores than those in the corresponding group. Thus this program indicates its efficiency with schizophrenic patients, and it serving as an evidence-based nursing practice.

Wang Y *et al*. (2013) examined the clinical utility of Social Cognition and Interaction Training (SCIT) in patients with schizophrenia, treatment was done for twenty weeks. Patients received the SCIT interference & usual treatment-. Attributional Style Questionnaire, Emotion Identification Task, Social Performance Scale, Chinese versions of the Personal and (PSP), Face (FEIT), Eyes task, and (ASQ) were given before & after intervention. Results showed a considerable

Table 2. Summary of intervention studies.

STUDY AUTHORS	APPLICATION OF TREATMENT	INTERFERENCE METHOD	SAMPLE/ DESIGN	SIGNIFICANT FINDING	OTHER OUTCOMES/NOTES
Won, M *et al.* 2012	Emotion management skills	I hour training on emotion management has. been applied for 2 months	The statistics were gathered from twenty two patients in intervention group &thirty in corresponding group	The intervention cluster demonstrate a considerable distinction in social relationship scores, emotional behavior & expression and social behavior scores than those in the corresponding group.	I hour training on emotion management for schizophrenic patients serving as resourceful evidence-based care to the patients during the course of intervention
Sachs, G *et al.* (2012)	Study the effects of a on affect recognition (TAR) computer-based training of emotion recognition and mainly on life quality & features	1.5 month teaching on emotions recognizing	prior & after intervention evaluation of affect recognizing life quality, cognition, and symptoms presentation were examined	An assessment was done before & after intervention regarding recognizing of different emotions, patients' life quality and clinical condition. Results show considerable progress especially in recognize gloomy faces and, in addition, in the quality of life area social connection.	The result sustain the effectiveness of emotion recognition teaching for clients with schizophrenia & the generality to societal connection
Peters MJ (2013)	Examined effect of emotionality on remembrance and meta-memory by means of videotape succession	27 clients and twenty four corresponding were given a recently created emotional videotape prototype with 5 diverse emotions including negative, positive, neutral and delusional themes.	pre- and post-treatment assessments	Following watching video, subject rating their confidence, naming emotions to create their judgment along with ratings, examine remembrance correctness and meta-memory insufficiency in more interacting context	Almost all patients confidently valenced video, patients recognized less right items contrast to corresponding subject, and did not vary with regard to the amount of false memories for related items.

Continued

Tsotsia S *et al.* (2017)	Randomly assigned thirty nine patients from outpatient's clinic in three group's intervention. First group involve training on facial affect recognition, Second group involve training on attention-training, third group involve treatment as usual	Thirty nine patients from outpatient's clinic distributed in three groups' intervention. First group involve training on facial affect recognition, Second group involve training on attention-training, third group involve treatment as usual. Noticing that twenty four healthy subject matched for age and education, were assigned to one of the two interventions.	Two FAR measurements, baseline and post-intervention, were conducted using an experimental design	Study found improved in affect recognition training group following the intervention targeting FAR this progress was marked more in terror recognition.	Result indicting that training course aimed affect recognition can be more efficient in enhancing emotional processing in schizophrenic person , mainly support them in perceiving threat-related cues more precisely.
Drusch K *et al.* (2014)	Examined the effect of emotions recognition training on emotions recognition by calculating numbers of right response & eye look behavior (amount & period of fixation into salient or non-salient facial regions) was assessed using 2 × 2-design.	The effect of the training on number of right response and eye behavior	2 × 2-design sixteen patients & sixteen corresponding complete a training	Results showed that at beginning patients demonstrate fewer facial affect recognition than matched group but after training session they was be better.	Result indicting that training course can be more efficient in enhancing affect recognition in schizophrenic patients
Wang Y *et al.* (2013)	The current study examined the clinical utility of social cognition and Interaction Training in schizophrenic clients.	The Social Cognition and Interaction Training have given the interference & usual treatment. every patient was fill the Personal and Social Performance Scale (PSP), Face Emotion Identification Task (FEIT), Eyes task, and Attributional Style Questionnaire (ASQ) at the beginning of the training and at follow-up, 6 months after completion of the 20-week treatment period	pre- and post-treatment assessments	Patients involved in program displayed a considerable enhancement in the areas of mind theory, emotion awareness, attributional style, and social functioning contrast to corresponding group	Result indicting that training course can be more efficient in enhancing emotion awareness, attributional style, and social functioning contrast to corresponding group

Continued

Campo VM (2016)	Examined 21schizophrenia patients whereby patients were involved in experimental group and nine in the corresponding group. Corresponding group was given typical treatment leisure & occupational therapy. The experimental group established usual treatment in addition to twelve session (60 minutes per week) as well as education element on emotional awareness and a short lively cartoon for mind theory and attribution style training, plus computerized metacognitive feedback	The intervention group received usual treatment in addition one and half month training session on emotional perception and a short lively cartoon, attribution style, mind theory & metacognitive feedback .	pre/post intervention pilot study was conducted	For the studied subject. After the Training, statistically considerable results were obtained for EP (Ekman 60 Faces Test), ToM (Hinting Task, Faux Pas, Happé), AS (Ambiguous Intentions Hostility Questionnaire).	Result indicting that training course can be more efficient in enhancing on emotional perception, attribution style, mind theory & metacognitive feedback.

progress in the areas of mind theory, attribution style, emotion perception, and social functioning compared to corresponding group [19].

While Peters MJ (2013) examined the effect of emotional training by using different video scenarios where by subjects given 5 different emotions including 2 negative, 1 neutral, one positive, and one delusional theme [20]. Following watching video, subject rating their confidence, naming emotions to create their judgment along with ratings, examine remembrance correctness and meta-memory insufficiency in more interacting context. Almost all patients confidently valenced video, patients recognized less right items contrast to corresponding subject, and did not vary with regard to the amount of false memories for related items.

Campo VM (2016) examined schizophrenia patients whereby 21 patients were involved in experimental group and nine in the corresponding group. Corresponding group was given typical treatment leisure & occupational therapy. The experimental group established usual treatment in addition to twelve session (60 minutes per week) as well as education element on emotional awareness and a short lively cartoon for mind theory and attribution style training, plus computerized metacognitive feedback. Endpoints: EP (Ekman 60 Faces Test), ToM (Hinting Task, Faux Pas, Happé), AS (Ambiguous Intentions Hostility Questionnaire). Following the interference, statistically considerable data were obtained for the EP, ToM and AS variables. Group reflect on the intervention plus treatment-as-usual. All patients were fill the Chinese forms of the Personal and

Social Performance Scale (PSP), Face Emotion Identification Task (FEIT), Eyes task, and Attributional Style Questionnaire (ASQ) at baseline of the social cognitive intervention treatment period and at follow-up, 6 months after completion of the 20-week treatment period [2].

Tso F I *et al*. (2010) investigated the input of emotional skill, social cognition & neurocognition in functional outcome of schizophrenia. Thirty nine patients from outpatient's clinic accidentally allocated to three groups intervention. First group involve training on facial affect recognition, second group involve training on attention-training, third group involve treatment as usual. Noticing that twenty four healthy subject harmonized for oldness and schooling, were allocated to one of the two interventions. Descriptive correlation patients and corresponding group show signs of good quality inner dependability on all self-report measures, except for negative affect severity. Patients describe evenly intense but fewer frequent positive emotions, more intense and frequent negative emotions, and additional anhedonia Study found improved in affect recognition training group following the intervention targeting FAR this progress was marked more in terror recognition. Furthermore, neurocognition and social cognition, emotional experience made exclusive influences to social outcome inschizophrenia [21].

Regarding attribution style, most of studies found no effect of social cognitive interventions on attribution style [22] [23] [24] [25] [26]. However, Wangs *et al*. 2013 found that patients in social cognitive intervention group showed a considerable enhancement in the areas of emotion perception, theory of mind, attributional style, and social functioning compared to control group. The same was reported previously by Horan *et al*. (2011) [23].

3. Discussion & Conclusion

In conclusion inquiry today has recognized that some social cognitive fields are responsive to planned teaching, and a great deal of work is still needed to be done, improving their effects on more complex social cognitive areas, to examine its effects as well as their extending to significant societal performance and also in enhancing neuroplasticity.

This review indicates the efficacy of social intervention that targets cognitive aspect and functional abilities of schizophrenic patients; and that effect perception is flexible and can be managed. Medications can properly modify neurochemical discrepancies that trigger neuroplasticity alterations in the brain, whereas cognitive training may induce the creation of more adaptive neural circuits. Emotion processing is significant mediators of social performance aptitudes in schizophrenia; variables such as social cognition deficit which limit patient ability in integrative capacity for verbal and non-verbal cues should be considered during management plan. This means that higher levels of social cognition are associated with better functioning in schizophrenia and that social cognition might have a specific impact in neurocognition; the same was indicated by many studies [26] [27] [28].

Clinical Implications

While social cognition intervention that target cognitive aspect and functional abilities of schizophrenic patients should be generally considered during management to create more adaptive neural circuits this can includes medications that can properly modify neurochemical discrepancies and trigger neuroplasticity alterations in the brain, emotion processing training, considering limited patient ability in integrative capacity for verbal and non-verbal cues.

Limitation of This Review

These review only emphases somewhat on predictive social cognitive factors that may be involved in outcome and recovery. The lack of uniform methods among long-term outcome studies limits generalizations regarding the difference between current outcomes and outcomes proceeding to the initiation of current management.

Further Research

Further researches is needed to assess effect and durability of applying social cognitive intervention on neuroplasticity taken into consideration patients subjective experience upon this intervention, symptoms severity and period of follow up.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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Mental Health Assessment of Elderly People Attending Geriatric Clinic in Medical City

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Abstract

Background: Worldwide elderly population and their life expectancy are increasing gradually. Longevity in most cases brings down poorer health as well as functional status. Thus, it is necessary to understand the problems as well as social, psychological, and medical needs of elderly people in order to plan their optimal care. **Objectives:** To assess the mental health status (depression and memory state) of elderly people attending Geriatric clinic in medical city, and to determine the influence of some sociodemographic factors on elderly mental health status. **Subjects and Method:** A cross-sectional study was conducted among elderly people aged 60 years and more who attended geriatric clinic of medical city in Baghdad, from 1st of April to the end of June 2015. Special questionnaire form had been used for data collection via direct interview. The evaluation of the mental state was performed by using modified version of Wechsler Memory Scale and geriatric depression scale. **Results:** A total of 400 elderly persons were enrolled in the study, 109 (27.3%) of them had impaired memory. The analysis of data revealed that the age and marital status had statistical significant association with memory state. Nearly three quarter (72.8%) of study group had depression according to geriatric depression scale. The majority of studied women had depression (90%), and the same percentage was observed among widowed elders joining in the study.

Keywords

Assessment, Mental, Health, Elderly Depression, Memory State

1. Introduction

As a result of declining mortality as well as improved public health interventions, population ageing has been a world-wide phenomenon [1].

There has been a sharp increase in the number of older persons worldwide

and more old people are alive nowadays than at any time in history [2] [3].

The proportion of the population aged 60 years and over is also growing each year. By the year 2025, the world will host 1.2 billion people aged 60 and over, which will rise to 1.9 billion in 2050 [4].

As the aging process continues various diseases and problems like mental and physical health, malnutrition and decrease in social participations are the common issues faced by the elders throughout the world [5] [6].

Chronic non-communicable diseases are characteristic of old age and the prime causes of deterioration of physical health [7].

In addition to chronic non-communicable diseases the overall prevalence of mental and behavioral disorders tends to increase with age due to the normal ageing of the brain, deteriorating physical health and cerebral pathology [8].

Among these mental and behavioral disorders depression, which is not a normal part of growing old but rather a treatable medical illness [9], it associated with disability, increased mortality and poorer outcomes from physical illness [10]. The World Health Organization estimated that the overall prevalence rate of depression among the elderly generally varies between 10% and 20%, depending on the cultural situations [11].

In Iraq, according to the Iraqi Mental Health Survey 2007, the age-group of 60 years and more shows high values for depressive episode with life time prevalence reaching 13.15% for males and 13.55% for females [12].

Both the prevalence and the consequences of depression retain an enormous impact on the health of ageing populations [13].

Memory loss is also a prominent feature of aging and is associated with substantial declines in quality of life and increased risk of dementia [14].

Prevalence of dementia rises sharply with age. Estimated 25% - 30% of people aged 85 or older have dementia [5].

The importance of early surveillance of the health needs of elderly people has been emphasized, Knowledge of the situation and circumstances of the elderly population is essential to the provision of cost-effective services and the planning of strategies for intervention and care [15].

In view of the vulnerability of elderly people and their growing number, assessment of the capability of elderly peoples to maintain physical and mental well-being and a state of independence is of much relevance [16].

The study was conducted aiming to assess the mental health status (depression and memory state) of elderly people attending geriatric clinic in medical city, and to pinpoint the influence of some sociodemographic factors on elderly mental health status.

2. Subjects and Method

A cross sectional study with analytic element was carried out in Geriatric Clinic of Baghdad hospital in Medical City (Baghdad, capital of Iraq) during the period extended from 1st April till end of June 2015.

The study group comprised convenient sample of elderly people aged 60 year and more who had attended the geriatric clinic during the period of study and agreed to participate in the study. It was indicated clearly to the elderly people that the participation was voluntary and their non-contribution would have no adverse effect on the quality of care given to them in the clinic.

The sample size determination was based upon the result of pilot study carried out prior to the main data collection. According to the pilot study the sample size was planned to be 300 to 400 participants, taking into consideration the time table for data collection, the predictable number of elderlies attending the Geriatric Clinic, and the time needed to conduct the interview and filling the questionnaire.

Data was collected through direct interview with each participant to avoid misinterpretation and ensure clarity on all issues. Using a structured questionnaire which was constructed for the purpose of the study. The questionnaire encompassed two sections.

Section 1:

Included information related to socio-demographic characteristic of participants such as:

- Age
- Gender (male, female)
- Marital status was classified as (married, widowed, single or divorce)

Section 2:

The evaluation of the mental state was performed by using modified set of seven questions based on Wechsler Memory Scale—4th Editions (2010) [17] [18]. Each correct answer scored 0, while wrong answer scored 1.

Any study participant achieved (4 - 7) score was classified as memory impairment and no memory impairment if achieved (0 - 3) score.

While screening for depression was accomplished by using a modified short version of the geriatric depression scale [19], which include ten questions.

Positive response answered by (yes) give 1 score and negative response answered by (no) give 0 score. Accordingly, any elderly participant with score (6 - 10) was considered depressed and score (1 - 5) was considered not depressed.

3. Ethical Consideration

A verbal consent was obtained from each participant prior to interview. As well as participants were informed that all data is confidential and be used for research purpose only.

Permission to carry out the study was sought from Baghdad/Medical city Health Directorate and Geriatric clinic in Baghdad Teaching Hospital.

4. Data Analysis

Microsoft Excel was used for data entry. Data were analyzed using Statistical Packages for Social Sciences (SPSS), version 22. Chi-square test was used to eva-

luate the association between the different study variables, A p-value of less than or equal to 0.05 was considered statistically significant.

5. Results

The study group included 400 elderly persons. The age of study group ranges from 60 - 90 years with a mean of 67.9 ± 6.4 years. Most of them were males (71.8%). At the time of study, 75.0% of the participants were married and 73.8% living with spouse.

From the elderly people enrolled in the study, 109 (27.3%) of them had impaired memory according to Wechsler memory scale as presented in Figure 1.

Table 1 describes the memory state according to some demographic characteristics of the participants. Among those aged 75 years and more, 77% of them had memory impairment, while only 23% of those aged less than 75 year had memory impairment. The relationship between age and memory state shows statistical significant association (P = 0.0001). But no statistical significant association was observed between gender and memory state (P = 0.763).

The marital status had statistical significant impact on the memory state (P = 0.017). Elderly people who were widowed, 39.6% of them had impaired memory, while among married elderly, only 26.3% of them had impaired memory (Table 1).

According to Geriatric depression scale, 291 (72.8%) of elderly participants in the study were classified as having depression (Figure 2).

Table 2 shows statistical significant association between different socio-demographic variables (age, gender and marital status) in relation to depression (P = 0.0001, 0.0001, 0.007) respectively.

The elderly people age 65 years and more, 71.9% of them had depression in comparison with only 28.1% of those aged less than 65 years.

The result revealed that the substantial proportion (90%) of elderly females enrolled in the study had depression, in comparison with 65.8% of elderly males.

When the depression state was analyzed in relation to the marital status, the
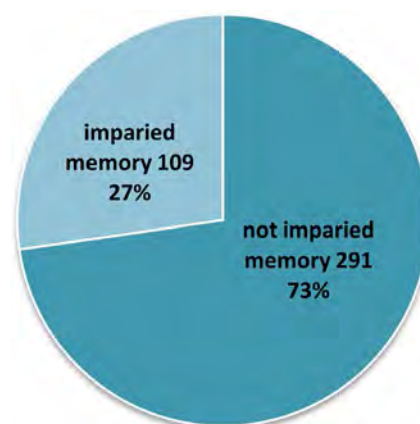
Figure 1. The distribution of study group according to memory state.

Figure 2. The distribution of study group according to geriatric depression scale.

Table 1. Distribution of study group according to memory state and some socio-demographic variables (age, gender, marital status).

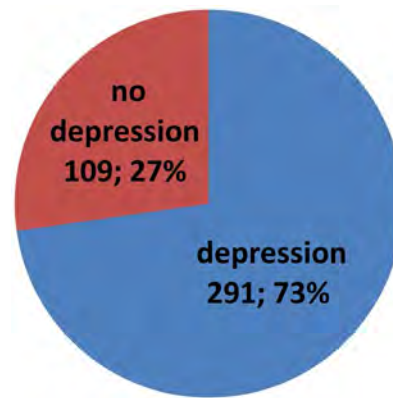| Socio-demographic variables		Impaired memory				P value
		Yes		No		
		No.	%	No.	%	
Age (years)	60 - 64	5	4.6	131	45.0	0.0001*
	65 - 69	20	18.3	90	30.9	
	70 - 74	35	32.1	54	18.6	
	75 - 79	19	17.4	13	4.5	
	≥80	30	27.5	3	1.0	
Gender	Male	77	70.6	210	72.2	0.763
	Female	32	29.4	81	27.8	
Marital status	Single	5	4.6	20	6.9	0.017*
	Married	79	72.5	221	75.9	
	Divorced	-	-	12	4.1	
	Widow	25	22.9	38	13.1	

highest percentage of depression was found among widowed elderly (90%) followed by divorced and single elderly (75%, 72%) respectively.

6. Discussion

Impaired memory is a common condition and its public health impact will continue to increase with increasing longevity of the population [20].

During natural ageing, some cognitive capacities, particularly memory, decline [4]. The current study result demonstrated that, about quarter of participants had impaired memory; this finding was also reported in previous studies conducted in Iraq and Lebanon 2007 [12] [21].

The result of study conducted in Egypt 2010 [20], revealed that, memory impairment increased with age, a similar observation was also reached by the current study.

Table 2. Distribution of study group according to depression state and some sociodemographic variables.

Socio-demographic variables		Depression				P value
		Yes		No		
		No.	%	No.	%	
Age (years)	60 - 64	82	28.1	54	49.5	0.0001*
	65 - 69	84	28.9	26	23.9	
	70 - 74	67	23.0	22	20.2	
	75 - 79	27	9.3	5	4.6	
	≥80	31	10.7	2	1.8	
Gender	Male	189	64.9	98	89.9	0.0001*
	Female	102	35.1	11	10.1	
Marital status	Single	18	6.2	7	6.4	0.007*
	Married	207	71.1	93	85.3	
	Divorced	9	3.1	3	2.8	
	Widow	57	19.6	6	5.5	

Biological and psychosocial factors could contribute to the development of impaired memory in late life [20]. Elevated blood pressure, dyslipidemia, physical inactivity, elevated body mass index or other factors inducing cerebral micro vascular damages or neurodegeneration usually be more prevalent in elderly and might explaining why memory problems increase with age [22].

Previous study conducted in Malaysia 2012 [23] showed that those who were living with a partner were significantly less likely to show memory impairment compared to those who were single, separated, divorced or widowed, the current study reached to a same result.

It is believed that social interaction between couples which is one of the most intense forms of social and intellectual stimulation that helps avoid the memory impairment [24].

Results of the current study showed that women exhibited marked memory impairment which was significantly higher than men; this finding was also reached by previous studies from Iraq and Malaysia [12] [25].

Depression is the most common geriatric psychiatric disorder. Other than organic, socio-demographic factors have been found to play an important role in mental health [26] [27]. The mental health of the older population is usually a neglected domain in our country. As such, the older persons are forced to spend their last years of life with a poor quality of life.

The present study reported a high rate (72.8%) of depression among the study subjects, this rate of depression was higher than the rates reported from previous studies conducted in Saudi Arabia [28], Iraq [29] and India [26] [30].

The study showed that women were having higher rate of depression than men, the association was statistically significant, this corroborates with the findings of previous studies from India [30] [31], and Bahrain [32]. This outcome

might be attributed to that depression is not characteristic of female gender but consequences of their restricted capacity in coping with demand of daily living and the negative perception of health [33].

The rate of depression was found to be significantly higher in the elderly, who were single, widowed, or divorced. Previous studies have deliberated these as risk factors for depression in the elderly [31] [34], such factors may inevitably lead to psychological stress and depression [35].

7. Limitation of the Study

Data collection was reliant on the reporting of elderly who could have directed to both under and over reporting of neuropsychological problems.

8. Conclusion

Mental health problems among elderly attending geriatric clinic were very common. Elder age, female gender and widowhood appear to be significant risk factors for such health problems.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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Biomarkers of Mental Illness—What Can We Learn from Circadian Heart Rate?

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Abstract

Background: Much research in psychiatry has been a search for diagnostic biomarkers of mental illness but practically useful markers have remained elusive. The problem may be unrealistic expectations and the aim in this paper is to show that the relationship between circadian heart rate and psychiatric status can contribute to useful understanding in this regard. **Aim:** To discuss the biomarker implications of changes in circadian heart rate (CHR) in psychiatric disorders. **Methods:** Comparisons of CHR were made between and within individuals receiving treatment for different psychiatric disorders diagnosed according to criteria defined in the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5). **Results:** Broadly different DSM-5 disorders are associated with distinctly different changes in CHR. Some disorders are more consistently associated with distinctive changes but CHR does not predict symptoms or specific clinical diagnoses reliably. Changes in CHR, particularly during sleep, are state-dependent. Clinical improvement is associated with normalisation of CHR. **Conclusion:** Changes in CHR are a part of the physiological changes in mental illness. Distinctly different changes in CHR suggest distinctly different physiological changes that may constitute diagnostic discrimination at a physiological level. An analysis of CHR can add objective adjunct information to clinical assessment and the evaluation of treatment but does not predict symptoms or clinical diagnoses reliably. Much the same is likely to apply to all candidate biomarkers of mental illness.

