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Full Length Research Paper

Determination, knowledge and prevalence of pregnancy-induced hypertension/eclampsia among women of childbearing age at Same District Hospital in Tanzania

Ejike Daniel Eze^{1*}, Ambrose Barasa², Moses Dele Adams³, Karimah Mohammed Rabiu⁴, Iliya Ezekiel⁵, Sheu Oluwadare Sulaiman² and Nganda Ponsiano¹

¹Department of Physiology, Faculty of Biomedical Sciences, Kampala International University, Western Campus, Ishaka-Bushenyi, Uganda.

²Department of Physiology, Faculty of Medicine, Kampala International University, Dar es Salaam, Tanzania.

³Department of Biochemistry, Faculty of Science and Technology, Bingham University, Karu, Nasarawa State, Nigeria.

⁴Department of Biological Sciences, Faculty of Science, Yobe State University, Damaturu, Yobe State, Nigeria.

⁵Department of Biological Sciences, Faculty of Pure and Applied Sciences, Federal University, Wukari, Nigeria.

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Several risk factors including hypertension are common complications of pregnancy with preeclampsia particularly associated with substantial risk to both the mother and fetus. This cross-sectional study involving quantitative approach was conducted in Same District Hospital in Tanzania. Data were collected from all pregnant women in the hospital using questionnaires. Respondents' knowledge on maternal mortality regarding preeclampsia included those who had no knowledge 60(60%), and those who had knowledge 40(40%). Most of the respondents had no knowledge of maternal mortality due to the complications of preeclampsia. The study revealed that 64(64%), had positive attitude towards maternal mortality due to preeclampsia prevention while 36(36%) had no response. About 68(68%) of the respondents could not access the health facilities saying that these health facilities were not affordable citing that the distance was too long. They reported no health facilities and services as well as insecurity while looking for health facilities/services and finally that there were few health workers in the health facilities meaning that patients could not be attended to on time. Furthermore, health workers harassed the patients and make them seek other alternatives when they are sick, while minority 32(32%) said that the health facilities were accessible, affordable and efficient. Medical history during prenatal care showed that 25% of the respondent had increased blood pressure more than 140/90 mmHg, but only 10% had breath issues. Laboratory diagnosis of the respondents revealed increased proteinuria (48%) and impaired liver function (7%). Respondents experienced 39% convulsion and 24% pulmonary edema. Overall, the study identified a few predisposing factors to preeclampsia/eclampsia among pregnant women. Also, most of the respondents were said to have no knowledge of eclampsia thereby increasing maternal mortality.

Key words: Preeclampsia, hemolytic elevated liver enzymes, eclampsia, low platelet count, disseminated intravascular coagulopathy, intrauterine growth restriction, intrauterine fetal death, pregnancy induced hypertension.

INTRODUCTION

Hypertension is a common complication of pregnancy. Preeclampsia, in particular, is associated with substantial risk to both the mother and the fetus. Several risk factors have been recognized to predict risk for preeclampsia (Solomon and Seely, 2011). However, at present no biomarkers have sufficient discriminatory ability to be useful in clinical practice, and no effective preventive strategies have yet been identified (Solomon and Seely, 2011). Commonly used medications for the treatment of hypertension in pregnancy include methyldopa and labetalol. Blood pressure thresholds for initiating antihypertensive therapy are higher than outside of pregnancy. Women with prior preeclampsia are at increased risk of hypertension, cardiovascular disease, and renal disease (Suzuki et al., 2015). Pregnancy induced hypertension (PIH) is classified according to the severity of hypertension. The Japan society of hypertension made practice guidelines in 2014, and the Japan Society for the study of hypertension in pregnancy made its guidelines subsequently in 2015. Both guidelines stated that the basic treatment for PIH is the interruption of pregnancy, and antihypertensive therapy should be given for protection in the mother complicated by severe hypertension (Suzuki et al., 2015). The fetal heart rates should be monitored enough due to worsening fetal circulation. It recommends that methyldopa, hydralazine, labetalol, and long-acting nifedipine (only after 20 weeks of gestation) should be used as the first-choice antihypertensive oral drugs. Intravenous administration should be selected when a hypertensive emergency occurs (Suzuki et al., 2015). Pregnancy-induced hypertension (PIH) complicates 6-10% of pregnancies around the world (WHO, 2011). However, hypertension and proteinuria which exist in preeclampsia, are present in 2-8% of all pregnancies (Steegers et al., 2010). In African countries such as South Africa, Egypt, Ethiopia and Tanzania, the rates of preeclampsia have been reported to vary from 1.8% to 7.1% (Osungbade and Ige, 2011). PIH is defined as systolic blood pressure (SBP) > 140 mmHg and diastolic blood pressure (DBP) > 90 mmHg. It is classified as mild (SBP 140-149 and DBP 90-99 mmHg), moderate (SBP 150-159 and DBP 100- 109 mmHg) and severe (SBP ≥160 and DBP ≥110 mmHg) (Kintiraki et al., 2015). PIH refers to one of four conditions: a) pre-existing hypertension, b) gestational hypertension and preeclampsia (PE), c) pre-existing hypertension plus superimposed gestational hypertension with proteinuria and d) unclassifiable hypertension. PIH is a major cause of maternal, fetal and newborn morbidity and mortality.

Women with PIH are at a greater risk of abruption placentae, cerebrovascular events, organ failure and disseminated intravascular coagulation (Kintiraki et al., 2015). Treatment of PIH depends on blood pressure levels, gestational age, presence of symptoms and associated risk factors. Non-drug management is recommended when SBP ranges between 140-149 mmHg or DBP between 90-99 mmHg. Blood pressure thresholds for drug management in pregnancy vary between different health's organizations (Katon et al., 2012).

There are many theories on the pathogenesis of preeclampsia, although the exact cause is not known. Most involve abnormal development of the placenta, which leads to a distressed placenta that secretes factors into the maternal blood. Maternal response (endothelial activation, pressor response, vasospasm) to these factors eventually leads to high blood pressure and proteinuria (protein in the urine) generally after 20th weeks of gestation (De Vera and Berard, 2012). Placenta is definitely the source of problem, and not the fetus. This is evident from preeclampsia happening in molar pregnancy (Hydatidiform Mole) which does not have foetal tissue. Preeclampsia can occur in extrauterine (for example abdominal) pregnancy which brings into question role of the maternal part (decidua) of the placenta. Preeclampsia is relieved on parturition (delivery) or on termination of pregnancy as the cause, that is the placenta, is removed. The maternal response reverts back to complete normal within a few months of delivery (Veerbeek et al., 2015).