Keywords

Circadian Heart Rate, Anxiety, Depression, Mania, Schizoaffective Disorder, Schizophrenia, Personality Disorder

'*There are no laboratory tests to date that can be used by clinicians to diagnose patients with psychiatric disorders.*' [1]

'*… there is little evidence that the majority of recognized mental disorders are separated by natural boundaries. Diagnostic categories defined by their clinical syndromes should be regarded as 'valid' only if they have been shown to be truly discrete entities. Most diagnostic concepts in psychiatry have not been demonstrated to be valid in this sense…*' [2]

1. Introduction

Mental illness is defined by symptoms and signs and it has long been suspected that clinically classified syndromes are not discrete biological entities. Biological heterogeneity is suggested clinically by the wide variation in symptoms and signs that is often evident between individuals given the same diagnosis. For example, two individuals given a diagnosis of 'major depression' may reveal different, even opposite symptoms such as hypersomnia or insomnia, weight gain or weight loss, psychomotor agitation or psychomotor retardation. Under such circumstances, no single biomarker is likely to demonstrate practically useful diagnostic specificity and it is not surprising that the search for biomarkers of clinically defined disorders has been disappointing despite numerous studies [3] [4] and not infrequent reports of positive findings [5] [6] [7] [8] [9]. Attempts to validate clinical syndromes at a biological level are likely to remain unrewarding [1] and there is a need to review assumptions and expectations in this regard. Neither state nor trait biomarkers are likely to prove usefully specific if, as suggested by Jablensky [2], there is little evidence that classified mental disorders are separated by natural boundaries. However biological variables that reveal a dependent relationship with mental or psychiatric status may provide clinically useful information, even if not diagnostically specific for clinically defined disorders, much like C-reactive protein provides a useful metric of inflammation without indicating a specific diagnosis.

2. Background

In psychiatry, heart rate is generally regarded as a diagnostically non-specific indication of 'arousal'. However, this is a simplistic appraisal, not least because 'arousal' is not a one dimensional variable or process. More relevant for present purposes is that circadian heart rate (CHR) is subject to visceral sleep-wake regulation and it has long been recognized that mental illness is associated with visceral dysregulation. This leaves the possibility that evidence of such illness-related visceral or autonomic dysregulation might be signalled by changes in CHR. If that is the case, then the important question is to what extent is the visceral dysregulation and associated changes in CHR relevant from a biomarker perspective.

Unlike C-reactive protein which varies only quantitatively, CHR is a multidimensional variable and it can readily be verified that that broadly different states of mental illness reveal distinctly different changes in CHR, particularly during sleep, when confounding influences on heart rate are minimal. All other things being equal, evidence of distinctly different changes in heart rate during sleep, is

evidence of different regulatory changes and differences in this regard may constitute biomarker information about mental illness at a physiological level. The state-dependent variation of CHR, as revealed in serial within-individual recordings, provides the most compelling evidence that CHR is involved in the biological changes of mental illness. Clinical improvement is associated with a 'shift' towards a normal pattern of CHR, much as recovery from infections is associated with a return to normal circadian variation in body temperature. The combination of distinctly different changes in CHR and their state-dependent variation in psychiatric disorders, suggests there is biomarker information in CHR at a physiological level. Variation in CHR between individuals given the same clinical diagnosis can provide potentially useful adjunct information and indicate the extent of physiological or biological heterogeneity in clinically defined disorders.

Presented data illustrate distinctly different changes in CHR, their relationship to clinical diagnoses and their state-dependent variation. Only illustrative examples are presented because discriminatory features of CHR are degraded or not at all evident in aggregated data. It is suggested that the evident relationship between psychiatric status and CHR provides a useful model for understanding the inevitable limitations of all candidate biomarkers in psychiatry, even if, like CHR, they can provide practically useful adjunct information for diagnostic assessment and clinical monitoring.

3. Heart Rate (HR) vs Heart Rate Variability (HRV)

Heart rate is a function of the time interval between successive heartbeats. Each inter-beat interval (IBI), measured in milliseconds, gives the instantaneous heart rate and a healthy heart beats with subtle variations in IBI. This time-dependent variation in IBI at different frequencies is referred to as 'heart rate variability' (HRV). Too regular, as well as too irregular, beat repetition is a sign of ill-health and numerous studies have reported changes in HRV (predominantly a reduction) across a wide range of physical illness [10] [11] [12] [13] [14] and mental illness [15] [16] [17]. The focus here is on heart rate measured in beats per minute (bpm). There is no direct or consistent relationship between rate and rate variability [18] [19] and questions remain about the reliability of HRV measures [20] [21]. Heart rate (HR) depends on the mean autonomic nervous system (ANS) input to the heart, whereas HRV depends on the balance of sympathetic (SNS) and parasympathetic (PNS) input [22]. HR varies about the mean of ANS input and mean ANS input can vary independently of HRV. Heart rate and HRV provide complementary information but investigations to date suggest that psychiatric status is more closely related to circadian HR, rather than HRV—in other words, more closely related to mean autonomic input. This is especially evident in serial data from individuals treated with psychotropic medications. Effective treatment is associated with normalization of the circadian 'rate architecture' even if HRV remains abnormally low due to medication effects [23] [24] [25].

4. Methods

4.1. Acquisition of Heart Rate Data

Heart rate data were obtained with a two-lead Bodyguard-2 cardiac monitor that also monitors activity as displacement in the x, y and z planes. Presented data were obtained from physically healthy adults, 18 - 65 years of age, who were admitted for inpatient treatment of a psychiatric disorder diagnosed according to DSM-5 criteria [26]. Exclusion criteria included a history or evidence of cardiac disease, obstructive sleep apnoea, alcohol dependence, medication with a recognized cardiac effect (e.g. beta-blocker, thyroxine, dexamphetamine). Patients prescribed first generation antipsychotics or antidepressants were excluded as were patients prescribed clozapine or ziprasidone. Sertindole, which has a recognized effect on HRV, is not prescribed in Australia.

4.2. Clinical Assessment

Clinical assessment did not go beyond diagnoses made by senior psychiatrists familiar with DSM-5 diagnostic criteria. The limitations of a clinical diagnosis are well recognized [27] and the focus here was on the variation in the physiological indicator of CHR, between individuals given the same and different clinical diagnoses, as well as the serial variation in CHR within individuals under treatment.

4.3. Quantitative vs Temporal or Circadian Variation in Heart Rate

Variations in CHR can be broadly classified as 'quantitative' and 'temporal' or 'circadian'. Quantitative variation means variation in the mean and standard deviation of rates measured in bpm over a specified time interval. 'Temporal' or 'circadian' variation means variation in the rate architecture or circadian rate pattern. Both temporal and quantitative aspects of CHR can vary on a continuum and independently in the sleep and awake state [28].

5. Results

5.1. Normal CHR

Examples of normal CHR, obtained from two volunteers identified here as 'a' and 'b', are shown below in Figure 1.
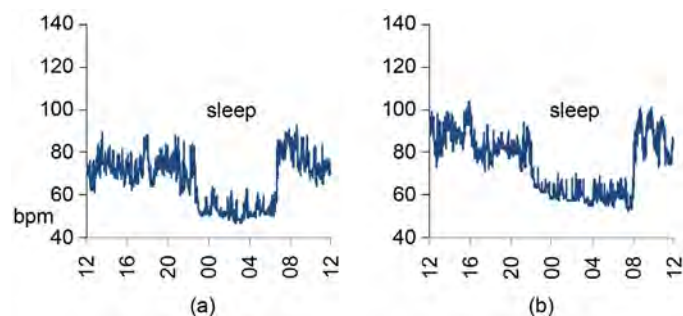
Figure 1. Examples of normal CHR.

Table 1. Basic heart rate statistics for data plotted in Figure 1.

Figure	awake (bpm)		sleep (bpm)	
	$\overline{x}$	σ	$\overline{x}$	σ
1 (a)	74	6.9	52	3.0
1 (b)	84	8.0	60	3.2

Figure 1(a) data were obtained from a 35 years old male, Figure 1(b) data from a 33 years old female. Both 'a' and 'b' were physically healthy, well adjusted individuals without a personal or family history of mental illness. Both their recordings show a typically normal circadian rate architecture, with a rectangular pattern of down regulation in rates during sleep, save for REM-sleep-related increases in rates and rate variability. Basic statistics are given in Table 1 and reveal normal rates as reported in the literature [29] [30].

5.2. Normal Serial Variation in CHR

Serial variation in CHR, particularly in sleep-related activity, is an important metric in evaluating changes in psychiatric status and the effectiveness of treatment. Serial recordings from healthy individuals living a stable life, show closely similar CHR as illustrated below in Figure 2.
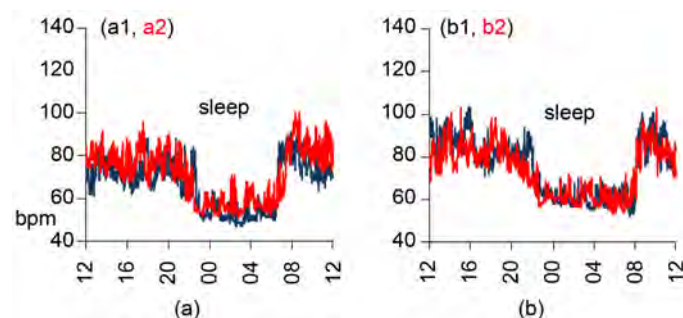
Figure 2. Examples of normal serial variation of CHR.

Table 2. Basic statistics for normal serial variation in CHR plotted in Figure 2.

Figure	awake (bpm)		sleep (bpm)	
	$\overline{x}$	σ	$\overline{x}$	σ
2(a1)	74	7.0	52	2.9
2(a2)	78	8.2	57	4.0
2(b1)	85	7.0	60	3.7
2(b2)	81	7.2	61	4.4

Figure 2 shows Figure 1 data (blue plot) with a superimposed second recording (red plot) obtained three weeks after the first. A comparison of basic statistics is given in Table 2. There is no statistically significant difference in rates and the circadian rate architecture is closely similar in each case.

5.3. Examples of CHR Changes in Mental Illness

Figure 3 data were obtained from three patients, identified here as 'a', 'b', and 'c', who were obviously manic at the time of recording. The circadian patterns show a closely similar deviation from the typically normal patterns in **Figure 1**, despite the gender differences and wide difference in age, as detailed in **Table 3**. The waking state is characterized by dense rate variability throughout, over a range of around 20 bpm. Sleep is reduced to around 4 hours in 3(a) and 3(c) and to around 5 hours in 3(b). Sleep rates are abnormally elevated in each case, as are awake rates in 3(a) and 3(c). **Figure 3** plots are examples of where the same clinical diagnosis shows much the same changes in CHR. However this is not always the case, as illustrated below in **Figure 4**.
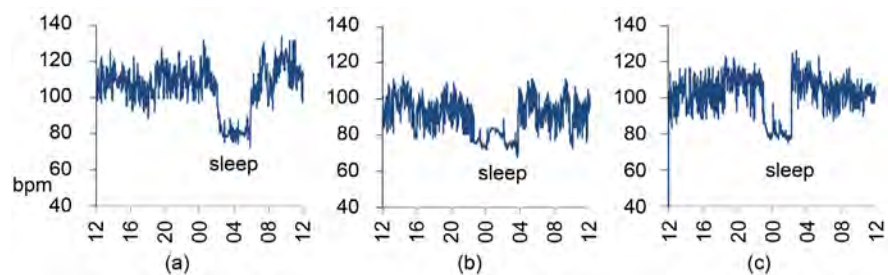
Figure 3. CHR changes in mental illness: same diagnosis, similar changes in CHR.

Table 3. Basic statistics for data plotted in **Figure 3**.

Figure	Clinical Diagnosis	Medication	age	gender	awake (bpm)		sleep (bpm)	
					$\overline{x}$	σ	$\overline{x}$	σ
3(a)	Mania	olanzapine lithium	23	M	109	7.8	81	3.4
3(b)	Mania	olanzapine valproate	43	F	94	7.4	78	3.9
3(c)	Mania	olanzapine valproate	55	M	104	7.3	80	3.4

Figure 4 data were obtained from four patients identified here as 'a', 'b', 'c' and 'd'. Relevant clinical details and basic statistics are given in **Table 4**. Patients 4(a) and 4(b) show a closely similar pattern of CHR despite the difference in gender, wide difference in age and different diagnosis. In each case, the waking state shows recurrent episodes of abrupt rate elevation to around 140 bpm. Both individuals were involuntary patients under close nursing observation throughout the day and there was no suggestion that these episodes of rate elevation were related to activity. 4(a) and 4(c), as well as 4(b) and 4(d), show distinctly different patterns of CHR despite the same gender, similar age and same diagnosis. By far the majority of patients with a diagnosis of schizophrenia and schizoaffective disorder show patterns respectively like 4(c) and 4(d), but as illustrated by 4(a) and 4(b), in some cases there may be significant variation in the pathophysiology

indicated by CHR.
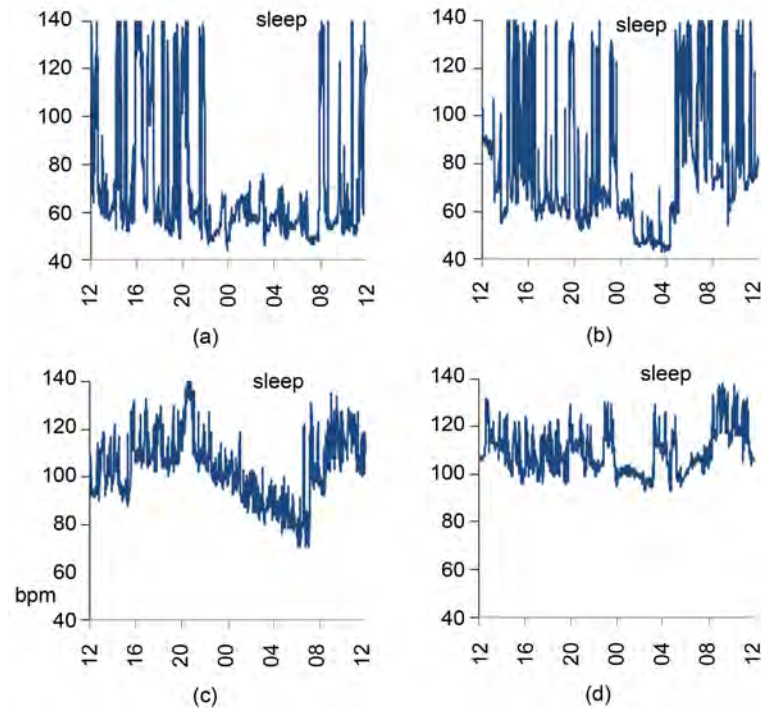
Figure 4. Same diagnosis different changes in CHR: different diagnosis similar changes in CHR.

Table 4. Diagnoses, medication and basic statistics for data plotted in **Figure 4**.

Figure	Clinical Diagnosis	Medication (daily dose)	age	gender	Awake (bpm)		Sleep (bpm)	
					$\bar{x}$	σ	$\bar{x}$	σ
4(a)	Paranoid Schizophrenia	olanzapine 15 mg quetiapine 300 mg	23	M	81	31.4	57	9.3
4(b)	Schizoaffective Disorder	olanzapine 10 mg valproate 1500 mg	53	F	82	26.0	47	3.2
4(c)	Paranoid Schizophrenia	olanzapine 15 mg	27	M	110	11.2	91	10.4
4(d)	Schizoaffective Disorder	olanzapine 15 mg quetiapine 500 mg lorazepam 3 mg	49	F	102	8.5	94	6.8

5.4. State vs Trait Changes in Personality Disorder

DSM Axis II Personality Disorders, especially Borderline Personality Disorder (BPD) show persisting deviations in CHR along with superimposed state changes during acute crises. The superimposed state changes usually abate with treatment but the underlying trait deviation persists. Examples of this are shown below in **Figure 5**.
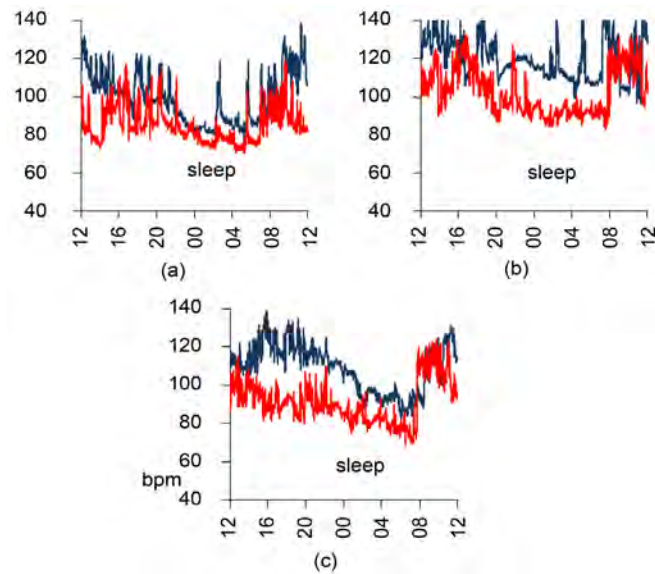
Figure 5. State vs trait changes in CHR.

Table 5. Comparison of basic statistics at time of admission and discharge for data plotted in Figure 5.

Figure	Time of HR Recording	Medication (daily dose)	age	Awake (bpm)		Sleep (bpm)	
				$\overline{x}$	σ	$\overline{x}$	σ
5(a)	Admission	quetiapine 500 mg	28	108	9.7	89	8.8
	Discharge	lorazepam 3 mg		88	6.6	78	4.1
5(b)	Admission	olanzapine 15 mg valproate 1500 mg	32	124	11.6	108	11.1
	Discharge	sertraline 100 mg		108	7.2	92	3.2
5(c)	Admission	olanzapine 10 mg quetiapine 300 mg	34	117	7.6	96	6.5
	Discharge	valproate 750 mg		95	8.4	81	4.6

Figure 5 data were obtained from three females identified here as 'a', 'b' and 'c'. Each had a well-established diagnosis of BPD, with a history of recurrent admissions for self-harm, overdose, and in the case of 5(b) and 5(c), transient psychotic symptoms of derogatory auditory hallucinations. Blue plots are of data obtained at the time of admission, red plots of data at the time of discharge. A comparison of basic statistics at admission and discharge is given in Table 5. It can be seen that awake and sleep rates lessened substantially in each case but remained abnormally elevated, severely so in the case of 5(b). The sleep rate-architecture at the time of admission is abnormal in each case, severely so in 5(b) and 5(c). It improved a little in 5(b) but remained much the same in 5(a) and 5(c).

5.5. Normalisation of CHR

Serial recordings of CHR from patients undergoing treatment may show no

change, worsening, improvement or normalisation and provide objective indications of the effectiveness of treatment because of the state-dependent relationship between CHR and psychiatric status. All three serial recordings in Figure 5 show relative improvement or worsening depending on whether the time reference is admission or discharge. The serial data from healthy individuals in Figure 2 show 'no change'. Clinical improvement is always associated with a shift towards a typically normal pattern even if only a partial shift in that direction as shown in each of the three examples in Figure 5. Improvement in the circadian pattern can be described as 'normalisation' the more it approximates to the normal patterns shown in Figure 2. Clinical improvement is never associated with greater deviation in the rate magnitude and/or circadian rate architecture. Examples of normalisation are shown below in Figure 6.
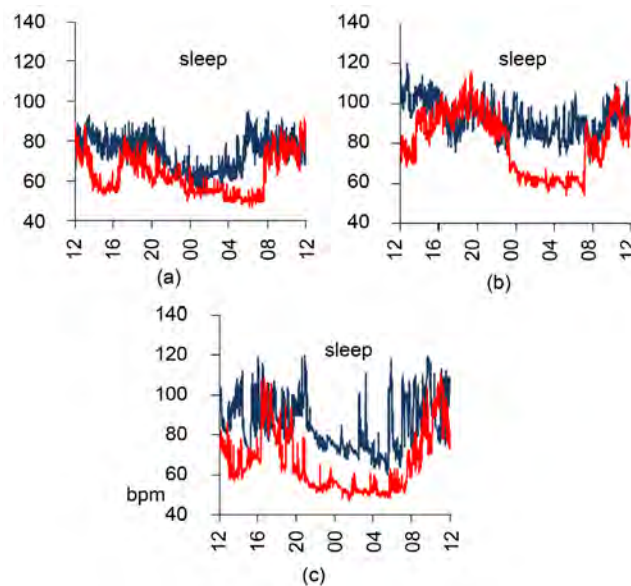
Figure 6. Examples of normalisation of CHR.

Table 6. Comparison of basic statistics at time of admission and discharge for data plotted in Figure 6.

| Figure	Clinical Diagnosis	Medication (daily dose)	age	gender	Time of recording	Awake (bpm) $\overline{x}$	σ	Sleep (bpm) $\overline{x}$	σ
6(a)	Major Depression	sertraline 100 mg temazepam 20 mg	42	F	admission	79	5.1	64	4.4
					discharge	68	8.6	53	3.0
6(b)	Drug-induced Psychosis	olanzapine 15 mg	24	M	admission	95	8.4	87	6.4
					discharge	89	10.0	62	3.1
6(c)	Acute Stress Reaction	quetiapine 300 mg	27	M	admission	91	10.1	75	8.1
					discharge	75	13.0	53	2.5

Figure 6 data were obtained from three patients identified here as 'a', 'b' and 'c', Blue plots are of data at the time of admission, red plots of data at the time of

discharge. Table 6 is a summary of clinically relevant information. The serial improvement in each case can be described as 'normalisation' even though there is some variation in the extent to which the serial improvement approximates to the signature normal patterns in Figure 1. The improvement in sleep rates and sleep rate architecture is particularly relevant. Evidence of this degree of normalisation is reliable evidence of clinical improvement.

5.6. Clinical Correlates of Variation in Rate Magnitude and Rate Architecture

Rate magnitude and rate architecture can vary independently [28]. The same 24-hour mean may reveal a distinctly different rate architecture, particularly during sleep, and the same circadian rate architecture can persist over a wide scalar offset, as illustrated below in Figure 7.
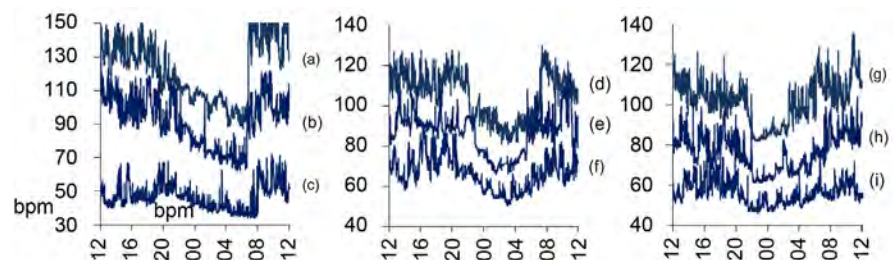
Figure 7. Examples of variation in rate magnitude and rate architecture.

Table 7. Diagnoses corresponding to data plotted in Figure 7.

	Clinical Diagnosis		Clinical Diagnosis		Clinical Diagnosis
7(a)	Schizophreniform Disorder	7(d)	Schizoaffective Disorder	7(g)	Psychotic Depression
7(b)	Generalized Anxiety Disorder	7(e)	Mixed Anxiety/Depression	7(h)	Melancholic Depression
7(c)	Adjustment Disorder	7(f)	Major Depression	7(i)	Dysthymia

Figure 7 data were obtained from 9 individuals identified here with lower case letters from 'a' to 'i'. Corresponding clinical diagnoses are given in Table 7. The three plots on the left [7(a), 7(b), 7(c)] show a similar down-ramp pattern during sleep, the three plots on the right [7(g), 7(h), 7(i)] a similar up-ramp pattern and the three plots in the middle [7(d), 7(e), 7(f)] a mix of down- and up-ramp pattern. Figure 7 shows that a closely similar rate architecture, particularly during sleep, can persist over a wide range of scalar offset and that clinical diagnoses vary with both the circadian rate architecture and scalar offset, as indicated by the diagnoses listed in Table 7. The scalar threshold for transition from non-psychotic to psychotic disorders can vary between individuals and whilst the down-ramp pattern remains associated with broadly defined 'anxiety' (generalized, not phobic or panic disorder) and the up-ramp pattern with broadly defined 'depression' (with melancholic features), clinical diagnoses can overlap

on both down-ramp, up-ramp and mixed patterns. For example, Figure 7(b) may be associated with clinical diagnoses of 'Generalized Anxiety Disorder', 'Obsessive Compulsive Disorder', 'Post-traumatic Stress Disorder' or 'Acute Stress Reaction': Figure 7(f) with 'major depressive disorder', 'dysthymia' or 'adjustment disorder with depressed mood'.

6. Discussion

The clinical heterogeneity and etiological complexity of psychiatric disorders makes the search for diagnostic biomarkers a daunting task. This applies particularly to hypothesized genetic markers. Genetic studies may demonstrate trait vulnerability for mental illness but are unlikely to provide clinically useful diagnostic information because of the number of genes involved [31] and the unpredictable epigenetic effects on their expression [32]. State markers, especially a battery of state markers, are more likely to provide clinically useful information that may also amount to diagnostic information, as suggested by changes in CHR. Dimensions of independent variation in CHR [28] effectively constitute a battery of state markers. Variation in these different dimensions of activity can give rise to distinctly different changes in CHR that suggest discriminatory differences at a physiological level.

The ANS plays a key role in the regulation of heart rate and evidence of abnormalities in CHR, especially during sleep, is evidence of abnormalities in ANS regulation, all other things being equal. The state-dependent nature of the relationship between CHR and psychiatric status suggests that changes in ANS regulation, as revealed in CHR, are an integral part of, or perhaps constitute, the biological changes of mental illness. Clinically relevant changes in CHR are deviations from a typically normal pattern and in broad terms, the greater the deviation in rate magnitude and/or rate-architecture, the greater the clinical significance. Deviations in CHR are not confined to diagnosed mental illness and this situation is analogous to what is found in hypertension. Many people in the community are living with undiagnosed hypertension [33]. Similarly, many individuals in the community will show deviations in CHR without having been diagnosed as mentally ill. The clinical consequences will depend in large part on the severity and duration of the deviation and this is generally the case with all dimensional bodily variation, be it weight, temperature, blood pressure or CHR.

Circadian heart rate qualifies as a biomarker primarily because of its state-dependent variation. Normalisation of CHR with clinical improvement is like normalisation of circadian temperature with recovery from an infection. It is diagnostically non-specific but provides clinically useful information. The biomarker information in CHR is suggested by findings that broadly different disorders are associated with distinctly different changes in CHR, as shown in Figure 3, Figure 4 and Figure 7. Unfortunately, CHR does not reliably predict specific symptoms or specific classified diagnoses. Similar changes in CHR may be associated with different clinical diagnoses and similar clinical manifestations

may be associated with different changes in CHR, as shown in **Figure 4**. Such imperfect correlation is not surprising given that symptoms may vary widely between individuals given the same clinical diagnosis and that the presentation of psychiatric disorders can vary considerably. For example, 'depression' can present as somatisation [34], 'depression without sadness' [35], conversion disorder [36], and in other culturally diverse ways [37] [38]. It may be that biomarkers can group such diverse presentations under the same diagnostic rubric if they involve similar biological changes, but if found, one would not expect markers of the biological changes to reliably predict the variations in clinical presentation.

Changes in CHR involve at least two broadly different dimensions of independent variation, namely, rate magnitude and rate architecture. The distinctive and unmistakably different down- and up-ramp variations in sleep rate architecture that are respectively associated with 'anxiety' and 'depression', suggest categorically different biological states. However, given the key role played by the ANS in the regulation of heart rate, these mirror-opposite patterns may merely reflect variation in relative SNS and PNS dominance or dysregulation, with dominance of SNS activity in the down-ramp pattern and initial dominance of the PNS in the up-ramp pattern. This conclusion is supported by evidence of 'mixed' patterns, shown in **Figure 7**, that are often associated with a clinical diagnosis of 'mixed' affective disturbance. However, variations in CHR are not confined to down-ramp and up-ramp. Entirely different changes, such as plots (a) and (b) in **Figure 4**, whilst also a manifestation of SNS/PNS dynamics, do suggest categorically different pathophysiology. Unlike biomarkers such as C-reactive protein, which vary only quantitatively, the changes in CHR reveal multidimensional and unmistakably different deviations from normal and since these deviations are state-dependent, they are an indication of diagnostic discrimination at a physiological level even if the clinical manifestations or clinical diagnoses are not fully predictable. Discrimination at a physiological level may be more relevant clinically because of its relative objectivity, potential relevance to pharmacotherapy, evaluation of a patient's response to treatment and understanding the different pathophysiological pathways involved.

The persistence of distinctive rate architecture patterns over a wide scalar range as shown in **Figure 7**, is interesting from a biomarker and theoretical perspective, in that it suggests the patterns are a manifestation of stable physiological or dys-regulatory states. This idea is supported by the fact that scalar shifts of much the same circadian pattern are evident not only between individuals, but also serially within individuals [28]. What is of interest from a biomarker perspective, is that a scalar increase may initially merely signal an increase in severity, but then progressively involve a change in clinical manifestations. For example, a scalar increase of a down-ramp pattern may initially signal more severe anxiety, but with further increases, signal psychotic symptoms. Evidence of such major variation in clinical manifestations with what seems like purely quantita-

tive variation in rate magnitude, leaves a question mark over any hoped-for biomarker specificity, since the threshold for the emergence of psychotic symptoms can vary between individuals.

Deviations in CHR are also found in Personality Disorders. Severe deviations can be found in DSM-5 'cluster B' disorders, particularly BPD, as shown in **Figure 5**. Such 'trait' changes persist and remain when superimposed 'state' changes have abated just as symptoms of a Personality Disorder remain after superimposed state disorders have abated. From this perspective, CHR reveals a cross-sectional and serial or longitudinal perspective. Cross-sectional changes may reflect purely state changes or a combination of state and underlying trait or personality-related changes. Purely state changes are suggested when there is a reversion to a typically normal pattern with clinical recovery, as illustrated in **Figure 6**. Persisting deviations may reflect chronic state changes, personality disorder trait changes, or a combination of trait and chronic state changes.

Circadian heart rate data suggest that the biological underpinnings of mental illness are dynamic and on a continuum from fully reversible, to persisting, seemingly irreversible changes, as evident for example, in chronic schizophrenia. From this perspective, changes in CHR are not unlike changes in blood pressure that can also vary from transient, reversible elevations to persisting elevations in hypertensive disease.

7. Conclusion

Circadian heart rate qualifies as a biomarker of mental illness because of its demonstrable state-dependent relationship with psychiatric status and persisting changes in personality disorders. However, CHR does not specify classified disorders reliably because whilst there are distinctly different 'deviations' in CHR between broadly different disorders, each of these different deviations may be associated with more than one classified disorder. This situation is likely to apply to all candidate biomarkers since many clinically classified disorders are probably not separated by natural boundaries. Serial recordings of CHR suggest that the biology of mental illness is not a static 'lesion', but a dynamic disturbance with variable outcomes ranging from fully reversible to varying degrees of persisting abnormality. Although not a reliable indication of clinical diagnoses, CHR provides objective physiological adjunct information which can be used in clinical assessment and in the evaluation of treatment. Also, distinctly different changes in CHR amount to discrimination at a physiological level and this information is potentially relevant from a clinical and theoretical perspective.

Limitations

Questions about normal variation in heart rate and rate architecture, particularly with respect to sleep-related changes, have not been addressed in detail. Our reference for 'deviation' in the magnitude of heart rate, is published normative data [29] [30], despite continuing debate about normal limits [39] and concern about

study shortcomings. Specifically, normative studies do not appear to have controlled for undiagnosed psychiatric disorders and this would challenge the assumption of normally distributed heart rate in the general population and add support to the idea of mixed distributions as suggested by Palatini [39]. We have given examples of signature normal circadian patterns and normalisation of rate architecture but have not addressed questions about normal variation in this regard. Very little research has addressed circadian rate architecture, particularly sleep-related changes. There are reports of nocturnal 'dipping' and 'non-dipping' heart rate [40] [41] but no detailed consideration has been given to the wide variation in sleep rate architecture, such as the mirror-opposite and 'mixed' patterns shown in Figure 7, or variation in the sleep-wake rate difference, where in some instances, sleep rates may be higher than awake rates. Accepting that more robust definitions of normal variation in rate and rate architecture are needed, existing shortcomings in this regard do not detract from the biomarker status of CHR, which is based on its demonstrable state-dependent relationship with psychiatric status. A similar argument applies to uncertainty as to whether ANS dysregulation, as signalled by CHR, is a primary or secondary, 'downstream' manifestation. The biomarker status of CHR would remain either way.

The only psychotropic drugs relevant to presented data were sertraline, olanzapine, quetiapine, valproate and lorazepam. These drugs do not affect HR or HRV to any significant extent [17] [24] [42] and could not in any event account for the demonstrated variations in CHR because the same medications were taken by individuals showing distinctly different patterns (see Figure 4).

Conflicts of Interest

SB Dimmitt has no conflict of interest.

HG Stampfer is currently conducting an ethics approved study on the usefulness of CHR for monitoring the response to antidepressant medication in the treatment of depression and/or anxiety. Funding for this study was provided by Medibio, a biotech company interested in developing the CHR technology.

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Occupational Stress, Coping Strategies, and Quality of Life among Nurses in General and Psychiatric Setting in Jeddah City—KSA

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Abstract

Purpose: This study is aimed at comparing the level of occupational stress, ways of coping and the quality of life among nurses. **Methods:** Descriptive explanatory design was used with 278 nurses working in King Abdul Aziz Hospital in Jeddah, Mental Health Hospital in Jeddah, and Dr. Suleiman Fakeeh Hospital in Jeddah. **Findings:** Psychiatric nurses experience greater occupational stress than general nurses (p = 0.001). There was no statistically significant difference between the psychiatric and general nurses in relation to coping strategies (p = 0.38). **Conclusion:** Healthcare institutions should adapt stress evaluation and coping models specific to their unit. **Practical Implication:** Implementation of programs in each healthcare unit to educate nurses how to deal with work stressors and their negative effects.

Keywords

Psychiatric Mental Nurses, Stress, Nurses, Occupational Stress, Coping Strategies, Quality of Life, Saudi Arabia

1. Introduction

Occupational stress in nursing is common worldwide, ranging from 9.2% to 68%. Caring for the weak, sick, and traumatized client can impose a stress on the nurse [1]. The nurses in different departments are exposed to a broad variety of stressors including unpredictable work conditions, experience exposure to traumatizing incidents such as aggression, amputation, and extreme suffering of clients and potential violence, including patients under the influence of drugs and alcohol, and crime suspects brought in by police [2].

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Occupational stress has become one of the most severe health problems in the contemporary world [3]. Job stress can cause health related problem such as hypertension, cardiac problems, reduce immunity, contribute to substance abuse and reduce the overall status of mental and physical wellbeing. In fact, stress becomes a natural part of daily life for caregivers such as nurses, doctors and hospital administrators [4]. Occupational stress in nursing is the physical and emotional reactions that occur when the nurse's abilities and resources cannot deal with the demands and requests of their work [5]. The nursing profession in general is increasingly characterized by job stress [6]. According to American Journal of Industrial Medicine (2014), more than 70% of interviewed nurses indicated acute and chronic impacts of stress and exhaustion on their safety and health concerns. Several studies indicated that there are individual, social, environmental and organizational factors that lead to high levels of occupational stress among nurses [7].

Habib and Shirazi pointed out that nursing is a stressful job and identified the stressors as workload, close interaction with patients, high emotional involvement and being responsible of patients' life [7]. Also, there are issues related to physical hazards at workplace such as work injuries, uncertain job security and the fear of layoff [8], meanwhile, taking into consideration that the most of nurses are females and they experience stress more frequently than males [8]. This could be explained by the fact that female nurses are emotionally sensitive group, and also, they have an additional social role as a wife, woman and mother. In addition to occupational demands, they should satisfy their family's needs such as nutrition, economic deals, educational matters, socializing kids, and family relations. These multiple roles impose severe burden and roles interactions, personal relationships at work and home, personal resources and job's natural complication, which can cause various hazards. In addition, occupational stress of nursing at hospitals is reported to be significantly higher than nurses in other working setting [9]. In psychiatric setting, there is challenging task for nurses because they have to care for both the mental and physical health of the patient and this leads to additional burden on these nurses [2].

Stress causes mental health disorders for psychiatric nurses, some common stressors include poor working relationships between nurses and doctors and other health care professionals, demanding communication and relationships with patients and relatives, emergency cases, high work load, understaffing and lack of support or positive feedback from senior nursing staff [10]. Also, psychiatric nurses have an isolated occupation environment that includes locked ward entrances, as a result, the potential for patient conflict with the associated risk of both physical and mental danger or violence perpetrated by aggressive patients is potentially present. In addition, psychiatric nurses are required to seclude or restrain patients to prevent them from harming themselves or others. Moreover, psychiatric nurses are dealing with high potential drugs and medication which

consider a stressor for psychiatric nurses more than other nursing specialties. Therefore, the structures of occupational stressors experienced by psychiatric nurses potentially differ from those of other employees [11].

Zeller and Levin [1] reported that occupational stress is a major challenge worldwide. Work stress affects individual mental and physical health as well as organizational health in diverse ways. These include the fact that stressed workers are more likely to be unhealthy, poorly motivated, less productive and less safe at work. Also, high level of occupational stress reduces the quality of nursing care [12], and can threaten patients' lives and security [7].

There are several traditional means of managing everyday stress. This evolves physical exercise, emotional and psychological therapies, change in work approach or medications. The choice of management procedure adopted is usually subjective to the source, nature of the stress and the resources available to the individual under stress (Cohen *et al.*, 2002). It is believed that the best management practice of stress is to learn how to cope with it using healthy and positive coping strategies. The first step of effective stress management is to understand one-self better and understand stress triggers and how one can react to stressful situations. In the nursing field, the ability to render high quality health and nursing services to the patients in spite of occupational stress is considered as an effective coping [13]. Most literatures that worked on stress and coping tried to link the coping strategies to the type and sources of the stressor. Lockley, Barger [14] established a safe hour work limit for nurses in order to prevent the high rate of fatigue related medical errors and injuries. Therefore, there is a need to limit the number of working hours done by nurses to help them to manage the stress arising from long working hours. The shifts and the duration of shifts can be controlled by a combined effort of the nurse managers and the nurses working in the hospitals. Fielden and Peckar [15] agreed that stress is associated to the number of working hours nurses do in the hospital.

Availability of social support also helped in reducing the negative effect of the stress on their performance. Consequently, social support was identified as an effective coping strategy. Sharma, Sharp [16] stated that nurses are believed to have lower level of burnout than surgeons and they agreed that this is as a result of better working practice, the type of responsibilities and the management structure. By this, a better-organized management structure and organized individual working practice are seen as effective way of managing or coping with working stress. Therefore, social support and working group are considered effective coping strategies for stress [17]. Other preventive strategies include effective communication strategies during end of life care, prevention of management conflicts [17].

Quality of life (QOL) is one of the most important aspects of human health, which is embedded in physical, cultural, and social contexts. Various studies have indicated that favorable QOL depends on working conditions and family life [17]. Therefore, working life is one of the factors affecting QOL. On the

other hand, hospitals as an organization may put the clients and specially nurses under a serious load of stress, which subsequently affects their physical and emotional health. Occupational stress has a large negative effect on QOL and may lead to reduced work performance, early retirement, dissatisfaction and physical damage [18]. Health related problems from stress such as migraine, hypertension, and irritable bowel syndrome can plague a nurse both at work and on their off-duty time and may require regular intake of medications, and restriction of social activities affecting nurses' QOL. Psychological problems such as chronic fatigue syndrome, secondary traumatic stress, and nursing burnout may also occur due to stress. It is logical to theorize that a nurse's quality of life is affected by these health conditions. Clearly, nurses play an effective role in improving patients' QOL, to do so; initially they themselves should have a high QOL. Nayomi [19] reported that the physical, social, and psychological QOL of nurses is lower than factory workers. The main goal of the study was to compare the level of occupational stress, ways of coping and the quality of life among nurses who work in general and psychiatric hospital in Jeddah city, KSA.This study was conducted in Jeddah city, the second biggest city in Kingdom of Saudi Arabia. The study included three main hospitals in Jeddah, two of them were governmental hospitals and one was a private hospital. The first hospital was King Abdul Aziz hospital which is a general hospital occupied with 445 beds with total of 850 nurses. The second hospital was Mental Health hospital which is a psychiatric hospital has 120 beds with total of 183 nurses. In addition, Dr. Suleiman Fakeeh hospital is a private hospital with 530 beds and it has 920 nurses. The sample of general hospital was obtained from seven workplaces: intensive care unit (ICU), emergency unit (ER), surgical unit, medical unit, operation room (OR), outpatient unit, and nursing offices whilst the sample of psychiatric hospital was obtained from three workplaces: inpatient unit, the outpatient unit, and nursing offices.

2. Methods

2.1. Study Design

The design of the study was used descriptive explanatory design.

2.2. Study Sample

The target sample of this study was 400 nurses and the final sample consisted of 278 nurses (response rate 69.5%) working in King Abdul Aziz Hospital (KAAH) in Jeddah, Mental Health Hospital in Jeddah, and Dr. Suleiman Fakeeh Hospital in Jeddah.

2.3. Inclusion Criteria

- Nurses and nurses' assistants.
- Both male and female.
- Working in the general and psychiatric hospital.

- Able to read and speak English language.

2.4. Exclusion Criteria

- Nurses who did not able to read and speak English language.

2.5. Data Collection Procedure

Ethical approval was obtained from the Institutional Review Board (IRB) committees in the Ministry of Health and from the Dr. Suleiman Fakeeh hospital. The author placed an A3 paper in the ward noticed-board to announce the study. The author met each potential participant providing them with an informational sheet about the study, purpose, and expected tasks. Verbal explanation is given alongside informed consent, then they were requested to return signed consent form. It was explained to the participants that they can withdraw at any time without harm from the study. It was also made clear that there was no financial or any other form of gain from the participation of study. The author distributed and collected the questionnaire to those who volunteered to participate in the study paper.

2.6. Data Collection Method and Outcomes Measure

A pre-designed structured interviewing questionnaire including the following items:

2.6.1. Socio-Demographic Characteristics of the Participants
Age, sex, marital status, level of education, hospital category (government, private) and work setting (general, psychiatric).

2.6.2. The Expanded Nursing Stress (ENSS) Scale
ENSS is an expanded and updated revision of the classic Nursing Stress Scale (NSS) developed by Gray-Toft and Anderson [20]. The NSS was the first instrument to target nursing stress rather than general job stress. The completed ENSS contained 59 items in nine subscales. The first source is physical which includes work overload and computer breakdown. The second source is psychological which includes death, inadequate preparation, pain and suffering, lack of support and mistakes. The third source is social which includes uncertainty related to conflicts with doctors and other nurses and lack of knowledge and conflict with supervisor.

The 59 items were arranged in a 5-point Likert response scale. The responses were "never stressful" [1], "occasionally stressful" [2], "frequently stressful" [3], "extremely stressful" [4], and "does not apply" [5]. ENSS demonstrated better reliability with Cronbach's alpha ($\alpha = 0.96$) over the original NSS ($\alpha = 0.89$). The Individual subscale reliability ranged from $\alpha = 0.88$ (problems with supervisors) to $\alpha = 0.65$ (discrimination).

2.6.3. The Brief Cope Scale
It was developed by Charles S. Carver in 1997. It has 28 questions divided in 14

subscales. The aim of the BC is to evaluate people coping abilities during times of stress (Carver, 1997). Scoring for the 28 questions is as follows: 1 = I haven't been doing this at all; 2 = I have been doing this a little bit; 3 = I have been doing this a medium amount; and 4 = I have been doing this a lot. Cronbach's Alpha was used to assess reliability. Subscale Items Cronbach's Alpha: self-distraction 0.77, active coping 0.63, denial 0.64, substance use 0.79, use of emotional support 0.51, use of instrumental support 0.68, behavioral disengagement 0.74, venting 0.74, positive reframing 0.75, planning 0.75, humor 0.75, acceptance 0.77, religion 0.81 and self-blame 0.61.