Women with pregnancy-induced hypertension have been noted to have an increased responsiveness to a variety of endogenous substances (prostaglandins, thromboxane) that can cause vasospasm and platelet aggregation. Thrombus formation or hemorrhage affects the central nervous system leading to headache, local neurological deficits, and seizure. Renal necrosis leads to a decreased glomerular filtration rate and proteinuria. Liver injury from hepatocellular necrosis causes right upper quadrant pain and elevated liver function tests (Sajith et al., 2014). Cardiovascular manifestations include a lower than normal intravascular volume, increased cardiac output, and an abnormally elevated peripheral vascular resistance. Microangiopathic hemolysis leads to anemia and thrombocytopenia. Placental infarction and abruptio placentae lead to intrauterine growth retardation and fetal death (Vest and Cho, 2014). Preeclampsia typically involves a wide spectrum of clinical signs and symptoms. Mild

*Corresponding author. E-mail: daniel.ejike@kiu.ac.ug. Tel: +256 -782975042.

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preeclampsia is characterized by mild hypertension with no evidence of end-organ pathology aside from minimal proteinuria (<2.0 g/d) (van Middendorp et al., 2013). Severe preeclampsia is at the other end of the spectrum and is characterized by significant hypertension, more pronounced proteinuria (>5.0 g/d), and evidence of end-organ damage due to systemic vasoconstriction. Severe preeclampsia can later lead to eclampsia which is the most dangerous condition to maternal and fetal well-being (Pieper et al., 2014).

The most successful treatment for advancing preeclampsia or eclampsia is delivery, either by induction or Caesarean section. Some forms of preeclampsia can be treated with anti-hypertensive medication. In some cases, women with preeclampsia or eclampsia can be stabilized temporarily with magnesium sulfate intravenously to prevent seizures. Attempts will be made to delay delivery until the fetus has matured, but in severe cases where the mother's life is threatened, delivery must occur as soon as possible (Aghamohammadi et al., 2011). Preeclampsia occurs in about 6% of the general population. It is one of the life threatening conditions that affect pregnant women. Among the predisposing factors are black race, prim gravidity, change of paternity, preexisting hypertension and previous history of preeclampsia.

This condition can be complicated and leads to eclampsia, which is mostly fatal to the fetus as well as the mother. Other complications posed by this condition include abruptio placenta, disseminated intravascular coagulopathy, acute tubular necrosis, and thrombocytopenia to the maternal side. About 25-30% prematurity cases result from this condition. Also, 10-15% reduction in gestational age and intrapartum fetal distress result from this same condition.

It is a third leading cause of maternal mortality worldwide. Owing to the fact that pregnant women are vulnerable to preeclampsia/eclampsia and its associated complications, then it follows that proper community understanding may lead to early detection of pregnancy risk and hence early booking and proper follow-up to reduce the complications associated with PIH/eclampsia. This concept formed the basis for this study to determine knowledge, the prevalence and risk factors associated with preeclampsia/eclampsia among pregnant women admitted at the maternity ward of Same District Hospital in Tanzania.

METHODOLOGY

Study design

The study is a cross-sectional type involving quantitative approaches.

Site

The study area was Same District hospital in Tanzania.

Population

The study population included all pregnant women in the hospital.

Data collection

Data was collected using questionnaires.

Sample size determination

A sample size of 100 was used; this was determined using the following formula as previously explained (Daniel, 1999).

$$n = \frac{Z^2pq}{d^2}$$

n = desired sample size; Z = Standard normal deviation usually set at 1.96; p = the proportion of study population that are at risk of preeclampsia (7%) (Osungbade and Ige, 2011); q = 1-p; d = amount of error (0.05 levels).

By substitution

$$\frac{1.96^2 \times 0.07 \times 0.93}{0.05 \times 0.05} = 100 \text{ mothers}$$

Data collection and processing

Data was collected using questionnaires which had both open ended and closed ended questions. The data was then entered into the computer by using Microsoft office word and Microsoft office Excel spreadsheets. The results were analyzed using SPSS Version 20.0.

Data analysis

Data was analyzed by using the SPSS and Microsoft office Excel Spreadsheets.

Data presentation

The data analyzed was presented by using tables, graphs, charts and texts together with interpretation of the research results

Ethical consideration

Ethical clearance for using human subjects was obtained from the Research Director of Same district. Permission was sought from the authorities to conduct the study in the area needed for the study. The purpose of the study was clearly explained to them.

RESULTS

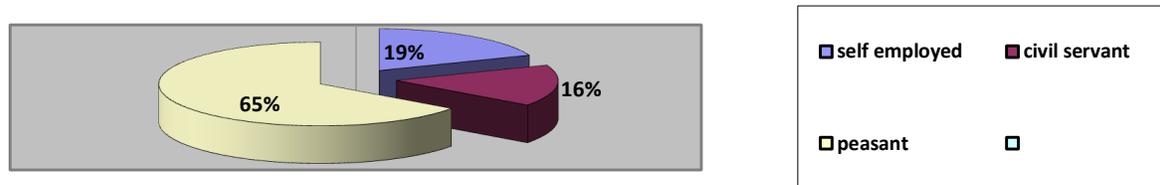
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Age of respondents

According to Table 1, most of the respondents were aged

Table 1. Age distribution of the respondents.

Age of Respondent	Frequency	Percentage
15-24	12	12
25-34	48	48
35-44	24	24
45-49	16	16
Total	100	100

**Figure 1.** Respondent's occupation.**Table 2.** Respondents by distance from the nearest health facilities.

Distance (KM)	Frequency	Percentage
Less than five	16	16
Five to Ten	36	36
More than Ten	48	48
Total	100	100

between 25-34 (48%), followed by the age range of 35-44 (24%), and those aged between 45-49 (16%) of the total respondents. The young mothers were within the age range of 15-24 (12%).