2.6.4. Professional Quality of Life Scale (ProQOL)

This scale was originally designed by a psychologist, Flanagan in 1975 and measured a person's sense of well-being (Burkhardt & Anderson, 2003). The tool has been adapted to assess different populations such as the chronically ill, and professionals who provide care. The reliability for the subscale—Trauma/Compassion Fatigue has an alpha score of 0.80.

2.7. Ethical Consideration

The ethical approval was obtained from the research and ethical committee in X. The participants were informed about the voluntary nature of participation and they then had a full right to withdraw at any point. Participants privacy and confidentially were assured and their names would not appear on any documents in the study.

2.8. Statistical Analysis

Data entry and statistical analysis were done by using the Statistical Package for the Social Sciences (SPSS) version 23. Statistical significance was set at $p < 0.05$. Descriptive and inferential statistical techniques were utilized to analyze the collected data. These techniques included (frequencies, percentages, mean value and standard deviations). In addition, Chi Square test and/or independent sample t test was applied to examine differences among participants in general and psychiatric hospitals.

3. Results

3.1. Socio-Demographic Characteristics of the Study Participants

A total of 400 questionnaires were distributed to nurses in each of intensive care unit (ICU), emergency unit (ER), surgical unit, medical unit, operation room (OR), outpatient unit, inpatient unit, and nursing office. The total number of returned questionnaires was 278 (response rate is 69.5%). As presented in Table 1, the study participants were divided according to work setting into two groups: general and psychiatric nurses. In both groups, females were predominant, as constituted 78.4% among general nurses versus 58.8% among psychiatric nurses. In addition, the age group of general nurses was slightly higher than psychiatric

Table 1. Socio-demographic characteristics of the study participants.

Socio-demographic Characteristic	General Nurses (%) N = 171	Psychiatric Nurses (%) N = 107
Gender:		
Male	37 (21.6%)	44 (41.1%)
Female	134 (78.4%)	63 (58.8%)
Age (years):		
20 - 29	56 (32.7%)	55 (51.4%)
30 - 39	76 (44.4%)	40 (37.4%)
40 - 49	33 (19.3%)	12 (11.2%)
50 - 59	6 (3.5%)	0 (0.0%)
Marital status:		
Single	75 (43.9%)	40 (37.4%)
Married	84 (49.1%)	56 (52.3%)
Widowed	3 (1.8%)	0 (0.0%)
Divorced	9 (5.3%)	11 (10.3%)
Education level:		
Diploma	34 (19.9%)	12 (11.2%)
Bachelor Degree	133 (77.8%)	95 (88.8%)
Postgraduate	4 (2.3%)	0 (0.0%)
Hospital category:		
Governmental Hospital	149 (87.1%)	83 (77.6%)
Private Hospital	22 (12.9%)	24 (22.4%)
Department:		
Inpatient	0 (0.0%)	58 (54.2%)
Outpatient	39 (22.8%)	37 (34.6%)
ICU	24 (14%)	0 (0.0%)
ER	21 (12.3%)	4 (3.7%)
Surgical	40 (23.4%)	0 (0.0%)
Medical	21 (12.3%)	0 (0.0%)
OR	6 (3.5%)	0 (0.0%)
Nursing Office	6 (11.7%)	8 (7.5%)

nurses. For instance, approximately 45% of general nurses were aged between 30 to 39 years and about half of the psychiatric nurses were aged ranged from 20 to 29 years. In addition, the majority of the study sample in both groups were married. Moreover, the highest percent of nurses in both groups had attained a bachelor's degree in nursing science.

3.2. Occupational Stress Level among the Study Participants

The maximum score of occupational stress is 236 with a mean score of 148.8 and a standard deviation of 35.22. Independent sample t test was used to compare the occupational stress level between psychiatric nurse and general nurses. There was significant difference between nurses regarding the work setting at the hospital level ($p < 0.05$), as indicated in Table 2. It was found that psychiatric nurses experience greater level of stress than general nurses.

3.2.1. Occupational Stress Subgroups
In Table 3, the result of subgroups analysis shows that there was statistically

Table 2. Occupational stress scores among the study participants.

Occupational Stress	Mean	SD	P value
Psychiatric Hospital	157.6	26	0.001
General Hospital	143.3	39	

SD: Standard Deviation.

Table 3. Occupational stress subgroups scores among the study participants.

Occupational Stress Subgroup	Sample	Mean	SD	P value
Death and Dying	General Nurses	2.5	0.62	0.007
	Psychiatric Nurses	2.25	0.79	
Conflict with Physicians	General Nurses	2.40	0.90	0.001
	Psychiatric Nurses	2.755	0.57	
Inadequate Emotional Preparation	General Nurses	2.17	0.80	0.034
	Psychiatric Nurses	2.35	0.60	
Problems Relating to Peers	General Nurses	1.98	0.75	0.006
	Psychiatric Nurses	2.21	0.56	
Problems Relating to Supervisors	General Nurses	2.64	0.90	0.04
	Psychiatric Nurses	2.87	0.43	
Work Load	General Nurses	2.71	0.61	0.011
	Psychiatric Nurses	2.46	0.88	
Patients and their Families	General Nurses	2.43	0.96	0.001
	Psychiatric Nurses	2.85	0.62	
Uncertainty Concerning Treatment	General Nurses	2.34	0.79	0.001
	Psychiatric Nurses	2.85	0.54	
Discrimination	General Nurses	2.10	1.19	0.001
	Psychiatric Nurses	2.89	0.88	

significant variation between general nurses and psychiatric nurses where independent t test value ($p < 0.05$). The significant variation includes death and dying approach ($p = 0.007$), conflict with physicians approach ($p = 0.001$), inadequate emotional preparation approach ($p = 0.034$), problems relating to peers approach ($p = 0.006$), problems relating to supervisor approach ($p = 0.04$), work load approach ($p = 0.011$), patients and their families approach ($p = 0.001$), uncertainty concerning treatment approach ($p = 0.001$), discrimination approach ($p = 0.001$).

3.2.2. Coping Strategies

The result of independent sample t test appeared that there was no statistically significant difference between the psychiatric and general nurses in relation to coping strategies ($p > 0.05$), as shows in Table 4. The result of coping strategies subgroup analysis in Table 5 indicate that there was statistically significant difference ($p > 0.05$) between the nurses in psychiatric and general setting in approach of avoidance coping were ($p = 0.012$). On other hand, there was no statistically significant difference between study's group in the others coping

Table 4. Coping strategies scores amongst the study participants.

Coping Strategies	Mean	SD	P value
Psychiatric Hospital	68.72	10.191	
General Hospital	67.44	13.869	0.38

SD: Standard Deviation.

Table 5. Coping strategies subgroups scores among the study participants.

Coping Strategies Subgroup	Sample	Mean	SD	P value
Approach Coping	General Nurses	2.69	0.67	0.35
	Psychiatric Nurses	2.63	0.48	
Avoidance Coping	General Nurses	2.18	0.57	0.012
	Psychiatric Nurses	2.34	0.47	
Altering Consciousness	General Nurses	2.22	0.48	0.87
	Psychiatric Nurses	2.21	0.37	
Seeking Support	General Nurses	2.50	0.65	0.17
	Psychiatric Nurses	2.59	0.51	

SD: Standard Deviation.

strategies subgroups such as approach of coping (p = 0.354), avoidance coping (p = 0.87) and seeking support (p = 0.17).

3.3. Quality of Life

The findings of the analysis highlighted that quality of life score was lower in psychiatric nurses compared with their counterparts as indicated in Table 6. There was statistically significant difference between the psychiatric and general nurses (p < 0.05).

4. Discussions

Nursing is a stressful profession that deals with intense human aspects of health and illness. General and psychiatric nurses experience different levels of occupational stress. In this study, compared to the nurses working in the general setting, those working in the psychiatric setting had a higher statically level of occupational stress (p = 0.001). There are several possible reasons that could explain psychiatric nurses had higher level of stress than general nurses. The main reason is that psychiatric nurses in this study worked in restricted environments, such as closed wards with isolation rooms that mainly serve acute and potentially violent patients [21]. Moreover, a considerable proportion of these patients displayed aggressive behavior previously and were compulsively admitted. Therefore, they were exposed to psychological and physical stress and aggression at work more frequently than nurses in general care setting [21]. In addition, there is a strong need for continuous education and training about workplace violence; particularly how to support each other and being sensitive to subtle signs that can indicate proneness to aggressive behavior [22]. However, this type

Table 6. Quality of life scores among the study participants.

Quality of Life	Mean	SD	P value
Psychiatric Hospital	95.14	7.61	
General Hospital	97.12	13.06	0.01

SD: Standard Deviation.

of training is not universally implemented or inadequate in psychiatric hospitals. For example, a survey of 300 randomly selected nurses from five psychiatric hospitals in China found that 75.6% were not satisfied with the lack of continuing training on violence [22].

The finding is supported by a study conducted by Qi, Xiang [23] who compared the level of work-related stress between female nurses working in psychiatric and general hospitals in China. It was found that compared to the nurses working in the general hospital, those working in the psychiatric setting had a higher level of stress. Another study designed by Jenkins and Elliott (2004) stated that psychiatry nursing has similarities to other nursing specialties, however, its difference is that psychiatric nurses have more deep relationships with their patients, engage in preventing self-harm and often face higher levels of challenging behaviors in the environment (Jenkins and Elliott, 2004). In contrast to the above finding, Jenkins and Elliott [24] conducted a study to investigate occupational stress levels among general and psychiatric nurses and found that general nurses reported stress levels that were significantly higher than those of psychiatric nurses and that they would be more likely to use workplace counseling services. Another study designed by Hussein, Aniza [25] concluded that psychiatric nurses are protected from stress through social support from the multi-disciplinary team [25].

Furthermore, Al Hosis *et al.* (2013) highlighted that the impact of occupational stress on the well-being of Saudi nurses working in the ministry of health hospitals (MOH) in AL-Qassim region in KSA found that nurses' occupational stress was not affected by their educational level. Also, a significant relationship was found between work setting and communication subscale. This goes in coincidence with the research conducted by Flannery *et al.* (2007), Hanrahan *et al.* (2010) these studies explained that psychiatric nurses constantly manage patients and families from all levels of people and is essential to deal with manifold communications. Both hurts from work and verbal attacks from patients will increase psychiatric nurses' occupational burnout. Yada *et al.* (2015) investigated the specificity and structures of occupational stress in psychiatric dementia nurses (PDNs) caring for elderly patients with serious behavioral and psychological symptoms of dementia occupational stress in PDNs revealed physical workload and work environment to be more significant stressors.

4.1. Coping Strategies

Coping strategies are used to help nurses who experience occupational stress. In

the current study, results revealed that there was no statistically significant difference between the psychiatric and general nurses in relation to coping strategies (p > 0.05). This finding agreed with a study designed by Dawood, Mitsu [26] who stated that there were no significant differences emerged between general and mental nurses regarding coping strategies.

The most used coping strategies by nurses in general and psychiatric nurses were problem focused or approach coping (mean score for general nurses was 2.69, mean score for general nurses was 2.63). This strategy corresponds to an active way to react to stressful situation, because coping, focused on the problem, is intended to remedy the stressful situation and is considered to be the most effective strategy to deal with stress (Bennett *et al.* 2001). This finding agreed with a study by conducted among community health agents, where problem focused, or approach coping was the most adopted approach to cope with occupational stress [27].

In contrast, Edwards and Burnard (2003) conducted a systematic review to determine the effectiveness of stress management methods that mental health nurses utilize. They reported that the most frequently reported coping strategies utilized by mental health nurses were seeking social support. Also, Happell *et al.* (2013), stated that the most popular form of coping mechanism among these nurses was the social support. However, the study by Zaki [18] has pointed out that one of the factors influencing psychiatric nurse's ability to cope effectively with their work stress as uncooperative work place. Psychiatric nurses have an uncommon work setting [11]. As well association was found between length of experience and communication subscale, but when this result is compared with research done by Ho, Chang [28] they explained that nurses with 6 - 10 years of experience have higher level of job stress than nurses with less than 5 years or more than 11 years' experience. Likewise, the finding from Yada, Abe [10] recognized that middle aged nurses *i.e.* with 6 - 10 years' experience are given full accountabilities at work, and many roles during this phase clarify why middle-aged nurses experience job stress more often.

4.2. Quality of Life

Nurses are a special professional that have a risk of suffering from occupational stress and insufficient coping strategies resources, which may lead to serious mental and physical health problems and a reduced QOL Asberg, Bowers [29]. Excessive occupational stress has a negative consequence on the psychological well-being of nurses (including behavioral, emotional and cognitive levels), reducing their work efficiency [10]. However, Asberg, Bowers [29] supported that occupational stress strongly correlated with QOL. The findings in the current study pointed out that quality of life score was lower in psychiatric nurses compared with their counterparts. There was statistically significant difference between the psychiatric and general nurses (p = 0.01). The main limitation of the study is that the sample selected from one governmental hospital which did not

represent all nurse in Saudi Arabia.

5. Conclusion

The study showed that occupational stress is a global phenomenon and it affects the nurses in all the countries in which researches had been conducted on occupational stress. The results noted that there was variety in occupational stress level between nurses working in the general setting and nurses working in the psychiatric setting.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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Semantic and Phonemic Verbal Fluency Performance in Patients with General Anxiety Disorders and Allostatic Load under Alprazolam Treatment

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Abstract

Purpose: Anxiety disorders are frequently associated with chronic stress with possible cognitive consequences. The aim of this study was to determine the verbal fluency performance in a cohort of patients with anxiety disorders and allostatic load, treated with alprazolam during 12 weeks. **Methods:** Patients with GAD (general anxiety disorders, DSM IV), with >6 in Hamilton Anxiety Rating Scale (HAM-A), neuroticism > 18 (NEO-FFI inventory), and normal Mini-Mental State Examination were included. Clinical and Psychiatric examination, Allostatic Load Index and cognitive assessment were analyzed before and after 12 weeks of treatment. The phonemic and semantic verbal fluency tests were determined in all patients. The scoring for each fluency task was determined by counting the number of correct words. The total score from each semantic and phonemic verbal task was analyzed comparing the individual score with normal data controlled by age and sex. Patients with scores > −2 standard deviation (SD) from normative data were considered impaired. **Results:** Fifty-four patients completed the semantic verbal fluency test before treatment and fifty patients completed after treatment. According to the z-scores before treatment 7 patients of 54 (12.9%) had verbal fluency impairments. After treatment none patients showed semantic verbal fluency deficits but 3 patients of 50 (6%) showed phonemic impairments. Impaired group was significantly associated with an older age before treatment (p = 0.033) and with a similar tendency but not significant (p = 0.09) after treatment (Student t test). **Conclusion:** In this study older age factor was associated with verbal fluency impairment in GAD patients. Stratified treatments

analyzing age and sex factors, including allostatic load measurements and cognitive assessments may be useful tools to determine the effectiveness and the safety of psychopharmacological treatments.

1. Introduction

Stressors trigger physiological and behavioural responses that are aimed at reinstating homeostasis. If the stress response is inadequate or excessive and prolonged (chronic stress), the cost of reinstating homeostasis might become too high and predisposed individuals at an increased risk of (mental) illness such as general anxiety disorder [1] [2]. Chronic stress has been demonstrated to induce functionally-relevant effects on hippocampus and prefrontal cortex brain neuroplasticity due to hypothalamic-pituitary-adrenal axis (HPA)[1] hyperactivity, traduced on impairments in cognition [3]-[8].

Verbal and non-verbal fluency performance have been previously studied in patients with attention deficit hyperactivity disorder [9] and in patients with obsessive compulsive disorder [10] and also in subjects with stress related conditions such as neuroticism [11], showing lower scores and impairments among these patients. In this line, other authors have been proposed that anxiety may modify neural activation during the performance of verbal fluency tasks, executive functions that are dependent on the frontal lobe function [12].

On the other side, the use of drugs such as benzodiazepines is effective in promptly reducing anxiety scores but may have controversial effects on cognition after long term use [13]-[18]. Nevertheless, there are not conclusive findings regarding verbal fluency, an executive function which depends on frontal lobe functions, in patients with general anxiety disorders treated with benzodiazepines [18] [19].

The rate of the outpatients' use of benzodiazepines has been increased substantially in the last years, especially among clinicians, psychiatrists and neurologists [20]; indeed clinical studies are continually needed to determine safety in long term uses. The GEMA project (Gador Study of Stress Modulation by Alprazolam) [21] consists of a series of consecutive studies performed on a group of high symptomatic outpatients with general anxiety disorder (GAD)[2] associated with chronic stress, determined by high allostatic load (AL) levels (indicators for the functioning of the main potentially stress affected systems) [22] [23] and neuroticism (a clinical condition well-known as a stress vulnerability factor and defined as an exaggerated response to psychosocial stressors with intense emotional reaction) [24] [25] [26] [27].

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[1](HPA) Hypothalamic-pituitary-adrenal axis.
[2](GAD) General Anxiety Disorder

In a previous analysis performed by our group in the same cohort of patients, we analyzed the AL index and determined the effects of sex and age on allostatic load variables before and after treatment [28]. In this study we found that female sex was associated with higher levels of anxiety with a better profile in the same allostatic load variables such as cardiovascular ones. Hereby, in the present report we aimed to determine the verbal fluency performance at basal conditions (before treatment) and after 12 weeks of treatment with alprazolam (a positive allosteric modulator of GABA A receptor), including sex and age as influential factors.

2. Methods

In this prospective study patients were recruited during 3 years up to 2014. The database is currently locked and subjected to multiple analyses. Inclusion criteria were Hamilton Anxiety Rating Scale (HAM-A)[3] [29] > 6, a minimum score of 18 points in the NEO-FFI neuroticism scale [30] and at least one positive criterion for AL load index modified from Seeman and Crimmins 2003 [22] (clinical manifestations were under personalized medical treatment and were stable). All patients had a normal performance in the Mini-Mental State Examination [31] with general good vision and hearing with or without the use of aids. Exclusion criteria were: subjects with depression and/or other comorbid diseases listed under axis I of the DSM-IV, (American Psychiatric Association, 1994), patients taking psychotropic drugs, sympathomimetic, corticosteroid and/or any other medication that might interact with alprazolam; persons who were hypersensitive to drugs; with confirmed or suspected gestation; women likely to become pregnant during the study; patients with an important clinical condition that required treatment modification and that might interfere with the study treatment or evaluation methods.

The protocol was evaluated in accordance with the code of ethics of the World Medical Association (Declaration of Helsinki) and Argentine clinical practice guideline, by the Independent Ethics Committee of Foundation for Pharmacological Studies and Drugs, Buenos Aires and then submitted to the national regulatory authority (ANMAT, Disposition #61409-8) and to the provincial regulatory authority, under the responsibility of the Ministry of Health of Córdoba Province (Dossier #1296). The trial is also registered at WHO (Word Health Organization)[4] trial registration data set. Results were reported to the Argentine regulatory agency ANMAT in accordance with regulations in force. All patients signed the informed consent form.

2.1. Clinical Assessment

In this trial all determinations were analyzed periodically (see Soria *et al.* 2005 for details) [21]. In the present study, we report the changes in verbal fluency

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[3](HAM-A) Hamilton Anxiety Rating Scale.
[4](WHO) World Health Organization.

tests and the correlations with clinical variables, after 12 weeks of treatment with reference to the basal status.

Anxiety assessment: All patients included in this study met criteria for general anxiety disorder codified in Axis I of DSM IV (American Psychiatric Association) [32], and psychiatric assessment was determined by experimented clinical psychiatrists. In all patients the HAM-A [29] of 14 items was determined, (>6 points indicated anxiety and ≥15 points indicated moderate to severe anxiety).

Allostatic Load assessment: For measuring AL index, 18 clinical and laboratory parameters were determined during the morning (10 ± 1 hour AM). One point was added for each abnormal parameter up or under the cut off points according to Crimmins and Seeman criteria modified (2) [1]: 1—Systolic blood pressure > 140 mmHg and/or; 2—diastolic pressure >90 mmHg; 3—BMI2 (body mass index) > 25; 4—waist-hip ratio (indexes of adipose tissue deposition) more than >1 in men and >0.8 in women; 5—total cholesterol > 200 mg/dl; 6—LDL (low density lipoprotein) > 120 mg/dl; 7—HDL (high density lipoprotein) > 37 mg/dl; 8—total cholesterol/HDL ratio > 3.5 mg/dl; 9—triglycerides > 200 mg/dl; 10—creatinine > 1.2 mg/dl; 11—albumin < 3.5 g/dl; 12—C-reactive protein (CRP) > 7.1 mg/L; 13—fibrinogen > 400 mg/dl; 14—glycated hemoglobin > 6 mg/dl; 15—salivary cortisol > 32 nM; 16—salivary methoxy-hydroxy-phenylglycol (MHPG) (noradrenaline metabolite) > 2750 nM; 17—serum dehydro-epi-androsterone (DHEA) < 80 ng/ml in men and <35 ng/ml in women; 18—serum noradrenaline levels > 100 pg/ml.

Cognitive assessment: The phonemic and semantic verbal fluency tests were determined in all patients [33]. On the semantic verbal fluency task participants had to name as many animals as possible within two minutes. Words that were not identifiable as animals were considered rule violations and the examiner recorded all correct words. On the phonemic verbal fluency task the patients were asked to name within 2 minutes, as many different words as possible beginning with the letter p. Words beginning with another letter and/or perseverations were considered rule violations. The scoring for each fluency task was determined by counting the number off correct words excluding the number of rule violations and repetitions. The tests were applied after 6 hours since the last administration of alprazolam (nadir plasma). Cognitive tests were blinded to the evaluator. In this report we analyzed the scores at two moments, before and after treatment. The total score from each semantic and phonemic verbal tasks were analyzed comparing the individual score with normal data controlled by age and sex. Patients with scores > −2 standard deviation (SD) from normative data controlled by age and sex were considered impaired [33].

2.2. Treatment Instauration

Patients admitted into the study were given alprazolam tablets (Alplax®, Gador SA, Buenos Aires; batch number 03730), in a flexible dosing regimen within 0.25

to 1 mg t.i.d. (three times a day), which enabled a dose-response analysis for the variables under investigation. Individual doses were determined according to clinical criteria by the researcher responsible for each patient, and the lowest effective dose was administered in each case. The alprazolam's dosage schedule was maintained for 12 weeks. Subsequently, the investigator decided to continue or discontinue treatment. All participants have been warned about alprazolam's depressant effects and the possible risks in activities that required alert. Alcohol consumption during the observational period was not recommended. Patients were also monitored to detect risk of suicide and/or overdose. All adverse events were monitored according to good clinical practice standards of the local regulatory authority; National Administration of Drugs, Foods and Medical Devices (ANMAT) and the Ministry of Health, Province of Córdoba.

2.3. Statistics

Descriptive statistics of quantitative variables were determined and compared. The sample size was calculated considering changes in variables higher than 25% with a $1-\beta$ power of 0 - 80 to be detected. Statistical significance was considered at $p < 0.05$ (2-sided; $1-\beta$ power ≥ 0.80). To analyze sex and age factors ($\geq$ or <50 years old) effects on total scores of cognitive parameters, a general univariate lineal model (Two-way ANOVA) was applied for each AL variable measured before and after treatment. Interactions between factors were also analyzed, and the effect size was calculated using the partial eta squared (hp^2). Effect size > 0.09 was considered strong, between 0.02 and 0.09 is moderate and ≤ 0.02 is statistically significant but weak. Student t test was determined to compare impaired versus no-impaired group. Spearman (non-parametric) and/or Pearson (parametric) tests were used to determine the correlation coefficient: $r \geq 0.80$ and $p < 0.05$ (2-sided) was considered as strong correlation, $r = 0.50 < r < 0.80$ and $p < 0.05$ (2-sided), was considered a moderate correlation and $r \geq 0.3$ and <0.5 and $p < 0.05$ (2-sided) was considered a low correlation [34].

3. Results

In this analysis, fifty-four patients completed the semantic verbal fluency test (35 women and 19 men), and 53 (35 women and 18 men) the phonemic verbal fluency test at basal. According age, at basal 26 patients had $\geq$50 years old, and 28 patients < 50 years. After treatment fifty patients completed both semantic and phonemic verbal fluency tests. Changes in the individual allostatic variables in this sample and psychiatric variables were described in detail in a previous publication [28]. The VFT scores according age a sex are resumed in **Table 1** and **Table 2**. No differences were found regarding sex and age factors in this sample analyzing the total score (Two way ANOVA) either at basal or at week 12. In a second analysis, the z-scores corrected by age and sex for each patient, were determined before and after treatment. Before treatment 7 patients of 54 (12.9%) had verbal fluency impairments (z-score > −2 comparing with normative data

Table 1. Sex differences in cognitive performance before and after treatment.

Clinical and Cognitive Assessments (Scores)	Sex	n	X	SD	Two-way ANOVA = p value	Partial eta squared (hp²)
Hamilton Anxiety Scale (HAM-A)						
Basal	Females	35	31.7	10.2	3.7 (1,50) = 0.05	0.069
	Males	19	28.2	6.4		
w12	Females	31	14.4	5.7	8.82 (1,46) = 0.005*	0.161
	Males	19	9.4	5.8		
Total Allostatic Index						
Basal	Females	35	5.4	2.3	1.08 (1,50) = 0.30	0.021
	Males	19	6.0	2.2		
w12	Females	31	4.6	2.5	2.13 (1,46) = 0.15	0.044
	Males	19	5.4	1.9		
Verbal Fluency Test (Semantic)						
Basal	Females	35	20.0	5.2	0.006 (1,50) = 0.94	0.001
	Males	19	20.0	4.8		
w12	Females	31	23.5	5.0	0.45 (1,46) = 0.23	0.03
	Males	19	25.3	6.3		
Verbal Fluency Test (Phonemic)						
Basal	Females	35	12.9	3.9	0.27 (1,49) = 0.6	0.006
	Males	18	12.1	4.8		
w12	Females	31	14.52	4.1	0.25 (1,46) = 0.6	0.021
	Males	19	13.74	3.5		

W12: Week 12, n (number of patients), X = mean, SD = standard deviation. hp² = Effect size. *p < 0.05.

matched by age and sex); 5 patients showed impairments in semantic verbal fluency, 2 patients in phonemic verbal fluency and 1 showed both semantic and phonemic impairments. After treatment none patients showed semantic verbal fluency deficits but 3 patients of 50 (6%) showed phonemic impairments (Figure 1).

In an ulterior analysis we compared the clinical variables (psychiatric, allostatic load and pharmacological variables), between impaired and no-impaired subjects before and after treatment. Impaired group was significantly associated to older age before treatment (p = 0.033) with a tendency but not significant (p = 0.09) after treatment (Student t test) (Figure 2). Pearson correlations between allostatic load individual parameters and verbal fluency tasks (z scores), showed a low correlation between phonemic verbal fluency and noradrenaline levels after treatment (r = 0.31, p = 0.03). Also a tendency to a negative correlation

Table 2. Age differences in cognitive performance before and after treatment.

| Clinical and Cognitive Assessments (Scores)	Age (Years = ys)	n	χ	SD	Two-way ANOVA F (df) = p value	Partial eta squared (hp²)
Hamilton Anxiety Scale (HAM-A)						
Basal	≥50 ys	26	31.4	8.1	0.01 (1,50) = 0.97	0.001
	<50 ys	28	30.9	8.3		
w12	≥50 ys	24	13.1	6.4	0.03 (1,46) = 0.90	0.000
	<50 ys	26	11.9	6.1		
Total Allostatic Load Index						
Basal	≥50 ys	26	6.1	1.8	3.31 (1,50) = 0.07	0.062
	<50 ys	28	5.1	2.4		
w12	≥50 ys	24	5.7	2.1	5.98 (1,46) = 0.02*	0.115
	<50 ys	26	4.1	2.3		
Verbal Fluency Test (Semantic)						
Basal	≥50 ys	26	19.7	5.9	0.01(1,50) = 0.89	0.001
	<50 ys	28	20.3	4.1		
w12	≥50 ys	24	24.4	5.8	0.27(1,46) = 0.63	0.006
	<50 ys	26	24.0	5.3		
Verbal Fluency Test (Phonemic)						
Basal	≥50 ys	26	12.1	4.1	0.76(1,49) = 0.80	0.015
	<50 ys	27	13.1	4.4		
w12	≥50 ys	24	14.5	4.3	0.69(1,46) = 0.40	0.015
	<50 ys	26	13.9	3.5		

W12: Week 12, n (number of patients), X = mean, SD = standard deviation. hp² = Effect size. *p < 0.05.

was found between DHEA plasmatic levels (r = −027, p = 0.04) and phonemic verbal fluency z-score at basal (**Figure 3**). Additionally, Pearson correlations between verbal fluency tests, showed an inverse correlation tendency between neuroticism score and phonemic verbal fluency score at basal (r = −0.258, p = 0.068).

4. Discussion

In this study we included a special sample of very symptomatic patients with GAD associated to AL (a clinical index of chronic stress) and neuroticism (a psychological condition associated to an exaggerated response to psychosocial stressors). These patients underwent long-term treatment (12 weeks) with alprazolam in low doses (1.5 to 3 mg/day). The high-potency BZD alprazolam (a triazolo-benzodiazepine), produces a positive allosteric modulation of GABA$_A$
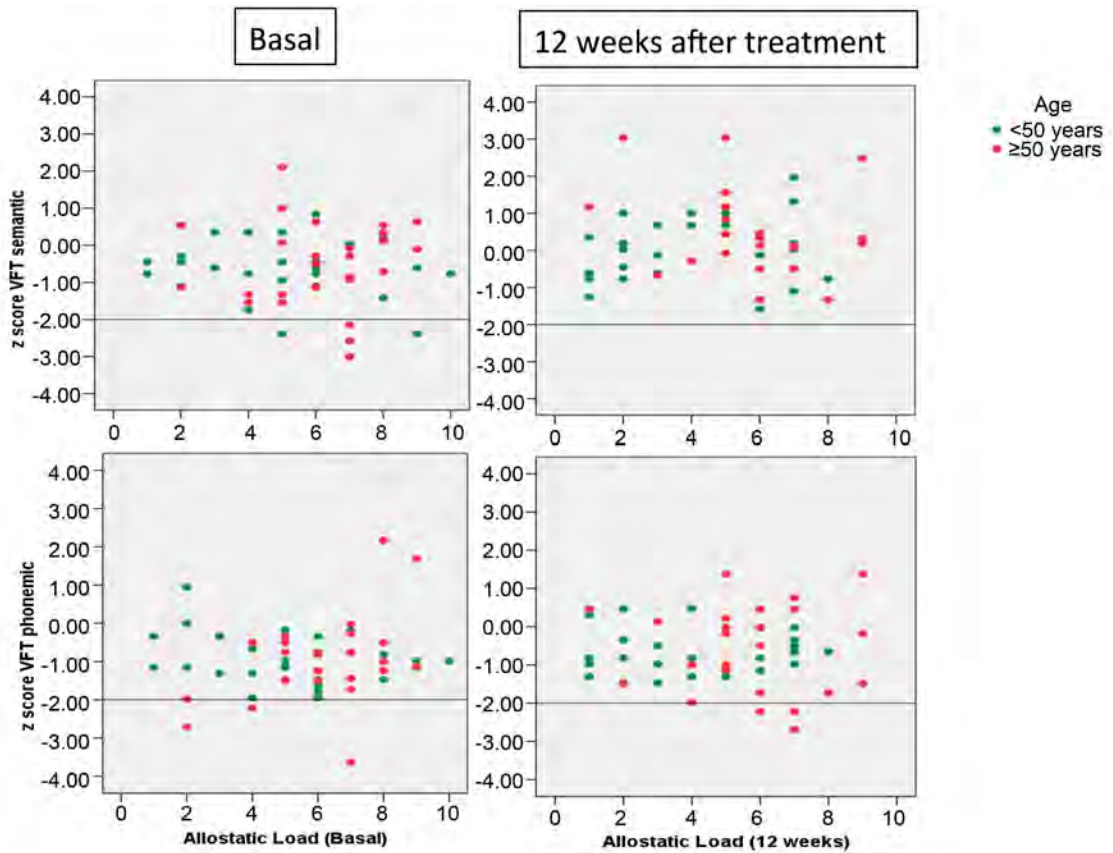
Figure 1. Verbal Fluency Test (VFT), semantic and phonemic z-scores in function of the allostatic load index in patients with general anxiety disorder treated during 12 weeks with alprazolam.
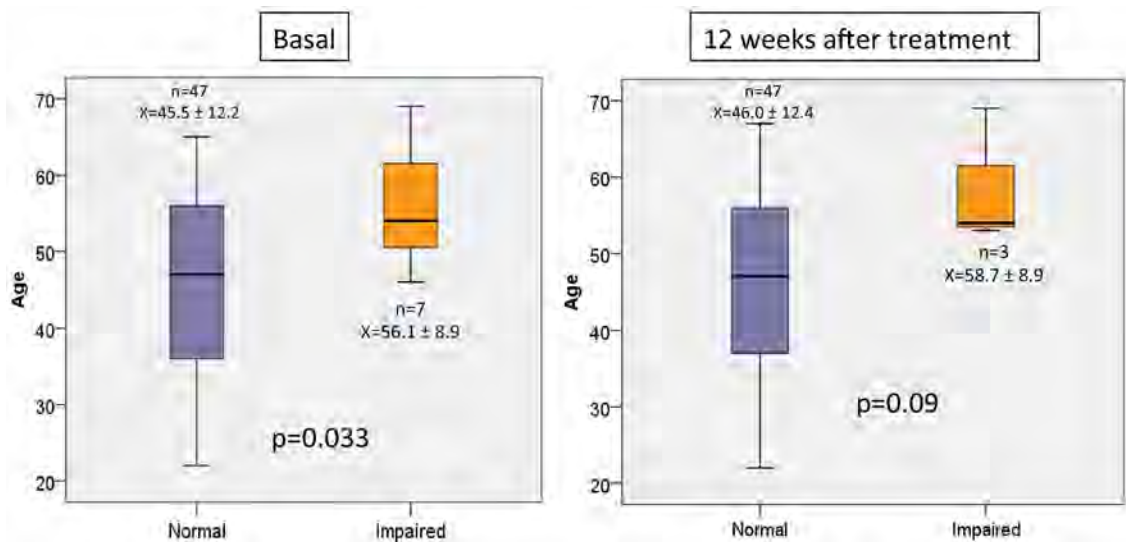
Figure 2. Age comparison of subjects with general anxiety disorder and allostatic load treated during 12 weeks with alprazolam according to the performance in the VFT (z-scores). Blue boxes represent patients with normal VFT (z-scores ≤ −2 SD), and orange boxes represent patients with impaired VFT (z-scores > −2 SD).

receptor. Alprazolam administered in relatively low doses may has a positive effect on individuals with anxiety disorders associated with chronic stress, and has
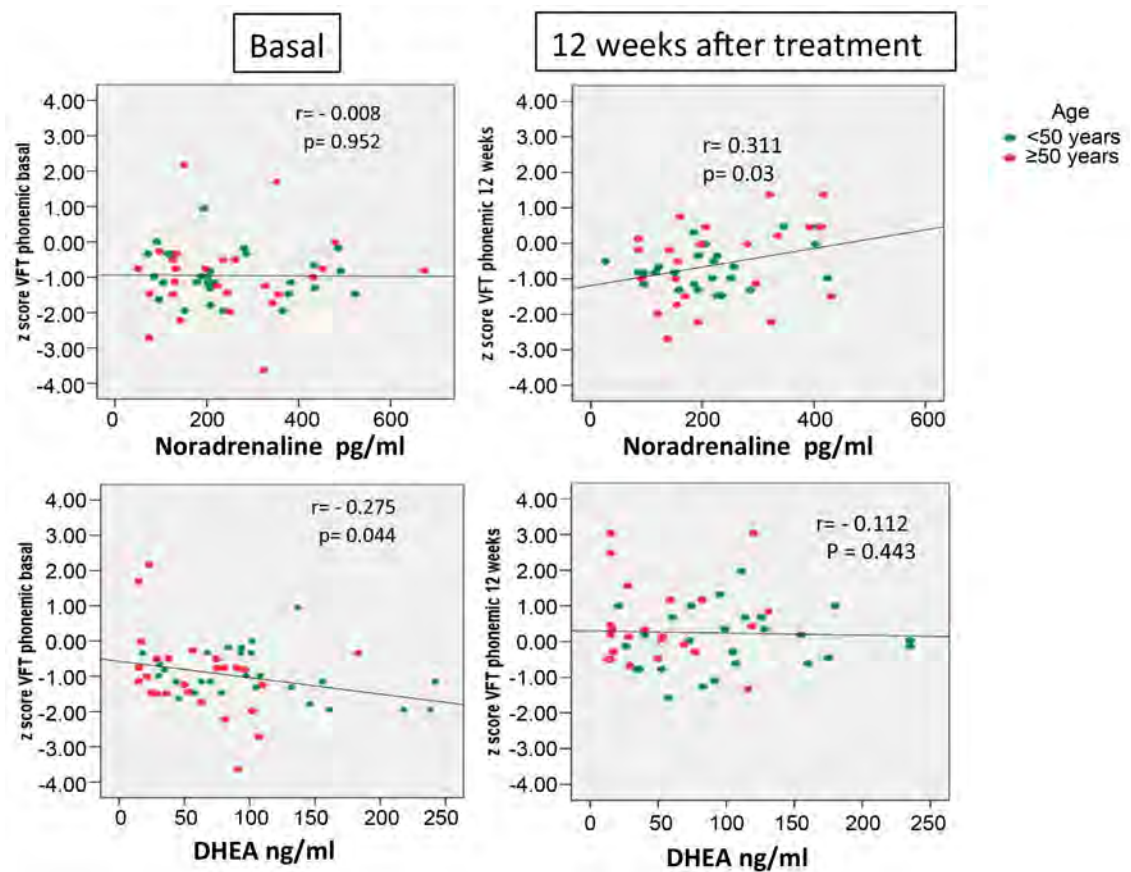
Figure 3. Pearson correlations between cognitive variables (Phonemic VFT) and allostatic load variables. Phonemic VFT inversely correlated with DHEA plasmatic levels at basal and positively correlated with noradrenaline plasmatic levels at 12 weeks.

been proposed to have less impact on cognitive functions because of the shorter acting and the lower doses required [18] [21]. Nevertheless, the risk of inducing pharmacological dependence and/or cognitive adverse events have been described, indeed it should be regarded with caution [13] [14] [15] [16] [17] [35] [36] [37]. In the present report, older age was the main factor involved in the verbal fluency alterations observed before and after alprazolam treatment. Before treatment a 13% was found impaired. After treatment, phonemic but not semantic verbal fluency was found impaired in a few cases. Older age is a known factor involved in cognition impairment, and has been proposed as a warning factor for developing cognitive decline induced by drugs, particularly benzodiazepines [18] [36] [38]-[43]. Additionally, in this study, the noradrenaline levels showed a low correlation with verbal fluency scores after treatment, suggesting that noradrenergic function may be a potential regulator of these functions with a potential dual effect (deleterious effect in high levels but also in very low levels). Similar to this results, other researchers determined lower salivary levels of MHPG in anxious patients treated with alprazolam [24] [44] [45] and in normal subjects who received the drug [46]. Similarly to these authors, we described in a previous report the reduction of MHPG (the main noradrenaline metabolite) and

noradrenaline, 12 weeks after treatment with alprazolam, contributing to reduce AL [28]. In this regard an increment of noradrenergic function was described in patients with anxiety disorders [47] [48]. Indeed, periodic dosages of allostatic load biochemical parameters may be an easy method to complete the clinical analysis during the follow up of treated patients.

Chronic stress has demonstrated to induce negative effects on cognitive functions and on emotional regulation, altering neuroendocrine and autonomic functions [8]. Chronic stress may impairs cognitive function [49] and has negative effects on cerebral neuroplasticity affecting dendritic arbor and synapses number in specific brain regions, including the hippocampus, amygdala and the prefrontal cortex. Chronic elevated levels of glucocorticoids may reduce memory processes (declarative memory) by affecting the normal hippocampal neuroplasticity and functionality [49] [50] [51]. Furthermore, stress-related events upon the prefrontal cortex may have deleterious actions in working memory (the short term memory that keep events in mind) which is also an executive function depending on frontal lobe normal functioning [52]. Not only chronic stress affects cognition, also anxiety by itself can modify executive functions. It has been proposed that anxiety as a personality trait reduces executive cognitive functions by impairing attention and task-switching capacity [53]. Gwada *et al.* recently found that low-anxious subjects showed an increased activation in the fronto-parietal networks, while highly anxious individuals showed a particular pattern of increased functioning of the cingulo-opercular and ventral attention favoring attention deficits [12]. In this study we did no found correlations between the severity of anxiety and verbal fluency but lower scores were found related to older age before treatment, in both semantic and phonemic verbal fluency. This finding suggests that anxiety may affect differently cognitive functions according age.

Limitations of this study must be mentioned: In this observational study we did not included a parallel control group, which is not allowed in a phase IV trial with highly symptomatic patients with inherent risks. Indeed, we could not compare the learning curve to determine the cognitive differences before and after treatment.

Cognitive tests were retested periodically during all the treatment period, principally to detect cognitive adverse events, nevertheless in this study we analyzed only at basal and at 12 weeks to determine the relationship within the clinical variables inside each period (basal: anxiety without treatment, and 12 weeks with alprazolam treatment).

5. Conclusions

In this study older age factor was associated with verbal fluency impairment in GAD patients.

Stratified treatments analyzing age and sex factors, including allostatic load measurements and cognitive assessments may be useful tools to determine the

effectiveness and the safety of psychopharmacological treatments.

Acknowledgements

Conflicts of Interest

CAS and LD received a partial grant from Gador SA, Darwin 429, Buenos Aires City, Argentina. EJAR in an investigator employed by Gador SA. CR does not declare any conflict of interest.

Patient Consent

Obtained. All patients signed the informed consent for participating in this study.

Ethics Approval

An Independent Ethics Committee of FEFyM (Fundación de Estudios Farmacológicos y Medicamentos/Foundation for Pharmacological Studies and Drugs, Buenos Aires), and regulatory authorities of Argentina (ANMAT, Dossier # 61409-8 of 20 April 2009), approved the protocol, following the law of Habeas Data and psychotherapeutic drug control.

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Predictors of Co-Occurring Substance Use among Asian Americans in Residential Treatment Programs

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Abstract

Although severe and chronic mental disorders are common among Asian Americans in residential treatment programs, little has been known about the prevalence and predictors of co-occurring substance use in this population. The purpose of this study was to examine predictors of co-occurring substance use among Asian Americans with mental disorders in residential treatment programs. This cross-sectional study included 375 clinical records of Asian Americans from residential treatment programs between 2007 and 2011. Demographic variables, principal psychiatric diagnoses, and data on alcohol, stimulant, and marijuana use were obtained from the clinical records. Separate binary logistic regression analyses were used to examine the demographic and diagnostic contributions to the risk of each type of substance use. Findings of this study indicated that the prevalence of co-occurring substance use was about 53% in Asian Americans with mental disorders. Binary logistic regression analyses revealed that male gender, older age, and depressive disorder predicted more alcohol use, but homelessness and schizophrenia predicted less alcohol use. Male gender, homelessness, and smoking predicted more stimulant use. Male gender and younger age predicted more marijuana use. Based on the findings of this study, awareness about co-occurring substance use problems of ethnic minority psychiatric clients should be increased and appropriate substance use prevention and treatment programs should be developed and provided for high-risk groups.

Keywords

Asian Americans, Mental Disorders, Substance Use

1. Introduction

The US Asian American population grew by 43% between 2000 and 2010, compared to a 9.7% growth in the general population, making Asian Americans the fastest growing racial group [1]. Asian Americans are projected to constitute 6.5% of the US population by 2025, and 9.3% by 2050 [2]. The Asian American population is a heterogeneous group that includes at least 43 ethnic subgroups with different languages and dialects, immigration histories, religious beliefs, socioeconomic statuses, and traditional patterns for seeking health care. These social and cultural differences among Asian Americans may affect their psychiatric clinical manifestations, severity of mental health problems, access to health care, and treatment compliance and outcomes [2].