Occupation of the respondent

Most of the respondents were peasants (65, 65%), followed by 19 (19%) who were self-employed and 16 (16%) that were civil servants (Figure 1).

Distance from nearest health facilities

According to Table 2, most of the respondents (48, 48%) covered a long distance of more than 10 km to the nearest health facilities, followed by 36 (36%) who covered 5 to 10 km and lastly 16 (16%) who covered less than 5 km.

Marital status

From the findings, most of the respondents were young

and single (46, 46%), followed by the married (17, 17%), the engaged (27, 27%), the widowed (6, 6%) and finally those who separated from their partners 4 (4%) (Figure 2).

Religion of respondents

Majority of the respondent by religion (74, 74%) were Christians while the minority (26, 26%) were Muslims (Figure 3).

Level of education

Table 3 shows that the majority of the respondents (60, 60%) had primary status of education, 24 (24%) had no formal education, 12 (12%) had secondary form of education and finally 4(4%), had tertiary education.

Knowledge of preeclampsia

Table 4 shows the respondents' knowledge on preeclampsia. Those who had no knowledge were 60 (60%) while those knowledgeable were 40 (40%).

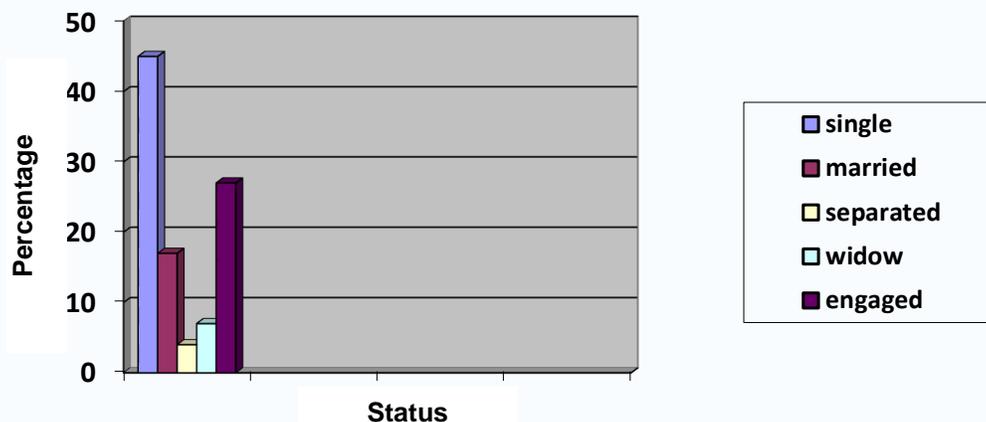


Figure 2. Marital status of the respondents.

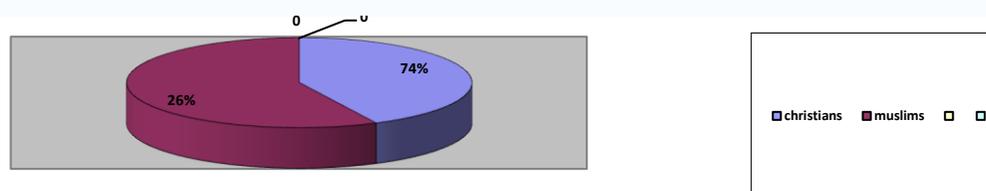


Figure 3. Respondent's religion.

Table 3. Level of education of the respondents.

Education level	Frequency	Percentage
No formal education	24	24
Primary	60	60
Secondary	12	12
Tertiary	4	4
Total	100	100

Table 4. Respondents knowledge on preeclampsia.

Knowledge on preeclampsia	Frequency	Percentage
Have no knowledge	60	60
Have knowledge	40	40
Total	100	100

Attitude of respondents on preeclampsia prevention

According to Table 5, 64(64%) had positive attitude towards preeclampsia prevention, 22(22%) had negative attitude towards preeclampsia prevention while 14 (14%) had no response.

According to Table 6, majority of respondents (68,

68%) could not access health facilities and services citing the reasons such as unaffordability of health services, long distance to the nearest health facilities, absence of health facilities and services, insecurity while looking for health services and presence of a few health workers in the available health workers, making them to seek other alternatives when they are sick. Only a minority (32, 32%)

Table 5. Attitude of respondent towards maternal mortality prevention.

Attitude	Frequency	Percentage
Positive attitude	64	64
Negative attitude	22	22
No response	14	14
Total	100	100

Table 6. Accessibility and affordability of health facilities.

Accessibility and affordability	Frequency	Percentage
No	68	68
Yes	32	32
Total	100	100

Table 7. Medical history during prenatal care.

S/N	Medical history	Frequency	Percentages
1	Blood pressure equal or more than 140/90mmhg.	25	25
2	Severe headache	20	20
3	Blurred vision	14	14
4	Upper abdominal pain	16	16
5	Nausea and vomiting	15	15
6	Shortness of breath	10	10
	Total	100	100

Table 8. Laboratory investigation results.

S/N	Results	Frequency	Percentage
1	Proteinuria	48	48
2	Reduced urine output	26	26
3	Thrombocytopenia	19	19
4	Impaired liver functions	7	7
	Total	100	100

said that the health facilities were accessible, affordable and efficient.

According to Table 7 on medical history of the respondents during prenatal care, most of the respondents (25%) had increased blood pressure more than 140/90 mmHg, 20% had a complain of severe headache, 14% had blurred vision, 16% had upper abdominal pain, 15% had nausea and vomiting while 10% also had shortness of breath.

According to Table 8 on the laboratory investigation results, 48% of respondents had increased proteins in urine (proteinuria), 26% had reduced urine output, 19% had thrombocytopenia, while 7% had impaired liver function.

According to Table 9, 39% of the respondents experienced fits/convulsion as a complication of preeclampsia, 24% had pulmonary edema, 20% had kidney failure while 17% had liver failure.

DISCUSSION

The findings and results obtained in the study is discussed with a view to getting information on hypertension as it relates to pregnant women and the role of medics (Young et al., 2012). According to the study, most of the respondents were aged between 25-34(48%), followed by the age range of 35-44 (12%) and age of

Table 9. Complications during clinical examination and diagnosis.