Overall, the reported prevalence of mental illness is lower in the Asian American adult population compared to other ethnic groups [3]. Despite the lower risk of mental illness among Asian Americans, it is still important to investigate because recent studies have shown that Asian American patients were admitted to the San Francisco Psychiatric Emergency Services twice as frequently as European and Latino/a Americans. They showed significantly higher functional impairment based on their Global Assessment Functioning (GAF) scores [4]. In addition, a prevalence study showed that schizophrenia and psychotic disorders, which are severe and chronic types of psychiatric disorders, are more common among Asian American veterans than among African American and Latino/a veterans [5].

Substance use studies have shown that Asian Americans are less likely to use substances and have a lower severity of drug use than European Americans [6] [7]. Of Asian Americans, Filipino/a Americans were reported to have the highest prevalence of substance use and cigarette smoking [8] [9]. Japanese Americans were found to have the highest number of alcohol related problems and binge-drinking episodes, followed by Filipino and Multi-Asian Americans including Korean and Chinese [10]. Substance use within the Asian American population has largely been ignored, mainly due to the popularity of the model minority theory which paints Asian Americans as the exemplary racial/ethnic group, thus minimizing the perceived severity of the problems [7]. Often, it is considered shameful within Asian cultures to have a family member with a mental illness or substance use problem, resulting in familial pressures to avoid seeking proper treatment [11] [12]. Substance dependent Asian Americans have already been shown to underutilize available programs and treatment when compared to European Americans [12] [13]. Park, Shibusawa, Yoon, & Son [14] found that the majority of Chinese Americans and Korean Americans referred to such treatment by the legal system denied having alcohol problems. Only five percent of the sample admitted to having alcohol problems. Very few of them had ever heard about the Alcoholics Anonymous program and none of them had ever attended the program. Similar results were found in another study that showed that Asian Americans utilized legal services more frequently than medi-

cal and psychiatric services related to their alcohol and drug use problems [7].

Co-occurring substance use in persons with mental disorders is a common issue. About 18.5% of the adults with mental disorders met the criteria for substance use disorders, whereas only 5% of the adults without mental disorders met the criteria for substance use disorders [3]. According to a recent epidemiology study, the prevalence of lifetime co-occurring substance use and mental disorder was about 7% [15]. Specific psychiatric diagnoses related to substance use have been explored. Depressive disorder was significantly related to higher rates of alcohol, stimulant, and opiate use, whereas schizophrenia and schizoaffective disorder were significantly related to lower rates of alcohol, opiate, and polysubstance use [16] [17]. In another national 10-year longitudinal survey, persons with major depression, anxiety disorder, and disruptive behavior disorder were at a significantly greater risk to start using illicit drugs during the follow-up period [18]. Although there were subgroup psychiatric diagnostic differences regarding the prevalence of substance use, persons with mental disorders generally showed a higher prevalence of substance use.

However, little has been done to study the coexistence of mental illness and substance use in the rapidly growing Asian American population. A study found a positive association between having a psychological disorder and substance use disorder in Latino/a and Asian American adults from the National Latino/a and Asian American Study data, 2001-2003 [19]. A positive association between depressive symptoms and alcohol and illicit drug use has been reported in a study with a small sample size of college students [20]. Higher rates of suicidal ideation/attempts and lifetime generalized anxiety disorders among female heavy drinkers have also been identified in a study with a small sample size [21].

Until now, demographic risk factors related to substance use have been identified in Asian American studies. In most studies, males were more likely to have substance use [22] and alcohol-related problems [10]. Males were found to have a 12-month prevalence of substance use disorders eight times higher than females, but binge drinking was found to be comparable between males and females [21]. Youth between 18 - 25 years old were at five times the risk of alcohol use compared to middle and older age adults [9]. In particular, Southeast Asian American adults between 25 - 44 years old reported alcohol use comparable to the national percentage, although a lower risk of substance use of Asian Americans has been previously reported [22]. Mental illness is tied to socioeconomic status. YM Lee and K Holm [23] reported that among elderly Korean immigrants, a negative correlation existed between their income and depression scale score, which is consistent with findings from another study [19]. Smoking is a predictor of binge drinking among Asian Americans [24]. DE Toleran, PD Tran, B Cabangun, J Lam, RS Battle and P Gardiner [9] also found that among adult males in the San Jose, Daly City, and San Francisco criminal justice systems, a positive correlation existed between tobacco (not including cigarettes) and substance use.

A limited amount of studies has investigated the prevalence and predictors of co-occurring alcohol, stimulant, and marijuana use among residential treatment program users, specifically Asian Americans. Therefore, the purpose of this study was to examine predictors of co-occurring alcohol, stimulant, and marijuana use among Asian Americans who receive residential treatment services.

2. Methods

2.1. Study Design

This study used a retrospective cross-sectional design using data obtained from clinical records from residential mental health treatment programs in California. The data source was from the Primary Health Care for the Mentally Ill Adults (Principal Investigator: Dr. Chafetz). This study was approved by the Committee on Human Research, University of California-San Francisco (UCSF).

2.2. Sample and Setting

This study included 375 Asian American patients in the San Francisco Bay Area. Patients were selected if he or she met the following criteria: 1) self-identified as an Asian American; 2) at least 18 years old; 3) had at least one psychiatric disorder; and 4) used residential treatment services provided by the San Francisco Progress Foundation between 2007 and 2011. Exclusion criteria were: 1) not self-identified as an Asian American; 2) under 18 years old; 3) had no psychiatric disorder; and 4) never used residential treatment services provided by the San Francisco Progress Foundation between 2007 and 2011.

The settings were 11 residential treatment programs for patients with psychiatric disorders operated by the San Francisco Progress Foundation in the San Francisco Bay area, California. These programs offer acute residential services that provide alternatives to hospitalization as well as a continuum of transitional residential programs including special programs for long-term patients and the elderly. Clinical faculty at the UCSF School of Nursing provide integrated primary care in these settings as a faculty outreach practice.

2.3. Data Collection

Data were extracted from clinical records completed by Nurse Practitioners (NPs) during the study period. Variables included age (younger (18 - 35 years old), middle (35 - 50 years old), and older (>50 years old)); gender (male vs. female); living condition (homeless on the streets or in shelters vs. other housing); insurance type (insured vs. uninsured); and smoking status (current smoker vs. non-smoker). Principal psychiatric diagnoses which represent the main reason for admission were used for this study. Classifications included schizophrenia, schizoaffective disorder (SAD), bipolar disorder, depressive disorder, anxiety disorder, psychosis not other specified (PNOS), and other minor psychiatric disorders (personality disorders, etc.). Substance use which is a dependent variable in this study, was noted as yes/no for alcohol, stimulant, and marijuana use

(currently using or used within 30 days prior to entering the residential treatment program).

2.4. Data Analyses

Descriptive statistics were used to examine sample characteristics, including frequencies and percentages for all categorical variables. As preliminary analyses, Chi-square tests were computed between patients' alcohol, stimulant, and marijuana use and all demographic and independent variables. Variables showing a significant relationship to alcohol, stimulant, and marijuana use were included in the final binary logistic regression analyses. Significance level was set at an alpha level of 0.05 in all analyses. The SPSS 21 version program was used to analyze data in this study.

3. Results

The sample included 375 Asian Americans (Table 1). About 46.7% were males and 53.3% were females. About 36.5% fell into the younger age group (18 - 35 years old), 40.3% into the middle age group (35 - 50 years old), and 23.2% in the older age group (>50 years old). Approximately 37% of the sample was homeless and 80% of the sample had insurance. About 57% of the sample was current smokers. In terms of psychiatric diagnoses, about 62.7% of the sample was diagnosed with schizophrenia or schizoaffective disorder, followed by depressive disorder (14.9%) and bipolar disorder (11.2%). Very few were diagnosed with anxiety disorder (3.7%), PNOS (3.2%), and other minor psychiatric diagnoses (4.3%). About 52.8% of the sample was co-occurring substance users. About 36.3% of the sample was alcohol users, 33.1% was stimulant users, and 25.6% was marijuana users.

Table 2 shows the findings for predictors of each alcohol, stimulant, and marijuana use. Firstly, six predictors explained 31% to 43% of the total variance in alcohol use ($\chi^2(df) = 121(7)$, $p < 0.001$). Males had a significantly increased risk of alcohol use 5.4 times (95% CI: 2.83, 10.40) higher than females. Depressive disorder also significantly increased the risk of alcohol use 5.3 times (95% CI: 2.37, 12.01) more than other psychiatric diagnoses. On the contrary, younger age ($OR = 0.33$, 95% CI: 0.15, 0.72) and middle age ($OR = 0.45$, 95% CI: 0.21, 0.94) significantly decreased the risk of alcohol use compared to the older age group. Homelessness ($OR = 0.38$, 95% CI: 0.20, 0.71) and schizophrenia ($OR = 0.22$, 95% CI: 0.11, 0.44) also significantly decreased the risk of alcohol use. For stimulant use, 24% to 34% of the total variance was explained by six predictors ($\chi^2(df) = 88(7)$, $p < 0.001$). Males have a significantly increased risk of stimulant use 6.5 times (95% CI: 3.49, 12.07) higher than females. Homelessness ($OR = 4.5$, 95% CI: 2.33, 8.81) and smoking ($OR = 2.8$, 95% CI: 1.33, 5.74) also significantly increased the risk of alcohol use. For marijuana use, 26% to 38% of the total variance was explained by four predictors ($\chi^2(df) = 113(5)$, $p < 0.001$). Males had a significantly increased risk of marijuana use 8.4 times (95% CI: 4.48, 15.9) higher

Table 1. Sample characteristics of Asian Americans in residential treatment programs (*N* = 375).

Variable	*n* (%)
Gender	
Male	175 (46.7)
Female	200 (53.3)
Age	
18 - 35	137 (36.5)
35 - 50	151 (40.3)
>50	87 (23.2)
Living condition	
Honelessness	139 (37.1)
Others	236 (62.9)
Insurance	
Insured	256 (79.8)
Uninsured	65 (20.2)
Smoking	
Smoker	197 (56.6)
Non-smoker	151 (43.4)
Psychiatric disgnosis	
Schizophrenia	121 (32.3)
Schizoaffective disorder (SAD)	114 (30.4)
Depressive disorder	56 (14.9)
Bipolar disorder	42 (11.2)
Anxiety disorder	14 (3.7)
Psychosis, not other specified (PNOS)	12 (3.2)
Others	16 (4.3)
Substance use	
No substance use	177 (47.2)
Any substance use	198 (52.8)
Alcohol	136 (36.3)
Stimulants	124 (33.1)
Marijuana	96 (25.6)

than females. Younger age, compared to older age, also significantly increased the risk of marijuana use by 3.6 times (95% CI: 1.72, 7.48).

4. Discussion

This study examined predictors of alcohol, stimulant, and marijuana use by Asian Americans with psychiatric disorders in residential treatment programs. The prevalence of co-occurring substance use was about 53% in Asian Americans with mental disorders. Binary logistic regression analyses revealed that male gender, older age, and depressive disorder predicted more alcohol use, but homelessness and schizophrenia predicted less alcohol use. Male gender, homelessness, and smoking predicted more stimulant use. Male gender and younger age predicted more marijuana use.

Table 2. Binary logistic regression analyses for variables predicting alcohol, stimulants, and marijuana use ($N = 375$).

Variable	Table Column Head					
	B	*S.E.*	*Wald* ($df = 1$)	*OR*	*LL*	*UL*
Alcohol use						
Younger age[a]	−1.12	0.40	7.78**	0.33	0.15	0.72
Middle age[a]	−0.80	0.38	4.46*	0.45	0.21	0.94
Male	1.69	0.33	25.91***	5.42	2.83	10.40
Homelessness	−0.97	0.32	9.19**	0.38	0.20	0.71
Smoker	0.41	0.33	1.61	1.51	0.80	2.87
Schizophrenia	−1.53	0.37	17.59***	0.22	0.11	0.44
Depressive disorder	1.67	0.42	16.30***	5.33	2.37	12.01
$R^2 = 0.31 - 0.43$						
$\chi^2(df) = 121.04\ (7)$***						
Stimulant use						
Younger age[a]	0.78	0.40	3.77	2.17	0.99	4.75
Middle age[a]	0.16	0.39	0.18	1.18	0.55	2.51
Male	1.87	0.32	34.85***	6.49	3.49	12.07
Homelessness	1.51	0.34	19.78***	4.53	2.33	8.81
Smoker	1.02	0.37	7.39**	2.76	1.33	5.74
Schizophrenia	0.51	0.35	2.14	1.66	0.84	3.28
SAD	0.39	0.40	0.93	1.47	0.67	3.26
$R^2 = 0.24 - 0.34$						
$\chi^2(df) = 88.54\ (7)$***						
Marijuana use						
Younger age[a]	1.28	0.38	11.58**	3.59	1.72	7.48
Middle age[a]	0.41	0.40	1.14	1.52	0.70	3.31
Male	2.13	0.32	43.63***	8.44	4.48	15.90
Bipolar disorder	−20.27	5648.89	0.00	0.00	0.00	0.00
Other psychiatric dx.	0.56	0.56	1.01	1.75	0.59	5.20
$R^2 = 0.26 - 0.38$						
$\chi^2(df) = 113\ (5)$***						

a. *Note.* [a]dummy variable, older age group was a reference group; *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

Most findings from this study were consistent with those from other studies [10] [20] [24] except for the association between age and alcohol use. In this study, older age (>50 years old) indicated an increased risk of alcohol use, which is inconsistent with findings from another study that showed higher alcohol use with younger age [9]. Due to characteristics of the study's settings, the residential treatment programs being located in the San Francisco Bay area with a higher number of homeless people, about 40% of this study's sample was homeless. Findings from this study revealed that homelessness significantly increased the risk of stimulant use, which is consistent with findings from another study and well supported since people with unstable housing conditions are highly vulnerable to substance use further leading to aggravated mental symptoms [25].

In this sample of Asian Americans, schizophrenia and schizoaffective disorder were major psychiatric diagnoses, whereas depressive disorder and bipolar disorder were much less common compared to other race/ethnic groups from other studies [26] [27] [28]. This may be related to underrepresented reports for and a

lower mental health service utilization for their mood disorders among Asian Americans. In accordance with findings from other studies, this study also found a lower prevalence of substance use among Asian Americans [6] [15] [29]. It is also possible that the higher proportion of patients with schizophrenia and schizoaffective disorder in this study is associated with lower rates of substance use due to a limited access to substances [16] [17]. Although schizophrenia was found to be a protective factor of substance use in this study as well as in other studies [18], having psychiatric disorders such as depression and anxiety is generally considered to increase vulnerability to substance use. Specifically, anxiety patients may seek drugs such as marijuana to relieve their anxious or depressive symptoms as a coping mechanism [30]. These self-medicating behaviors may be more common among untreated patients with underlying psychiatric disorders, and in turn, co-occurring substance use can aggravate the severity of their psychiatric symptoms [31]. In this study, however, the relationship between anxiety and more alcohol, stimulant, and marijuana use was unable to support this explanation due to the very low rate of anxiety disorder among Asian Americans.

It is obvious that co-occurring substance use leads to difficult psychiatric treatment, higher treatment costs, and longer hospital stays [32] [33] [34]. Studies have shown that substance users receiving care for their substance use showed decreased depressive symptoms [35] and integrated treatment programs improved patients' psychiatric symptoms [36]. Although co-occurring substance users are considered a highly vulnerable population, treatment services such as psychiatric outpatient visits and substance abuse treatment programs are still inadequately used [37] [38] [39]. Especially for Asian Americans, there may be other potential issues regarding the underutilization of mental health services such as lower English proficiencies, stigma around having or being diagnosed with psychiatric disorders, cultural beliefs about receiving psychiatric care, limited access to health care services, and discrimination within health care systems [40] [41]. Therefore, these barriers should be addressed in health care systems and efforts should be made to increase access to psychiatric mental health services for Asian Americans at individual, community, and policy levels.

Study Limitations

This study used a cross-sectional design to examine predictors of co-occurring alcohol, stimulant, and marijuana use of Asian Americans with psychiatric disorders receiving residential treatment services; therefore, a causal relationship cannot be assumed. The sample of this study came from residential treatment programs only in the San Francisco Bay area where Asian Americans and the homeless are overrepresented, resulting in a limited representation of the US population. In addition, this study did not examine Asian subgroup differences in the prevalence of and risk factors of substance use; therefore, it may overlook important factors such as levels of acculturation, length of residence in the US, and immigration generation [8] [42]. Variables reflecting socioeconomic status such as income level and current or past job which are possible risk factors of

psychiatric disorders and substance use [23] were not included in this study because most participants were homeless due to their lower level of functioning related to their psychiatric disorder prognosis. This study's sample was mostly diagnosed with severe psychiatric disorders such as schizophrenia and schizoaffective disorder, which may have led to biased findings. Lastly, findings from this study indicated that there may be patterns of polysubstance use among Asian Americans with psychiatric disorders; however, this study did not look at the prevalence of and risk factors of polysubstance use, indicating the need for future research study.

5. Conclusion

This study found that the prevalence of co-occurring substance use was significantly high among Asian Americans with mental disorders in residential treatment programs. Therefore, strategies to manage co-occurring substance use should include increasing awareness about co-occurring substance use problems of ethnic minority psychiatric clients, early identification of risk groups, and the development and implementation of appropriate prevention and treatment programs for high-risk groups at the local, state, and federal level.

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Conflicts of Interest

The authors declare that they have no competing interests.

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Authors' Contributions

MK developed the study design, performed data collection & analysis, and drafted the manuscript. JL and MN performed literature review and data collection. LC supervised overall study and reviewed the manuscript. All authors read and approved the final manuscript.

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Awareness and Perception of Drug Trials among Patients with Mental Disorders

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Abstract

Mental disorders are generally characterized by abnormal thoughts, perceptions and emotions. These abnormalities may make an informed consent more difficult to obtain from psychiatric patients. The implementation of drug trials is being threatened by the decline in its overall frequency generally, especially in Psychiatry. This foretells a dearth of major breakthroughs in pharmacotherapy for psychiatric patients if they are unwilling to present themselves for drug trials. Insight into patient's awareness and perception of drug trials will enhance the planning, design and implementation of drug trials among this vulnerable subpopulation. This was a cross-sectional study of one hundred patients attending the follow-up clinic of a tertiary psychiatric hospital. A proforma questionnaire to assess awareness and perception of drug trials was administered to participants. About half (51%) were aware of drug trials and 50% of the participants were not willing to participate in a drug trial. Sixty-five percent considered it highly risky to participate. Females were more likely to be unsure whether informed consent will be needed for drug trials. The married were more likely to be unaware of drug trials in clinical research. The unmarried were more likely to be informed about drug trials through the media. Findings are likely to have been influenced by the socio-cultural environment of this study setting. Drug trials among this population require an approach that will create an initial drug trial disorder—sensitive awareness and a design that will ensure that the consent process will take into cognizance the vulnerability of these patients; especially among females.

1. Introduction

According to the World Health Organization (WHO), mental disorders are

generally characterized by a combination of abnormal thoughts, perceptions, emotions, behaviours and relationship with others [1]. All these abnormalities may sometimes make working with someone with mental illness a difficult and an uneasy task. Furthermore, activities that will require an informed consent on the part of the mentally ill are even more difficult to engage in. Since clinical researches are studies in which people participate as either volunteers or as patient [2], finding people that are mentally ill to participate have always been difficult.

Clinical drug trials generate essential evidence for clinicians to make informed decisions for the care of their patient and discovery of novel drugs. As important as the process of drug trials may seem, its implementation is being threatened by the decline in the overall frequency of drug trials in general and in psychiatry in particular. Nierenberg noted that other fields of medicine are in the best of time as there had been a remarkable improvement in basic sciences like neuroimaging and genetics but psychiatry is in the worst of time due to the dearth of drug trials that assesses new drug interventions [3]. This foretells an unpalatable story for Psychiatry because there will be no major new breakthrough in patients' care if those that will need the care are unwilling to present themselves for clinical drug trials.

Little is known about the awareness and perception of drug trials among psychiatric patients. Successful implementation of drug trial among psychiatric patients will require an in-depth knowledge of the scope of awareness and perception of these patients. This is likely to be influenced by the socio-cultural environment of the study setting.

2. Definition of the Research Problem

Drug trial is one of the most potent method for evidence based medicine [4]. If science (medicine inclusive) is predicated on time tested evidences, then a decline in such evidence generating endeavours like drug trials can spell doom for the specific body of knowledge. It would not be an easy task to know the rate of drug trials in a sub-Saharan African country like Nigeria, but the best guess will be that a poor economy will affect the rate at which researches and by implication, drug trials are being done [5]. There are many factors that militate against people getting involved in drug trials in psychiatry among which are people awareness and perception of drug trials. Most patients suffering from mental illness are not receiving any form of treatment, albeit subjecting themselves for research endeavours that will improve their treatment and others' will help advance treatment modalities [6]. Knowing the level of awareness of the patients suffering from mental illness to drug trials and their attitude towards it will go a long way in helping the clinicians and researchers in making informed decisions about the best form of design and protocol to develop in a drug trial.

3. Literature Review

3.1. Definition

According to the world health organization (WHO), a clinical trial is any re-

search study that prospectively assigns human participants or groups of humans to one or more health-related interventions to evaluate the effects on health outcomes [7]. While Clinical trial entails all types of medical interventions, drug trial is a subgroup of clinical trial that subsumes the use of drugs/medications as the form of intervention in the experimental study called clinical trial. It has been reported that less than 10% of Americans participates in research studies and less than 10% reported knowing "a lot" about drug trials [8]. Another study among Americans also revealed that 32% were willing to participate in cancer clinical trials [9]. In developing countries where lower number of such research activities are carried out, the level of awareness is expected to be much lower.

3.2. Goals

The two major goals of drug trials are to learn about the efficacy and effectiveness of a drug and to learn about how safe a drug is. These goals are further typified by what the researchers want to achieve with the trials. This may thus be in form of Prevention, treatment, diagnostic trials, screening and to assess patients Quality of life [10].

3.3. Phases

Most researchers go with the notion that there are four phases to a drug trial (Phase 1 - 4), but a few others believe there are five stages to it (Phase 0 - 4) [11] [12] [13].

Phase 0: These are usually optional. It is the first-in-human trials of drug. It is equivalent to the usual test dose given to patients on potentially dangerous drugs. Here, a sub-therapeutic dose of the drug to be tested is given to a small group of individuals (10 - 15 subjects) and a preliminary data on the drug pharmacodynamics and pharmacokinetics are collected.

Phase 1: This is often the first in-human trials. It is a testing that takes between 20 - 80 subjects. It is to evaluate safety of the drug and determine the safe dosage range. It is also the stage at which side effects of the trial drug is being identified.

Phase 2: This stage deals with larger number of subjects (100 - 300). It also determines efficacy of drugs and evaluate some less common side effects. Since rarer adverse effects come to the fore with larger number of people, this stage helps in identifying uncommon side effects of the drugs being tested.

Phase 3: This entails testing with an even larger number of subjects (1000 - 3000). This is to confirm efficacy, evaluate effectiveness, monitor side effects and then compare these to some commonly used treatment. This is to ensure that information that will allow it to be used safely is collected.

Phase 4: This is the post marketing phase where continuous monitoring of the marketed drug is done. Information about the drug is collected throughout the lifetime of the drug use.

3.4. Who Can Participate in Drug Trials?

Generally speaking, anyone can participate in drug trials once an informed con-

sent can be gotten. However, some special groups have more stringent criteria than others. In the US, people that are above 55 years are often excluded from drug trials because of their greater health issues and their different physiology in drug metabolism when compared to young people. Also pregnant women (fear of teratogens), children and people with unrelated medical conditions are often excluded [14].

3.5. The Process of Drug Trial

Investigators usually recruit subjects that have a predetermined characteristic into the drug trial over a period of time. There is usually a study protocol that stipulates all the aims, objectives and other terms of reference of the study as the guide to each investigator. Consenting subjects will be administered the drug or placebo (as the case may be) and data about the subjects' health will be collected for statistical analysis [15] [16].

3.6. Safety Issues Why Protocol Eligible Subjects Refuse Participation

The responsibility of safety of subjects is shared among the sponsors of the drug trials, the local investigator who implements the study, the ethical committee of the institution on whose subjects the drug is to be tested, and the regulatory agency of the country where the study is being done.

Some studies have been done on why protocol eligible study subjects refuse to participate in drug trials and they came with different arrays of reasons. According to Julie et al in their 2011 study, among the commonest reason for refusal in drug trials are the research protocol issues like long duration of study, use of invasive procedures like setting IV line, collecting blood, taking other body tissues sample etc. Subjects are also often weary of the side effect of drugs and the risk of symptoms getting worse during the drug washout period [13]. Some study schedules are also inconvenient to a large number of subjects like studies held during work hours, studies in which patients will have to travel a long distance and lack of flexibility in the participants' schedule. Some other reason given by subjects include concerns about confidentiality, some are interested only in trials that involve alternative medicine, some for religious reasons, while some also have a particular type of research they want to participate in, others can participate solely for pay [13] [17]. A 1991 study by Llewellyn-Thomas et al reported that out of the 60 people interviewed, only 25 of them said they can agree to a drug trial while the remaining 35 were on a negative affirmative. Two-third of those that refused were averse to the use of randomization [18].

Subjects' aversion to drug trials in psychiatry seems to be similar to what obtains in the general medical practice but with some peculiarities that are associated with patients that are mentally ill. March et al for instance noted that drug trials on mentally ill patients often fail to maximize clinical utility for practicing

clinicians and thus has low clinical impact [19]. They suggested the use of straight forward clinical questions, use of a representative sample of subjects, randomization, and limited burdens on the subjects among other things as the solution to this. Tansella *et al.* noted that there were no published criteria for improving the quality and effectiveness of randomized control trials in psychiatry and suggested that the study subject sampled should be as closely related to the target population as possible. They also suggested the use of a culturally acceptable intervention and elimination of bias through the use of controls as the solution to bad study quality being experienced in psychiatry [20].

3.7. Benefits

Drug trials participation is beneficial to the participants and the society at large. It is the basis for generating essential evidence for clinicians to make informed decisions for the care of their patients [3]. I addition, it avails the participants access to treatment with experimental or study drugs that may not be available elsewhere. It gives participants access to care by teams that are familiar with the most advanced treatment available and to treatment that have been reviewed by many people including specialists and researchers. It gives participants the opportunity to learn about their illness and how to take care of it. There is often the availability of free drugs to the participants by virtue of their participation. Lastly, the satisfaction of helping others by contributing to knowledge or helping to find a possibly new treatment cannot be overemphasized [3] [10].

4. Methodology

Setting: The Federal Neuropsychiatric Hospital Kware, Sokoto is a tertiary health care facility located in Kware local government area of Sokoto State, Nigeria.

4.1. Study Design

It was a cross-sectional study involving patients managed for psychiatric disorder and attending the follow-up clinic at the hospital from August 2017 to November 2018.

4.2. Ethical Consideration

Ethical committee of Federal Neuropsychiatric Hospital Kware, Sokoto was sought to ensure that the work meets ethical standards and approval was granted by this committee.

4.3. Questionnaire

A proforma was developed containing items on sociodemogrphic factors. Questions to assess awareness and perception of drug trials was also included. This was designed to elicit the following:

1) Socio-demographic data e.g. gender, marital status, age, sex, educational

level, occupation and residence.

2) Awareness and perception of the processes involved in a drug trial. See **Appendix A**.

4.4. Procedure

Participants were recruited consecutively through personal contact as they came for follow-up care at the clinic. Potential participants (Those that satisfy the inclusion and exclusion criteria) were informed of the nature of the study, the anticipated amount of time required for participation. Patients were informed that their participation is voluntary and that there are no penalties for non-participation. Informed consent was obtained from all participants before the administration of the instruments.

4.5. Patient Selection

A sample size of one hundred patients that satisfied the International Classification of Diseases Version 10 (ICD-10) for research were recruited for this study. This sample size was based on the findings of recent studies were most drug trials are carried out. It was reported among American adults that less than 10% knew "a lot" about drug trials [8]. In developing countries this is expected to be much lower.

The ICD-10 manual contains the diagnostic criteria for various mental disorders for research purposes. Participants, documented symptoms and signs in the medical files must satisfy these criteria to be recruited for the study. Patients with active psychotic symptoms and co-morbid medical conditions were excluded from the study.

4.6. Statistical Analysis

Data collected was analyzed using the Statistical Package for Social Sciences (SPSS) version 20. Numerical data like age of participants was stratified and the percentage of the number of participants in each stratum calculated. For categorical variables, descriptive statistics included frequency distributions and cross tabulations in each category. The proportions were compared using chi-square (χ^2) test. The data was represented in tables to differentiate the demographic and response (to questions on awareness and perception) variables compared. All tests of significance were set at $p < 0.05$. Variables that have common associations and are statistically significant were further subjected to logistic regression analysis to determine the predictors of the awareness and perception of the drug trials questions.

4.7. Results

A total of 100 patients satisfied the ICD-10 Diagnostic criteria for research for various mental disorders. 56% were males while 44% were females. Most of them were married (67%) and unemployed (67%). They were mainly of the Hausa

tribe with predominantly Muslims. Most of the participants are uneducated (71%) and majority were of the age range 25 - 34 years. Full description of socio-demographic factors are in Table 1.

When participants were asked if they were aware of drug trials, about half (51%) reported being aware and 49% were not aware. See Figure 1.

Also, 50% of the participants were not willing to participate in a drug trial. 65% percent considered it highly risky to participate. Females were more likely to be unsure whether informed consent will be needed for drug trials ($\chi^2 = 7.65$, p = 0.02). The married were more likely to be unaware of drug trials in clinical research ($\chi^2 = 9.30$, p = 0.002). The unmarried were more likely to be informed about drug trials through the media. Full details are as shown in Table 2.

Logistic regression analysis of the common associations of socio-demographic factors with some of the variables showed that being a male was a predictor of the need for school authorities consent to be sought when doing research among school children (B = 1.40, p = 0.01). Also, being unmarried was a predictor of getting information about drug trials from the television (B = 1.28, p = 0.02). Full details are shown in Table 3.

Table 1. Sociodemographic factors.

s/n	Variable	n/%
	Gender	
1.	Male	56 (56%)
	Female	44 (44%)
	Marital Status	
2.	Married	67 (67%)
	Unmarried	33 (33%)
	Religion	
3.	Christianity	1 (1%)
	Islam	99 (99%)
	Tribe	
	Fulani	4 (4%)
4.	Hausa	93 (93%)
	Igbo	1 (1%)
	Yoruba	2 (2%)
	Employment	
5.	Employed	33 (33%)
	Unemployed	67 (67%)
	Age (years)	
	15 - 24	20 (20%)
	25 - 34	42 (42%)
6.	35 - 44	19 (19%)
	45 - 54	11 (11%)
	55 - 64	3 (3%)
	65 - 74	5 (5%)
	Education (Formal)	
7.	Educated	29 (29%)
	Uneducated	71 (71%)
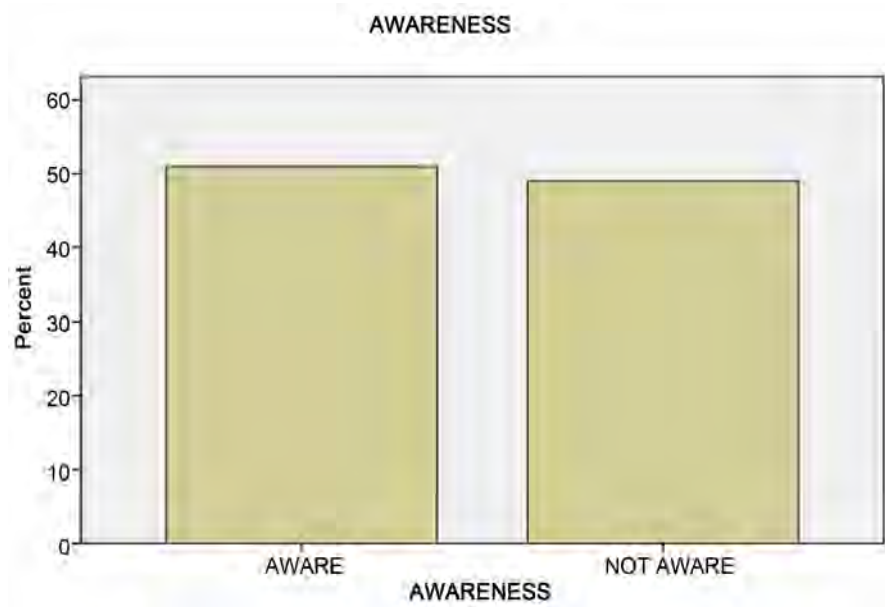
Figure 1. Awareness of drug trial patients with mental disorders.

Table 2. Association between Sociodemographic factors and Awareness/Perception Questions (see **Apendix A** below for the list of questions on the questionnaire). Table shows mainly associations with significant findings except for Question E5, B6, Q1, Q2, B6 and O2. Other non-significant findings are not shown.

Question	Variables compared	χ^2/Fisher's exact	P value
B2	No/Yes Vs. Hausa/Non-Hausa	$\chi^2 = 4.53$	0.03
O4	No/Yes Vs. Hausa/non-Hausa	$\chi^2 = 11.83$	P < 0.01
E5	No/Yes Vs. organic/Non-organic-psychiatric disorders	Fisher's exact = 1	P > 0.05
B6	No/Yes. Vs. Christianity/Islam	Fisher's exact = 0.17	P > 0.05
Q1	No/Yes. Vs. Christianity/Islam	Fisher's exact = 0.16	P > 0.05
Q2	No/Yes. Vs. Christianity/Islam	Fisher's exact = 0.16	P > 0.05
B6	No/Yes. Vs. 25 - 34 yrs/Other age groups	$\chi^2 = 0.38$	0.54
O2	No/Yes. Vs. 25 - 34 yrs/Other age groups	Fisher's exact = 0.26	P > 0.05
E1	No/Yes. Vs. 25 - 34 yrs/Other age groups	$\chi^2 = 5.78$	0.02
E3	No/Yes. Vs. 25 - 34 yrs/Other age groups	$\chi^2 = 5.43$	0.02
F	Don't-know/No/Yes. Vs. Female/Male	$\chi^2 = 7.65$	0.02
A	Don't-know/No/Yes. Vs. Married/unmarried	$\chi^2 = 10.23$	0.01

Table 3. Logistic regression analysis of variables with common awareness/perception association.

Variable	B	Wald	df	P value	Exp (B)	95% CI (Lower)	95% CI (Upper)
Question N3							
Marital Status (1)	1.55	3.72	1	0.05	4.72	0.98	22.83
Gender (1)	1.40	6.40	1	0.01	4.04	1.37	11.93
Question N2							
Marital Status (1)	1.41	3.05	1	0.08	4.10	0.84	20.00
Gender (1)	1.11	3.94	1	0.05	3.05	1.02	9.15
Question B1							
Marital Status (1)	1.28	5.77	1	0.02	3.59	1.27	10.16
Gender (1)	0.88	2.17	1	0.14	2.40	0.75	7.69
Question B6							
Marital Status (1)	0.88	1.58	1	0.21	2.41	0.61	9.49
Religion (1)	−21.62	0.00	1	1.00	0.00	0.00	
Age group (1)	−0.85	0.71	1	0.23	0.43	0.11	1.73
Question M							
Gender (1)	0.50	0.44	1	0.51	1.66	0.37	7.33
Marital Status (1)	19.16	0.00	1	1.00	2.09	0.00	
Tribe (1)	−19.40	0.00	1	1.00	0.00	0.00	
Question H							
Gender (1)	0.59	1.75	1	0.19	1.80	0.75	4.33
Marital status (1)	0.77	2.35	1	0.13	2.16	0.81	5.80

{NOTE: Maritalstatus (1)-Unmarried, Gender (1)-Male, Religion (1)-Islam, Age group (1)-(25 - 34 years), Tribe (1)-Hausa}.

5. Discussion

The main thrust of this study is on the assessment of awareness and perception of drug trial among patients with mental disorders. Majority of the participants

were young adults which implies that the decision to participate in a drug trial will depend a lot on the individuals themselves. This is because participants in the extremes of life (children and elderly) require inputs from significant family relatives which are usually overriding. Inability to properly engage these young adults may actually hinder the implementation of the protocol despite the willingness of relatives.

Majority were also unemployed; this can make these individuals vulnerable to coercion or abuse in drug trials. About half of the participants were aware of drug trials. This finding probably reflects a general knowledge of drug trials but not a depth of knowledge sufficient for participation in such research activities. This finding is lower than that reported by studies done in western countries like America were 74% and 80% were reported in two studies respectively [9] [21]. However, the unwillingness of half of the participants to participate in drug trials portends a not very good outlook among these subjects in drug trials research. There are mixed findings in other challenging disease conditions like cancer where about 69% have been reported to be willing to participate in drug trials [22] and over 80% unwilling to participates [23]. Furthermore, the greater percentage of participants' perception of drug trials as highly risky will likely also negatively affect participation. A study conducted in about 68 countries reported that 90% believed drug trials are generally safe [24], while another study among American adults reported that 43% considered it too risky [9].

The finding of the married being more likely to be unaware of drug trials may be due to majority of the participants being married which might have influenced the finding of the association of married participants with unawareness of drug trials. This may also require further investigation into other possible reasons for this finding. The unmarried were however more likely predictors of awareness through the television. This is in keeping with the increased use of media platforms and internet in the last decade especially among young adults in this country. It is possible that they have heard more about the litigations of drug companies due to failed drug trails and complications from the media and internet. One study found increased use of the internet as a predictor of drug trial awareness [21]. Little is known through the media about its importance and benefits. This might also have influenced the greater number of participants considering drug trials as highly risky. This impression is also seen among young adults in productive age group (24 - 34 years) higher preference for the use of the elderly in drug trials. This may likely be due to the assumption that risky research activities should be done among people that a closer to death than among young people. Those below 24 years and above 34 years were more likely to recommend healthy individuals for drug trials than the young adults. It is possible that older people and the younger age group (below 24 years) consider the 24 - 34 years age group as the healthy ones.

The finding of females' association with being unsure of whether their consent will be needed may likely reflect an underlying social-cultural pattern as pre-

viously described [25]. This socio-cultural pattern creates a need to be holistic during the consenting process in drug trials. This is because socio-cultural factors play pivotal role in influencing the decisions of participants. In typical Northern Nigeria the consent of married females is usually determined by their husbands' permission to participate in such research activities despite its necessity or urgency. Designs of drug trials in such socio-cultural setting will therefore require proper engagement with their husbands even before married female participants are approached for participation.

High socio-economic problems have been associated with these patients in previous studies [26] [27] this can be linked to the high rate of unemployment and lack of formal education of majority of the participants in this study. This makes participants more vulnerable to inducements and coercion in drug trials.

The participants of the minority tribe (non-Hausa) were more likely to be aware of drug trials from reading newspapers and to request for other forms compensation in instances of adverse drug reactions than the predominant tribe (Hausa) during drug trials. These findings may be due to the rather small number of the minority tribe rather than inherent attributes. However further examination of these findings in future studies may be necessary.

6. Conclusion

The level of awareness of drug trials among psychiatric patients appears to be poor and majority of them consider it a highly risky research to participate in. Socio-economic problems encountered by participants with psychiatric disorders need to be considered in the design of drug trials among them. The female patients are likely to be more vulnerable to coercion and abuse in such research activities.

7. Recommendations

There should be concerted effort to correct the wrong perception of drug trials through the use of media platforms and public enlightenment programmes.

The design of drug trials among psychiatric patients should adequately include a legal framework that takes into cognizance their vulnerability and how to ensure that the consent process is not compromised. This will require a multidisciplinary team of experts in the field of Mental Health who will provide guidance on the development of a protocol that shows an understanding of the disorder and its psychopathology.

Researchers should consider the addition of long-term benefits in the research design to participants that will be supportive, considering the continuous social challenges they face due to mental disorders. This will go a long way in sustaining the quality of life of participants beyond the research period and encourage participation.

8. Limitations

It was a cross-section study and may not be sensitive to changes in awareness

and perception over a period of time.

It was a hospital based study, which may not reflect what obtains in the community.

Declaration

All authors agree with the content of the manuscript and there are no conflicts of interest between/among the authors.

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Appendix A

Proforma

Questions

A. Are you aware that new drugs are being tested before they are released into the market?

B. If you are aware where did you get your information from?

Television/Radio-B1, Newspaper-B2, Friends/Relatives-B3, Internet-B4, Doctors-B5, Others-B6.

C. Do you know that drugs are first tested in animals?

D. Do you know that after the animal testing it is then tested on humans?

E. If yes, tick the appropriate group of persons that should be used for the test.

Healthy individuals-E1, critically ill patients-E2, Elderly patients-E3, mentally ill patients-E4, others specify-E5.

F. Is the participant's consent required before carrying out the test?

G. Should the test be carried out on participants for free?

H. Should the new drug be tested and compared with other drugs that are used to treat the same disease?

I. How will you feel if you are asked to participate in the testing of a new drug?

J. Can you willingly offer yourself to participate in testing a new drug?

K. If yes, why?

No other medicine available to treat the disease-K1, If the drug is given free of Charge-K2, If I have used the new drug before-K3, I trust the Doctors-K4, If there is hope of cure with the new drug-K5,others specify-K6.

L. How will you feel not knowing the drug you are being given during the drug test?

M. How risky do you think it is participating in the test of a new drug?

Dangerous-M1, High risk-M2, Moderate risk-M3, Low risk-M4, Safe-M5.

N. Who should consent to the testing of a new drug in children?

Parent-N1, Child-N2, School Authourities-N3, Others specify-N4.

O. In case of adverse effects during the drug test, what should be done to the participants affected?

Stoppage of the drug-O1, Prompt medical attention-O2, Compensation-O3, Others specify-O4.

P. Do you think you need to be paid before participating in the testing of a new drug?

Q. If yes,

Give reason(s) why-Q1.

How much do you think you should be paid? -Q2.

Prevalence and Pattern of Alcohol Use among Adults in an Urban Slum in South East Nigeria

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Abstract

Background: Alcohol is one of the most commonly abused psychoactive substances in the country. Studies have shown sharp increases in alcohol consumption among Nigerians. This increase is likely to continue because of increased local production and availability of alcohol in the country. Knowledge of the prevalence and pattern of current alcohol use is important considering the public health and socio-economic effects of alcohol use. **Methods:** Using a semi-structured questionnaire, we estimated the prevalence of current alcohol use among adults 18 years and older living in urban slums in Enugu South East Nigeria. Current use of alcohol was defined as use of any or all alcohol beverages in the past 4 weeks. The safe limit of alcohol was defined using WHO guidelines. Study duration was 5 months. **Results:** A total of 1411 individuals were recruited into the study. Males were 658 (46.6%) and females were 753 (53.4%). The overall prevalence of current use of alcohol was 66.7%; males 75.7% and females 58.8% (p < 0.01). The commonest alcoholic beverage consumed was beer 37.1%. The peak age of consumption was 40 - 49 years followed by 50 - 59 years. About 8.1% drank alcohol above the generally recommended units per week while 5.2% drank above the safe limit for chronic liver disease. Significant correlates of alcohol intake were increasing age, male gender, having a job, cigarette smoking and the use of snuff. Significant correlates for excessive consumption of alcohol were increasing age and cigarette smoking while those for exceeding the safe limit chronic liver were increasing age, male gender and cigarette smoking. **Conclusion:** There is a high prevalence of current alcohol use among urban slums in Enugu. Public health educational measures for reducing alcohol consumption should be encouraged. Efforts should be made to educate the populace on the need for abstinence.

1. Introduction

Alcohol consumption is widespread in Nigeria. It is one of the most commonly abused psychoactive substances in the country [1] [2] [3] [4]. The increasing use of alcohol in Nigeria has been attributed to different factors such as socio-cultural practices, rapidly changing lifestyles and increasing purchasing power [5]. Studies from the 90s showed a sharp increase in alcohol consumption among Nigerians [6] which has continued up to the present day. This increase may also be attributed to increased local production of alcohol within the same period of time [7].

The prevalence of current alcohol use varies between regions, age groups, gender and socioeconomic status. Studies from the western part Nigeria revealed a prevalence of current use of alcohol between 14% - 32.7% depending on gender and location [8] [9] [10] [11]. More recent studies clearly reveal persisting high rates of alcohol use especially among the young [4] [5] [12] [13]. A study from South-South Nigeria among an Ijaw community reported a 90% one-prevalence of alcohol use and a 23.7% [14] prevalence of current use. In South East Nigeria, the current rate of alcohol use has been reported to be the highest in the country [4]. Prevalences as high as 63% to 78.4% have been reported among undergraduates [12] [13]. Studies from other West African countries showed a self-reported current use of alcohol 62.2% [15].