S/N	Complications	Frequency	Percentage
1	Fits /convulsions	39	39
2	Pulmonary edema	24	24
3	Kidney failure	20	20
4	Liver failure	17	17
	Total	100	100

between 45-49 (16%), while the young mothers most of the age 15-24 (12%). This shows that most of the respondents, who were in the reproductive stage of life were much more exposed to preeclampsia than any other group (Hollegaard et al., 2013). Thus, there is need to further educate patients about preeclampsia/eclampsia to decrease adverse outcomes associated with this condition (You et al., 2012a, b).

Most of respondents were peasants 65 (65%), followed by 19 (19%) who were self-employed and 16 (16%) who were civil servants. This shows that poverty is one cause of high rate of preeclampsia since most of the respondents could not afford to travel or look for health facilities in case of maternal health problems (You et al., 2012b). According to the study, most of the respondents (48, 48%) covered a long distance of more than 10 km to the nearest health facilities, followed by 36 (36%) who covered 5 to 10 km and lastly 16 (16%) who covered less than 5 km. Distance was also a contributing factor to maternal health problems like preeclampsia since the health facilities were more than 5 km from most of the respondents; therefore most of the residents prefer the alternative to the standard health facilities. This is as a result of the patients' understanding of the implication of preeclampsia/eclampsia if not treated on time (You et al., 2012b; Heidrich et al., 2013; Lo et al., 2013). The findings showed that the majority of the respondents (60, 60%) had primary status of education, 24 (24%) had no formal education, 12 (12%) had secondary form of education and finally 4 (4%) had tertiary education. This shows that they did not have knowledge on the cause and prevention of maternal health problems like preeclampsia or eclampsia and education is also a factor that determines the maternal mortality. In addition, patients who were exposed to a graphics-based educational tool showed superior pre-eclampsia/eclampsia related knowledge compared to those who were exposed to little or no education (You et al., 2012b; Seely et al., 2015). From the findings, most of the respondents were young and single (46, 46%), followed by the married who were 17 (17%), the engaged who were 27 (27%), the widowed who were 6 (6%) and those who separated from their partners (4, 4%). This indicates that they could not support themselves in form of financial needs in case of maternal health problems since they were single mothers. Majority of respondents by religion (74, 74%)

were Christians while the minorities (26, 26%) were Muslims. Hence, Christians were more exposed to maternal health problems like preeclampsia/eclampsia than any other religion (Ferrer et al., 2000; Solomon and Seely, 2011).

According to the study, the findings showed that respondents' knowledge on maternal mortality due to preeclampsia includes those who had no knowledge (60, 60%) and those who had knowledge (40, 40%). Most of the respondents had no knowledge on maternal mortality due to complications of preeclampsia/eclampsia (Repke et al., 2002). According to the information, 64 (64%) had a positive attitude towards maternal mortality due to preeclampsia prevention, 36(36%) had no response. According to the information, majority of the respondents (68, 68%) could not access the health facilities and health services. while minority 32(32%) said that the health facilities were accessible, affordable and efficient (Heidrich et al., 2013; Garg et al., 2014).

Information on medical history during prenatal care showed that about 25% of the respondents had increased blood pressure of more than 140/90 mmHg, severe headache (20%), upper abdominal pain (14%) and only 10% had breath issues among other clinical issues. This history indicates that the respondents had clinical conditions that could predispose to preeclampsia/eclampsia (Spratling et al., 2014; Imes et al., 2015; Zoet et al., 2015). Laboratory diagnosis of the respondents which revealed increased proteinuria (48%), reduced urine output (26%), thrombocytopenia (19%) and impaired liver function (7%) may be adduced to the presence of biomolecules normally associated with pregnancy-induced hypertension/eclampsia (Mehta et al., 2015), which are potent risk factors. Clinical complications experienced by respondents which included 39% convulsion, 24% pulmonary edema, 20% kidney failure, 17% liver failure are indications of cardiovascular implications of preeclampsia/eclampsia (Seely et al., 2013; Burgess and Founds, 2016).

Conclusion

Majority of respondents, had no knowledge on cause, complication and prevention of preeclampsia/eclampsia and the ignorance could lead to increase in, or could cause maternal mortality.

Other problems identified that could lead to preeclampsia among pregnant mothers were poor health education to pregnant mothers since most of them had only primary education, poor roads and insecurity, poverty, long distance to health facilities, harassment by the health workers, unaffordable health services, lack of health workers and lack of education.

RECOMMENDATIONS

1. Government should encourage health education on causes and prevention of the preeclampsia and its complications.
2. Pregnant mothers should take the antenatal care very seriously.
3. Mothers should be encouraged to deliver in the hospital.
4. Eradication of poverty should be carried out by the government.
5. Government should provide enough health facilities and health workers.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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Full Length Research Paper

Auditory effects of noise and its prevalence among sawmill workers

Bright Otoghile¹, Paul Adekunle Onakoya² and Confidence Chioma Otoghile^{3*}

¹Department of Otorhinolaryngology, Federal Medical Centre, Yenagoa, Bayelsa State, Nigeria.

²Department of Otorhinolaryngology, University College Hospital, Ibadan, Oyo State, Nigeria.

³Department of Psychology, Faculty of Social Sciences, Obafemi Awolowo University, Ile-Ife, Osun State, Nigeria.

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Noise at work could be hazardous, particularly after prolonged period of exposure. Sources of noise include generators, grinding machines, loud music at home, religious houses and clubs. The objective of this study was to find the auditory effects of noise and its effects on sawmill workers. This is a prospective, community based study involving sawmill workers in Ile-Ife. The prevalence of hearing loss was determined and the pattern of hearing loss was evaluated among the workers. Four hundred and twenty sawmill workers were recruited into the study of whom 410 were males and 10 females. The prevalence of hearing impairment was 89.7%. Ninety three of them had hearing threshold greater than 40 dB, and it was bilateral in all the cases. Tinnitus was present in 41 (9.8%) subjects. The main auditory effects of occupational noise among sawmill workers are hearing loss and tinnitus.