Current alcohol use has been associated with age, gender, marital status, level of education, socioeconomic class, employment status and religious beliefs [5] [8]. While the health benefits of drinking alcohol at low amounts remain controversial [16]; alcohol consumption is related to several acute and chronic diseases, family and social disruptions as well as physical injuries [6] [16] [17]. In one rural study from South-South Nigeria, about 33% of the subjects had harmful drinking, while 12.73% had alcohol dependence problem [14]. Documented associated factors for high alcohol consumption include male gender, age, low educational level, lower socioeconomic status and marital status [5] [14] [18].

Types of alcoholic beverages consumed in Nigeria vary between localities. The most commonly consumed alcoholic beverage is beer according to most studies but the overall pattern depends on the community studied and the year of study [5] [8] [12] [19] [20]. Factors that mediate beverage choice may include cost, availability, cultural orientation and advertisement. Knowledge of the prevalence and pattern of current alcohol use is important considering the public health and socio-economic effects of alcohol use. Such information is scarce from South East Nigeria. The aim of this study was to determine the prevalence and pattern of alcohol use among adults in an urban slum in Enugu, Nigeria.

2. Methods

This was a cross-sectional descriptive study. Using a purposive sampling method, we selected 2 isolated urban slum settlements (Agu-Abor and Ugbodogwu) in Enugu, the capital of Enugu State, south east Nigeria. The two settlements have an estimated adult population of 7000 - 9000 individuals (based on church and local records). The total area occupied by both settlements is approximately 2.5 - 5 km^2 and both are located about 1 - 2.5 km from the nearest state-owned teaching hospital. The two settlements were selected purposively because of their relatively isolated location. The inhabitants of Agu-Abor were surveyed over a 4-week period (August 12-September 9, 2013), while Ugbodogwu inhabitants were surveyed between November 25-December 21, 2013. This study was approved by the ethics committee of the University of Nigeria Teaching Hospital Ituku/Ozalla, P M B 01129 Enugu. No NHREC/05/01/2008B-FWA00002458-1RB00002323.

3. Study Protocol

A semi structured questionnaire was used to collect data on selected socio-demographic characteristics, lifestyle behaviors and medical history. Data on alcohol use was collected using a semi-structured questionnaire (See Appendix), specifically designed by the investigators after a review of the relevant literature [1] [2] [3] [4] [5]. The study was preceded by sensitization meetings in the communities. Prior community awareness announcements in churches and by town criers invited participants to sensitization meeting(s) on the selected day(s). All participants who came out for the survey were interviewed by teams of research assistants using the research questionnaire. All consecutive consenting adults 18 years and above were included in the study, whereas the exclusion criteria were refusal to participate and cognitive decline.

The questionnaire sought to elicit data on alcohol use within the last 30 days. Estimated amount of alcohol used in a week and the type of alcoholic beverage preferred were documented. The quantity of alcohol was estimated using different bottle sizes for beer (600 mL), stout (600 mL and 300 mL), palm wine (200 mL cups) and gin (25 and 50 mL cups).

Cases of hypertension, diabetes, epilepsy and other medical conditions were recorded if such diagnosis was done in a hospital by medically qualified personnel (physician). Current tobacco use was defined as the use of any form of tobacco products in the past 4 weeks. Current use of alcohol was defined as use of any or all alcohol beverages in the past 4 weeks. The safe limit of alcohol was defined based on WHO guidelines of 21 units for men and 14 units for women per week [21]. The safe limit of alcohol for liver cirrhosis was defined based as of 21 units/week in women and 28 units/week in males [17]. Level of education was the individual's highest educational (formal) attainment based on the Nigerian school system.

The minimum sample size was calculated using the Taro Yamane formula [22], N = N/1 + N(e)^2. Where: n = required sample size, e^2 = error limit and N =

estimated adult population in both settlements.

N = estimated population of the community (9000), e = 0.05.

N = 9000/9000 × 0.0025 = 9000/22.5 = 400.

4. Statistical Methods

For database management and statistical analyses, we used the SPSS version 23 (IBM Corporation, New York, USA). Data were presented in tables and figures. For continuous variables, mean values and standard deviation were calculated. Rates were expressed as percentages. Categorical values were compared using the Chi Square test. Mean age was compared using the independent t-test. In all, p value of <0.05 was regarded as statistically significant. Conclusions were drawn at 95% confidence interval.

5. Results

1) General Characteristics of the sample population.

A total of 1411 individuals were recruited in the study. Males were 658 (46.6%) and females were 753 (53.4%). The male to female ratio of those screened was 0.9:1. The participants' age ranged from 18 to 90 years, averaging 34.5 (14.4) years. Males were older than females by about 4 years (mean age: 36.8 vs 32.5 years, p < 0.01).

The peak age group of males and females was 20 - 29 years (36.3% and 44.1% respectively) (Table 1 and Figure 1). Most participants were working at the time of the study (54.8%) and had at least a senior secondary school education (69.2%) (Table 1).

2) Lifestyle and Medical History.

Current tobacco use (232 (16.4%)) use was more prevalent in males than females (males 179 (27.2%) versus females 53 (7%). P < 0.01) (Table 1). A total of 141 (10%) of the subjects had a history of hypertension, 47 (3.3%) had a history of diabetes and 21 (1.5%) reported a past medical history of stroke. Other
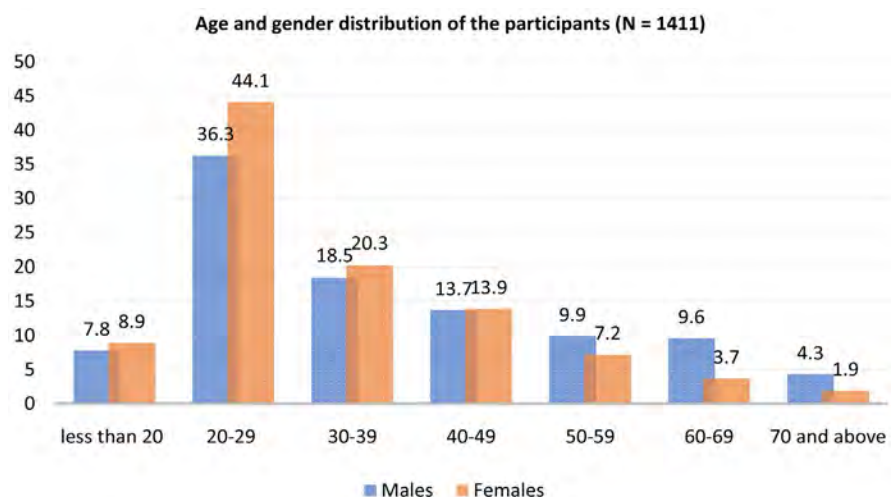
Figure 1. Age and gender distribution of the participants.

Table 1. Characteristics of participants.

Characteristic	Female	Male	Total	*P*-value
N (%)	753 (53.4)	658 (46.6)	1411 (100)	0.01
Age, years, (sd)	32.5 (12.7)	36.8 (15.7)	34.5 (14.4)	<0.01
Age group years				
<20 n (%)	67 (8.9)	51 (7.8)	118 (8.4)	
20 - 29 n (%)	332 (44.1)	239 (36.3)	571 (40.5)	
30 - 39 n (%)	153 (20.3)	122 (18.5)	275 (19.5)	
40 - 49 n (%)	105 (13.9)	90 (13.7)	195 (14.5))	
50 - 59 n (%)	54 (7.2)	65 (9.9)	119 (8.4)	
60 - 69 n (%)	28 (3.7)	63 (9.6)	91 (6.4)	
≥70 n (%)	14 (1.9)	28 (4.3)	42 (3)	<0.01
Occupational status				
Students/apprentices	351 (46.6)	240 (36.5)	591 (41.9)	
Employed	381 (50.6)	392 (59.6)	773 (54.8)	
Retired/unemployed	21 (2.8)	26 (4)	47 (3.3)	
Level of Education				
None n (%)	2 (0.3)	3 (0.5)	5 (0.4)	
Primary, n (%)	160 (21.2)	149 (22.6)	309 (21.9)	
Junior Secondary n (%)	68 (9)	48 (7.3)	116 (8.2)	
Senior Secondary n (%)	521 (69.2)	455 (69.1)	976 (69.2)	
Tertiary n (%)	2 (0.3)	3 (0.5)	5 (0.4)	0.68
Lifestyle				
Current tobacco use, n (%)	53 (7)	179 (27.2)	232 (16.4)	<0.01
Cigarettes	10 (1.3)	72 (10.9)	82 (5.8)	<0.01
Snuff	44 (5.8)	108 (16.4)	152 (10.8)	<0.01
Both	1 (0.1)	3 (0.5)	4 (0.3)	<0.34
Current Marijuana use, n (%)	5 (0.7)	18 (2.7)	23 (1.6)	<0.01
Medical History of				
Hypertension n (%)	79 (10.5)	62 (9.4)	141 (10)	
Diabetes n (%)	21 (2.8)	26 (4)	47 (3.3)	
Stroke n (%)	11 (1.5)	10 (1.5)	21 (1.5)	
Epilepsy n (%)	4 (0.5)	3 (0.5)	7 (0.5)	
Chronic headache	94 (12.5)	86 (13.1)	180 (12.8)	
Chronic cough	39 (5.2)	39 (5.9)	78 (5.5)	
Tremor	1 (0.1)	-	1 (0.1)	
Loss of memory	-	1 (0.2)	1 (0.1)	

P-values are for the sex differences.

patient-reported medical cases are shown in Table 1.

3) Alcohol consumption.

A total of 941 (66.7%) were currently using alcohol at the time of the study (males 498 (75.7%) versus females (443 (58.8%) p < 0.01). The commonest alcoholic beverage consumed was beer 524 (37.1%) which was also used more by males p < 0.01. The least consumed alcoholic beverage gin 40 (2.9%) was equally used by both sexes (P = 0.26) (Table 2). Based on the standard alcoholic con-

tents of alcoholic beverages sold in Nigeria, the mean amount of alcohol (in grams) and the mean unit of alcohol is shown in Table 3. Overall males mean consumption (in grams and units) of alcohol was higher in males than females (P ≤ 0.01). The peak age of consumption was 40 - 49 years followed by 50 - 59 years (Table 4).

Table 5 shows the level of alcohol consumption in the community. A total of 114 (8.1%) drank alcohol above the general recommended units per week while 74 (5.2%) drank above the safe limit for chronic liver disease. A higher proportion of males 65 (9.9%) than females 49 (6.5%) drank more than the recommended

Table 2. Alcohol consumption in the community.

Characteristic	Males n (%)	Females N (%, 95%, CI)	Total	p-value
N	498 (75.7)	443 (58.8)	941 (66.7)	<0.01
Beer	327 (49.7)	197 (26.2)	524 (37.1)	<0.01
Stout	157 (23.9)	201 (26.7)	358 (25.4)	0.22
Gin	23 (3.5)	17 (2.3)	40 (2.9)	0.26
Local Brew	81 (12.3)	87 (11.6)	168 (11.9)	0.66

P-values for sex differences.

Table 3. Mean consumption of different types of alcoholic in the sample population.

Characteristic	Males, mean (sd)	Females, Mean (sd)	Total, mean (sd, range)	p-value*
Quantity of Alcohol/week(g)				
Beer	55.2 (96.5)	23.3 (85.6)	38.2 (92.2)	<0.01
Stout	27.1 (8.2)	17.7 (49)	22.1 (65.1)	0.01
Gin	1.2 (54.5)	0.6 (5.7)	0.9 (7)	0.12
Local brews	12.2 (54.5)	7.3 (36.7)	9.6 (45.9)	0.05
Total	95.6 (183.1)	48.9 (119.2)	70.7 (154.1)	<0.01
Unit of alcohol	9.6 (18.3)	5.0 (11.9)	7.1 (15.4)	<0.01

Table 4. Overall mean consumption of alcohol.

Characteristic	Mean, gr (sd)	p-value	Unit of alcohol, mean (%)	p-value*
N	70.7 (154.1)		7.1 (15.4)	
Males	95.6 (183.1)		9.7 (18.3)	
Females	48.9 (119.2)		4.9 (11.9)	
20 - 29	21.4 (35.6)		2.1 (3.6)	
30 - 39	63.5 (121.1)		6.4 (12.1)	
40 - 49	95.3 (237.6)		95 (23.4)	
50 - 59	81.6 (155.8)		8.2 (15.6)	
60 - 69	78.2 (100.3)		7.8 (10)	
≥70	52.1 (84.5)	0.001	5.2 (8.4)	0.001

*P values for sex differences.

Table 5. Drinking pattern in the population.

Characteristic	Not drinking n (%)	Drinks within the safe limit n (%)	Drinks above the safe limit n (%)	Drinks above the safe limit for CLD n (%)	p-value*
N	473 (33.5)	824 (58.4)	114 (8.1)	74 (5.2)	
Females	312 (41.4)	392 (52.1)	49 (6.5)	48 (7.3)	
Males	161 (24.5)	432 (65.7)	65 (9.9)	26 (3.5)	<0.01#
Age group					
<20	68 (57.6)	50 (6.1)	-	-	
20 - 29	197 (41.6)	335 (40.7)	39 (6.8)	24 (4.2)	
30 - 39	83 (17.5)	161 (19.5)	31 (11.3)	21 (7.6)	
40 - 49	50 (10.6)	125 (15.2)	20 (10.3)	14 (7.2)	
50 - 59	39 (8.2)	68 (8.3)	12 (10.1)	7 (9.5)	
60 - 69	19 (20.9)	62 (7.5)	10 (11)	6 (8.1)	
≥70	17 (3.6)	23 (2.8)	2 (4.8)	2 (2.7)	

*P value for sex differences; #p value similar for population recommended levels and for chronic liver disease.

weekly limit. The age distribution of units consumed per week showed that from 30 to 69 years the proportion of those drinking more than recommended unit was similar. While all those less than 20 years drank safely, 4.8% of individuals 70 years and above exceeded the recommended levels. With reference to the recommended safe limit of alcohol for chronic liver disease: 74 (5.2%) of the population surveyed exceeded that limit (males 48 (7.3%) and females 26 (3.5%) $p < 0.01$). The age distribution of excess consumption of alcohol peaked at 50 - 69 years.

Significant correlates alcohol consumption were increasing age, male gender (females 0, males 1), occupational status (unemployed 0, employed 1), cigarette smoking (no 0, yes 1) and the use of snuff (no 0, yes 1). Significant correlates for excessive consumption of alcohol were increasing age and cigarette smoking (no 0, yes 1) while that for exceeding the safe limit chronic liver were increasing age, male gender (females 0, males 1) and cigarette smoking (no 0, yes 1) (Table 6).

6. Discussion

Alcohol consumption in Nigeria is embedded into cultural and religious practices especially in the Christian dominated South East of the country. It is the most commonly abused psychoactive substance in the country [1] [2] [4] [9] [10]. With changing lifestyles, increasing purchasing power and availability of alcoholic beverages, the use of alcohol will definitely continue to increase in the country.

In the index study the prevalence of current alcohol use was 66.7%, greater in males 498 (75.7%) than females 443 (58.8%). The preferred alcoholic beverage was beer 524 (37.1%) while the least was gin 40 (2.9%) with a peak age of 40 - 49

Table 6. Correlates of level of alcohol consumption.

Variable	Alcohol use r (p-value)	Safe Limit r (p-value)	Safe Limit CLD*
Age	0.14 (<0.01)	0.09 (0.01)	0.08 (0.02)
Gender	0.18 (<0.01)	0.03 (0.34)	0.07 (0.03)
Level education	0.00 (0.85)	0.04 (0.23)	0.03 (0.33)
**ES	0.13 (<0.01)	0.14 (<0.01)	0.14 (<0.01)
Cigarette	0.16 (<0.01)	0.12 (0.01)	0.12 (0.01)
Snuff	0.20 (<0.01)	0.02 (0.47)	0.04 (0.21)

*CLD Chronic liver disease. **ES employment status. Students, apprentices and retired individuals were counted as unemployed.

years followed by 50 - 59 years. A total of 114 (8.1%) individuals drank alcohol more than the recommended units per week (males 65 (9.9%) more than females 49 (6.5%) with a peak age of 20 - 29 years. With reference to the recommended safe limit of alcohol for chronic liver disease; 7 (5.2%) of the population surveyed exceeded that limit with a peak age at 50 - 69 years. Significant correlates of alcohol consumption were increasing age, male gender, being employed, cigarette smoking and the use of snuff. Among these variables, age, being employed and cigarette smoking correlated with exceeding the general safe limit of alcohol consumption, while age, gender, being employed and cigarette smoking were significant correlates of exceeding the set limit for liver disease.

The 5.8% rate of current cigarette smoking and 10.8% rate of snuff use is within the previously reported ranges in the country [4] [23]. Together with alcohol tobacco is one of the most commonly abused psychoactive drugs in Nigeria [1] [2] [4] [9] [10] [23] [24]. The prevalence of current cigarette and snuff use in population based studies range between 5.3% to 17.6% and 4.1% to 9.6% respectively [4] [24]. Similar to some of these studies, tobacco was used commonly among males. The high rate of snuff use in this study may be related to cultural and religious norms. In dominant Igbo culture of south east Nigeria, snuff use is more culturally acceptable in both males and females.

About 10% of the subjects had a history of hypertension, 3.3% had a history of diabetes and 1.5% reported a past medical history of stroke. The relationship between these disorders and alcohol use is well documented [25]. Alcohol consumption is likely to increase both morbidity and mortality of these disorders. Other patient reported medical cases in the index study may or may not be related to alcohol nevertheless alcohol is a risk factor for some of these disorders [16] [17].

The prevalence of current consumption of alcohol was 66.7%: more in males 75.7% than in females 58.8%. In the past 30 years the rate of alcohol consumption has increased across all regions of Nigeria [3]. Data from a recent nation-wide study supported this trend in all regions of country [4]. The age distribution of alcohol consumption in the index study is different from some and

similar to other studies [5] [12] [14]. In a study among rural dwellers in South-s Nigeria the reported peak age prevalence of 25 - 44 years was slightly younger than in the index study [5]. The peak age of alcohol consumption may reflect the purchasing power in this group which is also related to their employment status.

The preponderance of male alcohol users seems to be universal [2] [4] [5] [10] [11] [26] [27]. Male consumption of alcohol has been linked to masculinity and high sexual performance [12] [28] [29]. High levels of female consumption have also been documented especially in universities [8] [12] [14]. A higher proportion of males 65 (9.9%) than females 49 (6.5%) drank more than the recommended weekly limit of 21 units for males and 14 units for females. Alcohol abuse disrupts social, occupational, interpersonal and marital life and has been related to domestic violence [6] [15] [27]. In one study from North Central Nigeria, 54% of males and 46% of female alcohol users were identified as alcohol abusers through the use of a 4-item CAGE instrument [26]. In a study from South Western Nigeria, 69.1% of current alcohol users were at either moderate or high health risk from alcohol [5]. Other studies have shown that more than 50% of non-heavy drinkers and of heavy drinkers have felt the effects of alcohol while at work, while driving or have been involved in a road traffic accident [30]. Harmful drinking have been reported in about 33% of the subjects, while 12.73% had alcohol dependence problem [14]. The net effect of alcohol consumption on the index population is enormous considering the percentage and age distribution of the population studied. This is even more obvious considering the rate of tobacco use in the population.

Alcohol use was largely accounted by beer and stout. The least consumed alcoholic beverage was gin. This pattern of beverage use is similar to many studies [3] [5] [31] and different from others [14] [19]. The emergence of stout as a common alcoholic beverage may suggest increasing Western cultural influence, higher purchasing power and/or increasing availability. Traditional (brew palm wine) was consumed by 11.9% of the population. Traditional alcoholic beverages are popular in both rural and urban communities where it is mostly enjoyed with local delicacies. Palm wine is popular in southern eastern Nigerians and contains varying amounts of alcohol 3% - 6% [3] [6].

Significant correlates of alcohol consumption in the index study were increasing age, male gender, having a job, cigarette smoking and using snuff. Increasing age, cigarette smoking positively correlated with drinking more than the recommended limit and the recommended limit for CLD. People drinking alcohol above the recommended limit may be regarded as abusers. Unlike the index study, studies from other parts of Nigeria have associated alcohol to younger age [5] [9] [19] [26]. Other documented correlates of current alcohol use and alcohol abuse include being unmarried, low educational level and being unemployed [5] [9] [19] [26]. The higher rate of alcohol consumption in this study may be linked to the dominant christian beliefs [5] [10] [32] (all the people included in the index study were Christians).

The index study has some limitations. First, the quantity of alcohol used was self-reported and may not be accurate. However, data was collected individually after proper explanation of privacy concerns. Secondly, alcohol drinks in Nigeria have slight variations in their alcohol content. Thirdly, local brews (gin and palm wine) may not have fixed alcoholic content. Despite these limitations this study will provide baseline data for further studies in the region and educational material for public health workers and policy makers.

7. Conclusion

There was a high prevalence of alcohol use in the study population. There is a need for public health enlightenment on the dangers of excessive alcohol use. Being employed, increasing age and cigarette smoking correlated positively with exceeding the general safe limit of alcohol consumption.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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Appendix

Questionnaire

This work is designed to find out how many people in Aguabor and Ugbodogwu use alcohol and tobacco and how much of these substances they use. Your identity will not be disclosed to anyone or released for any other purpose except for the goal of this study without your permission.

Initials…………… Age…………… Sex…………… Occupation………

Level of Education. *Primary*, *Secondary*, *Tertiary*

1) Past medical history

Have you been told that you have or had

Hypertension---Diabetes---Stroke---Epilepsy---Asthma---Sickle Cell disease--others---

2) Use of tobacco and other substances. type…smoking…snuff. Use of Marijuana

Others …………(describe)…….glue………..cocaine…….(etc) ASK!

Current……(las 4 weeks)   Past……………………..

3) Use of alcohol…current (in the past 4 weeks)

Which type of alcohol do you prefer most of the time:

Beer………. Stout ………. Local gin……… Palm wine………. Wine……….
Others………

Give an estimate how much alcohol you took in the last 4 weeks.

Bottles………

Small stout………

Big stout………

Drinking glass (200 mls) ………

Shots………

Thank you for cooperating with us.

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