Key words: Auditory, noise, prevalence, sawmill workers.

INTRODUCTION

Noise is an unwanted sound, particularly complex sounds that lacks a musical quality (Stedman's Electronic Medical Dictionary, 2000). Prolonged exposure to hazardous noise levels could predispose to noise induced hearing loss and this is a well-known entity in the practice of otolaryngology (Valoski, 1994 and Azizi, 2010). Occupational hearing loss is noise induced hearing loss (NIHL) due to chronic overexposure to hazardous sound levels of noise in the work place (Gates and Clark, 2012). Noise is a major cause of occupational illness (Uimonen et al., 1998). Sources of occupational noise include generators, grinding machines, religious houses and clubs. Hearing loss from hazardous noise is

an occupational illness among artillery men, ironsmiths, workers in the power houses and highly mechanized industries, sawmills among others. Possible effects of noise include acoustic trauma, tinnitus, temporary threshold shift, permanent threshold shift and interference with communication. Noise has been identified as a variable that could affect public health negatively (Basner et al., 2014). Hence an effective noise prevention program is important initiative which should consist of identification of noise sources and the implementation of noise control measures and regulations of work environments as well as performing periodic audiological evaluation of those who are

*Corresponding author. E-mail: otoghilebright@gmail.com.

exposed to noisy environments. This study aims to find the auditory effects of noise and its prevalence among sawmill workers.

METHODOLOGY

Study design

This is a prospective, community based study involving sawmill workers in Ile-Ife with noise related data obtained from the sawmill workers.

Study setting

The study was done in Ife East Local Government Area of Osun State in the southwestern part of Nigeria where more than 500 sawmills are located.

Study protocol

Ten workers were selected from each sawmill, and 42 sawmills were used for the study with a total of 420 sawmill workers were recruited for the investigation. The inclusion criteria involved all adult male and female sawmill workers including male and female in Ife East Local Government area between ages of 18 to 60 years who gave consent for the study. The exclusion criteria included any history and examination findings suggestive of active ear disease at the time of recruitment, head injury, previous chronic ear diseases such as recurrent episode of vertigo, chronic otitis media, use of ototoxic drugs, as well as medical conditions such as diabetes mellitus, and sickle cell disease. The sound level at each work station of the saw mill was measured with a sound level meter when the machines were in operation.

Pure tone audiometry was done on all the participants using an international organization for standardization (ISO) standard calibrated screening audiometer that was used to determine the hearing threshold for octave frequencies between 250 to 8000 Hz. Conductive hearing loss was ruled out by a negative history of ear ache, ear discharge at time of recruitment, previous history suggestive chronic ear disease such as chronic otitis media, feeling of aural fullness and autophony. This was followed by an ear examination to ensure participants had a patent external auditory canal, no active ear discharge, intact and shiny tympanic membrane with a normal light reflex. A Tuning fork test was also done to rule out conductive hearing loss. Pure tone audiometry was done according to guidelines recommended by the American Speech Language Hearing Association (American National Standards Institute, 2004).

Pure tones were delivered to one ear at a time at octave frequencies between 250 to 800 Hz and the threshold for each frequency taken as the lowest decibel hearing level at which response occurred in at least one half of the ascending trials (Campbell, 1998). Pure tone average was determined by finding the average thresholds from 500, 1000, 2000 and 4000 Hz frequencies, respectively for each ear. The degree of hearing loss in the less affected ear was used in order to determine the prevalence of those who experience a hearing loss. Hearing loss from the audiogram was defined as pure tone average greater than 25 dBHL and categorized (Appendix VIII) as slight (26-40 dBHL), moderate (41-60 dBHL), severe (61-80 dBHL) and profound (81 dBHL or greater) (Mathers et al., 2000). The tinnitus handicap inventory developed by Newman was used to grade the level of tinnitus (Newman et al., 1996). Data were analyzed and results presented in descriptive format.

RESULTS

Four hundred and twenty sawmill workers were recruited into the study that includes 410 males and 10 females. The age grouping of the participants and characteristics of variables are shown in Table 1. The maximum level of occupational noise as measured by a sound meter was 99.5 dB and the minimum 81.9 dB with a mean of 87.7 ± 1.87 dB. An average hearing threshold in the better ear was 36.21 ± 3.53 dB. Table 3 shows 377 sawmill workers had a hearing threshold greater than 25 dB which was bilateral in 234 of the subjects. Hence, the prevalence of hearing impairment was 89.7% with ninety three of them having hearing threshold greater than 40 dB that was bilateral in all the cases. Tinnitus was present in 41(9.8%) subjects and bilateral in 32 cases with the average tinnitus score at 19.8 ± 2.89 .

DISCUSSION

Worldwide, noise-induced hearing impairment is the most prevalent irreversible occupational hazard (Berglund et al., 1999). Noise induced hearing loss has been shown to be more common in males (Wu et al., 1998; Thorne et al., 2008; Razman et al., 2010). This trend may be as a result of males being more exposed to occupational noise than females as observed with sawmill workers during this study. This corroborates the findings by Ighoroje et al. (2004) who also found that sawmill workers are predominantly males. Prolong exposure is known to be hazardous and the effects could be both auditory and non auditory. The auditory effects of noise could be affected by the duration of exposure, intensity of the noise, whether continuous or interrupted noise, co-existing ear disease and the susceptibility of the individual to noise. According to American College of Occupational and Environmental Medicine (2003), occupational noise induced hearing loss (ONHL) as opposed to occupational acoustic trauma, is hearing loss that develops slowly over a long period of time (several years) as a result of exposure to continuous or intermittent loud noise and it is characterized by being sensorineural, symmetric and bilateral, the risk of having it increases significantly with chronic exposures above 85 dBHL for an 8-hour time-weighted average. The average noise level measured at the sawmills in this study was 87.7dB as shown in Table 1, and majority of them are exposed to the noise at the sawmill for up to 8hours a day. Hence, sawmill workers are particularly exposed to loud and hazardous noise.

Table 2 shows that most of the sawmill workers particularly the bandmill operators, saw doctors, and re-saw operators are exposed to loud noise for a significant duration of at least 8 h. The auditory effect of prolong exposure to loud noise found in this study were hearing loss and tinnitus. Hearing impairment was prevalent (89.7%) among the sawmill workers in this study. This

Table 1. Summary of demographic data and variables.

Demographic characteristics of subjects	
Age(years)	Sawmill subjects (N, %), N=420
≤ 20	9 (2.1)
21-30	158 (37.6)
31-40	175 (41.7)
41-50	74 (17.6)
51-60	4 (1.0)

Summary of variables	
Variable	Mean score±SD
Mean occupational noise (dB)	87.70±1.87
Hearing threshold(dB)	36.21±3.53
Mean tinnitus score	19.80±2.89

Table 2. Occupational noise, duration of exposure and hearing threshold of sawmill workers.

S/N	Workplaces/machines	Average noise level (dB)	Average working hours	Average hearing threshold (dB)
1	Director	80.9	4	26.41
2	Manager	81.6	6	29.62
3	Bandmill operator	94.5	9	44.70
4	Re-saw operator	91.7	9	39.25
5	Circular cross cutting saw operator	93.5	9	38.50
6	Saw doctor	95.8	8	42.10
7	Off loader	83.4	6	36.80
8	Other workers (wood sellers, cleaners)	82.3	6	35.50

Table 3. Severity of hearing loss among the participants.

Severity of hearing loss	Side of lesion			Total
	Right	Left	Bilateral	
26-40 dBHL	16	34	234	284
41-60 dBHL	0	0	93	93
61-80 dBHL	0	0	0	0
≥81 dBHL	0	0	0	0
Total	16	34	327	377

is higher, compared to findings from a similar study in Calabar, Nigeria by Dickson (1990) who found a prevalence of 71%. Hearing threshold of 41dB and above is said to be disabling (Mathers et al, 2000) and this was found in 93 (22.1%) of the subjects recruited for the current study.

According to Nelson et al. (2005), 16% of the disabling hearing loss in adult is attributed to occupational noise, ranging from 7% to 21% in the various sub-regions of the world. The majority of the sawmill workers with hearing

loss had a bilateral condition (Table 3) which is typical of noise induced hearing loss. Hearing deficits may be accompanied by tinnitus (ringing in the ears). Tinnitus was another condition that was found in 9.8% of the subjects. Axelsson and Barrenas (1991) found that 33% of patients with tinnitus have a previous history of exposure to occupational noise. Hence, tinnitus could occur as a result of exposure to loud noise. Prolonged exposure to noise is known to cause damage to the sensory epithelium of the cochlea. Damage to the

cochlea and altered rate of auditory firing may result in tinnitus (Møller, 1984; Salvi et al., 2000). Prolong exposure to noise can result to hearing loss which can potentially be disabling in nature and it can also cause tinnitus.

Conclusion

Hearing loss and tinnitus which are auditory effects of prolonged exposure to loud noise are prevalent among sawmill workers. It is therefore recommend that all sawmill workers should be encouraged to use hearing protecting devices such as ear muffs, plugs and this should be ensured. Periodic audiometric evaluation should also be encouraged and the design and technology of the machines should be modified to reduce noise emission.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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Full Length Research Paper

Profile and management of community acquired pneumonia in a tertiary care hospital in Karachi

Maqsood A. Khan^{1*}, Zeb-un-nisa¹, Syed I. Ali¹, Sadia S. Kashif¹, Farya Zafar², Huma Ali⁴, Rasheeda Fatima³, Hafsa Sohail³ and Sarwat Jahan¹

¹Faculty of Pharmacy, Ziauddin University, Karachi Sindh, Pakistan.

²Department of Pharmaceutics, University Of Karachi Sindh, Pakistan.

³Department of Pharmacy Practice, Ziauddin University, Karachi Sindh, Pakistan.

⁴Institute of Pharmaceutical Sciences, Jinnah Sindh Medical University, Karachi Sindh, Pakistan.

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The objective of this study was to assess the demographic profile, severity of patient, co morbidity, length of stay (LOS) and management of community acquired pneumonia. The study was a prospective study and consist of 212 patients (>20 years of age) with community acquired pneumonia (CAP) hospitalized to the tertiary care hospital, situated in Karachi between 1st January, 2010 and 31st March, 2012. Information related to demography and socioeconomic condition (gender, age, education, occupation and household income) and clinical details includes, evaluating severity using pneumonia severity index (PSI) score, laboratory finding, initial antibiotics prescribed, and hospital stay were composed. Demographic, socioeconomic and clinical variables were analyzed using descriptive statistics which is presented as percentage, frequencies, range and means. 116 (54.7%) patients had less severe pneumonia; 60 (28.3%) patients had moderately severe CAP and 36 (16.98%) patients had severe pneumonia. Commonly prescribed monotherapy of antibiotics initially on hospitalization were intravenous ceftriaxone 36 (16.98%). We recommend prospective multicenter setting studies to analyze the prevalence and burden of CAP in Pakistan. Improved assessment and proper utilization of guidelines is mandatory in the management of patients admitted with CAP.

Key words: Community acquired pneumonia (CAP), length of stay (LOS), antibiotic and pneumonia severity index (PSI).

INTRODUCTION

Community-acquired pneumonia (CAP) is considered to be the most growing disease of the modern world (Pletz et al., 2016). Lower respiratory tract infections are considered to be the greatest reason of death in terms of

infectious disease and third most common cause of death overall (Wunderink and Waterer, 2014).

In European Union, 1 per 1000 of their population is a victim of CAP while 68.8% individuals suffering from CAP

*Corresponding author. E-mail: maqsoodkhan711@yahoo.com.

required hospitalization (Blasi et al., 2013). In United States of America, the frequency of CAP is around 3 to 5 cases per 1000 individuals with mortality of 5.0 to 15.0% which were hospitalized. Hence, CAP is categorized as one of the infectious diseases that require sudden hospital attention in all countries of the world (Onyedum and Chukwuka, 2011). Around 1.9 million deaths per year are being caused by pneumonia (Ramachandran et al., 2011). According to the study conducted in Karachi related to seasonal variation in incidence of community acquired pneumonia, it stated that an average of 77 cases per month of community acquired pneumonia were reported in hospitals in Karachi (Raza et al., 2012).

The most populous and largest city of Pakistan is Karachi and it is ranked as the 7th most populous urban city in the world. An estimated population of Karachi is over 23.5 million people as of 2013 (Karim and Afzal, 1995). *Chlamydomphila pneumoniae* causes respiratory tract infections including pneumonia. It has been diagnosed in the last 15 years where *C. pneumoniae* is the pathogen that causes CAP (Chedid et al., 2007). Elderly individuals are more prone to CAP in comparison to younger individuals (Stupka et al., 2009).

The treatment guideline available and used in our country is Pakistan chest society, used for the management of community acquired pneumonia in adults and include; Inpatient and non-ICU treatment.

(a) A β -lactam plus macrolide (Preferred β -lactam agents include ampicillin; 500 mg-1 gm tid/Benzyle Penicillin 1.2-2.4 Gm qds (600 mg = one million units), cefotaxime, ceftriaxone. (A respiratory fluoroquinolone should be used for penicillin allergic patients).

(b) A respiratory fluoroquinolone or a macrolide alone.

Due to increase in resistance rates it is recommended that empirical therapy with single agent can be used only for the treatment of carefully selected hospitalized patients with no severe disease (<http://www.pakistanchestociety.pk>).

MATERIALS AND METHODS

This is a prospective study, consisting of 212 patients with CAP hospitalized to the public sector hospital between 1st January, 2010 and 31st March, 2012. The hospital is situated in Karachi, Pakistan, and has 1185 beds, which is a tertiary care center, an area with a population of approximately 23.5 million people as of 2013 (<http://tribune.com.pk>, 2014). This hospital is one of the largest public hospitals in the city.

The inclusion criteria consist of over 20 years of age, having been diagnosed with pneumonia (which has chest X-ray findings and presence of one or more symptoms). The exclusion criteria consist of HIV patients and pregnant women believe to have nosocomial pneumonia. The study design was accepted and supported by the Research Ethics Committee of the University, attached with the hospital.

On admission, the following demo-graphic parameters were retrieved that is gender, age, education, marital status, smoking

habits and occupation. The patients were categorized based on pneumonia severity index (PSI) (Corr ea and Lundgren, 2009; Fine et al., 1997). This study received no funding support.

The null hypothesis was that, there is no difference in socioeconomic and demographic proportions distribution of CAP. The collected data was examined by SPSS-15. Demographic and clinical variables were calculated by using descriptive statistics.

RESULTS AND DISCUSSION

Table 1 summarizes the socioeconomic and demographic profile of the patients. Overall, 212 patients with CAP (mean age 52 years (range: 20 to 90 years), 126 (59.4%) male and 86 (40.57%) females were recruited in this study. Regarding occupation, 50(23.58%) was unemployed. In Table 2 it is summarized that at admission, 151(71.22%) were associated with comorbid condition, 55(25.94%) possess hypertension diseases and 38(17.92%) possess diabetic disease all these were the most commonly comorbid conditions. Mean length of stay in hospital was 7.77 days in patients hospitalized due to community acquired pneumonia. Most commonly occurring symptoms were cough, sputum production and breathlessness. 116 (54.7%) patients had less severe pneumonia, 60 (28.3%) had moderately severe CAP and 36 (16.98%) patients had severe pneumonia. Community acquired pneumonia (CAP) is a serious illness of respiratory system which is prevalent and occur both in developing and developed nations. Its frequency and severity change with different human demographic features (Figures 1 and 2).

Complete studies which analyze the profile, management and outcome of patients with CAP are not easily obtain in Pakistan and those that had been found, majorly focused on the etiological profile and were performed in children. The main findings were;

- i. It was inspected that the frequency of CAP was inversely proportional to the socio-economic class. The lower class exhibits the highest frequency (53.77%) of CAP patients.
- ii. Hospitalized cases were mainly the male patients with CAP.
- iii. The frequency of patients with age 61 to 70 years comprised 24.53% of those hospitalized.
- iv. The percentage of patient who was admitted with CAP and may not need admission at this center was 54.71% which had less severe pneumonia with PSI score of I and II.
- v. it was found that comorbidity were frequent in patients with CAP and the hypertension was frequently found in 25.94% of those that were screened.
- vi. X-rays and CBC were most commonly recommended in the laboratory and diagnostic tests. The most commonly prescribed antibiotic was ceftriaxone in admitted patient due to CAP (Tables 3 and 4).

The greater frequency of male were hospitalized with

Table 1. Results of a public tertiary care hospital.

Demographic parameter	Frequencies (n=212)	%	Gender	Frequencies	%	SES	Frequencies	%
Age								
21-30 years	28	13.21	Male	126	59.4	Lower	96	45.28
31-40 years	43	20.28	Female	86	40.57	Middle	110	51.89
41-50 years	28	13.21	-	-	-	Upper	6	2.83
51-60 years	34	16.04	Smoker	70	33.02	Marital status	-	-
61-70 years	52	24.53	Former smoker	20	9.43	Married	188	-
71-80 years	21	9.91	Non smoker	122	57.55	unmarried	24	-
81-90 years	6	3.30	-	-	-	-	-	-
Unemployed	50	23.58	Household income up to 10,000	114	53.77	-	-	-
Retired	30	14.15	Household income up to 20,000	87	41.03	-	-	-
Service sector	50	-	Household >20,000	11	5.19	-	-	-
Labour (Home maker, Maid, Cleaner)	56	26.42	-	-	-	-	-	-
Self-employed profession	26	12.26	-	-	-	-	-	-

Table 2. Comorbidity and PSI.

Comorbidity	Frequencies	%	PSI class	Frequencies	%
Hypertension	55	25.94	PSI class I	48	22.64
Diabetic disease	38	17.92	PSI class II	68	32.07
Liver diseases	15	7.07	PSI class III	60	28.30
Renal diseases	10	4.71	PSI class IV	21	9.91
Reparatory diseases	30	14.15	PSI class V	15	7.07
CNS diseases	3	1.42	Mean LOS	7.77 days	-
			-	-	-

Table 3. Diagnosis and laboratory assessment.

Tests	Frequencies	%
X-RAY	212	100
CBC	180	84.91
SEUC	26	12.2
Sputum culture	68	32.07
Blood culture	30	14.15

Table 4. Commonly antibiotic monotherapy prescribed in adults

Antibiotics	Frequencies	%
Ceftriaxone	36	16.98
Coamoxiclave	16	7.54
Clarithromycin	9	4.24
Moxifloxacin	4	1.88
Ceftazidime	6	2.83

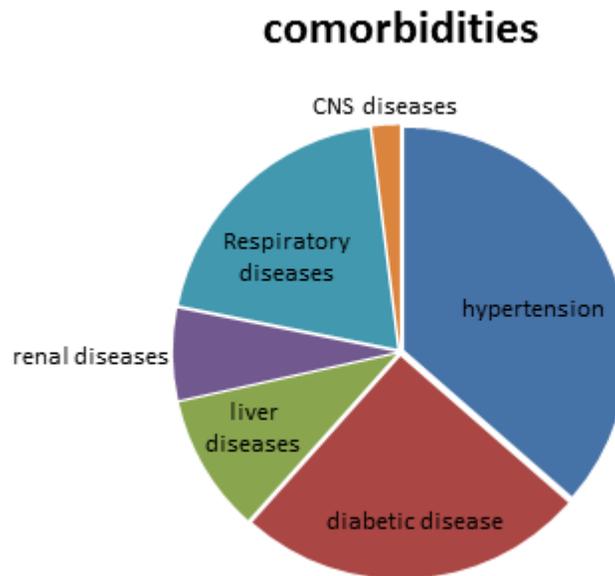


Figure 1. Comorbid conditions of the patients.

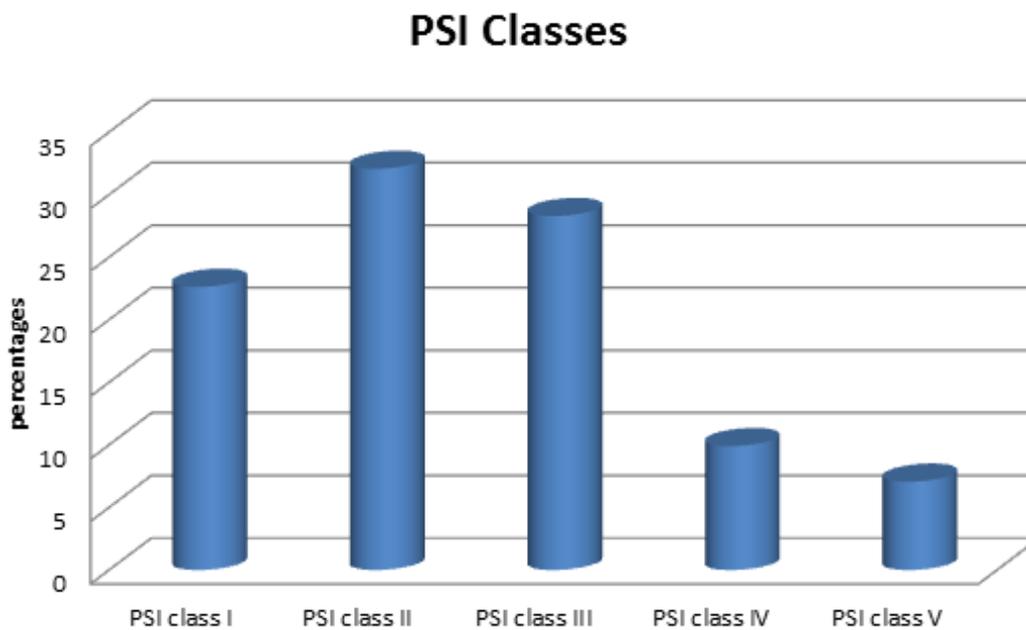


Figure 2. Pneumonia severity index classes based on severity of diseases.

pneumonia as reported in previous studies by Sow et al. (1996), Fiberesima and Onwuchekwa, (2007) and Man et al. (2007). Older people were further affected with about 35% of them, being older than 65 years of age. This is not astonishing as, it exhibit that elderly people tend to have more attacks of severe CAP which have greater chance to be hospitalized during the course of the disease. In the present study, the laboratory assessment was that x-ray were prescribed for 100% patients and sputum culture was prescribed for 32% patient, same result were reported in a study in which it is reported that 100% patients were recommended for chest X-rays and 31% were prescribed for sputum culture (Onyedum and Chukwuka, 2011).

However 71.21% of the total number of patients had comorbidity illness associated with comorbid hypertension, diabetic disease, liver diseases, renal disease, respiratory disease, CNS diseases while 61(28.77%) patients were without comorbidity etc. This is higher than what was obtained in other study conducted in 2011 in Nigeria (Onyedum and Chukwuka, 2011) with comorbidity prevalence 38.8%.

The PSI categorization recommend that a large part of patients who could be treated as outpatients were admitted, this was particularly true for 54.71% patients, and were associated with PSI I or II. Inversely, the PSI classified 45.28% of CAP cases among the patients as cases for hospitalization.

Generally patient was from very low income class, living low profile areas where opportunity to approach health care facilities can be examined poorly and the decision rates are examined as low. The teams who initially assess patients selected for admission in order to access the proper utilization of medications, as well as the upcoming clinical examination of patients, particularly the older individuals with chronic illness and similar pattern, were also found in other study conducted by Chedid et al. (2007).

Frequently prescribed antibiotic at first on hospitalization was intravenous ceftriaxone alone (16.98%). To determine the evaluation of antibiotic, it is use in accordance to the criteria developed through the guideline of Pakistan chest society, for the management of community acquired pneumonia in adults for inpatient treatment. This study results showed that, only 16.98% patients were treated in accordance to this guideline. A wide variation exists in the treatment pattern of community acquired pneumonia in adults in this hospital setting.

Conclusion

Important consideration should be given to Severity assessment scores for CAP in the initial assessment of patients with CAP, to stop needless hospitalization. Majority of the patients tend to have co morbidities like

diabetes mellitus and hypertension so, assessment of comorbidities should be done on priority bases.

There is an urgent need to start the continuing medical education on institutional and national levels to make sure of the proper management of these cases.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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