

The Prevalence and Causes of Non-Steroidal Anti-Inflammatory Drugs and Paracetamol Abuse among the Local People of Ndola City

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Abstract

Non-steroidal anti-inflammatory drugs are a drugs that are used to treat inflammatory processes and also used to relieve pain in inflammatory areas of the body by inhibiting two enzymes that are involve in inflammation. This group of drugs includes aspirin, Indometacin, Brustan, Diclofenac, Ibuprofen, Sulindac, Naproxen, Piroxam, and Paracetamol. Though Paracetamol is included in here, it does not basically work in the same way as other NSAIDS and does not prevent inflammation but it relieve pain and is also commonly abused. These drugs are used to treat wide variety of pain such as headache, backache, dysmenorrhea, muscular pains etc. people overuse them and this cause many effects in the body of humans. The study focused on the prevalence, the most affected group of people that abuse the NSAIDS and Paracetamol the signs and symptoms associated with the abuse of NSAIDS. The study was a cross sectional study which focused on residents Ndola district of Copperbelt province of Zambia.

Objectives: The objectives of this research were to determine the causes, associated risk factors and prevalence of NSAIDS abuse cases among the residents of Ndola city.

Methodology: The study was a cross-sectional study that targeted Ndola city residents both males and females aged 18 years and above. The sample size was 385 but only 371 questionnaires were filled give a response rate of 96%the study was conducted from June 2020 to January 2021. The data was analyzed using SPSS software considering the frequencies and the chi-square method.

Results: Out of 371 respondents 198 were females which make 53.4% and 173 were male which make up to 46.6%. The mean age was young adults making up to 63.3%, above 45 years old was 14.6%, 18.6% were middle age. 52.8% were tertiary education. 32.6% were of secondary education the remaining percentage was primary education and illiterate which. 89.1% used pain killers. Brufen, diclofenac and paracetamol were the most commonly used drugs. 9.23% of the population was found to abuse drugs No associated risk factor pain killer use was found however female sex showed to use pain killers more than males. Those above the age of 45years used pain killers than younger age.

Conclusion: We have shown that on average about 9.23% of the population abuse pain killers however no factor was identified to contribute the abuse of these drugs further studies on this topic will help to establish the factors responsible for abuse of these pain killer drugs.

Recommendations: Based on my finding from this research I recommend that the Zambia medicines regulatory committee should step up there inspections of shops and drug stores possibly to limit the sale of pain killers to pharmacies that have a qualified pharmacists who can guide the people who buy pain killers on the dosage and duration of taking pain killers, the ZAMRA also should start conducting health education to educate the people about the side effects of using and abusing pain killers.

Keywords: Brustan • Diclofenac • Ibuprofen • Ulindac • Naproxen • Piroxam

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Received: 13 September, 2021; **Accepted:** 27 September, 2021; **Published:** 04 October, 2021.

Introduction

Non-steroidal anti-inflammatory drugs (NSAIDs) are a group of drugs that are used to treat inflammatory conditions. They provide symptomatic relief in acute and chronic inflammation but do not improve the course of chronic inflammatory conditions such as rheumatoid arthritis in which there is structural disability and deformity there is considerable variation in clinical response. Other types of pain including headaches, dysmenorrhea, muscular sprains and other soft tissue injuries which are mild and pain from metastatic deposits in the bone etc which are severe may respond to NSAIDs treatment. These drugs are commonly known as analgesia or pain killers.

They inhibit prostaglandins biosynthesis by inhibiting cyclo-oxygenase (COX), this is the basis of most of their therapeutic as well as their undesired actions. Prostaglandins are important mediators of the erythema, edema, pain and fever of inflammation and the key enzymes in the synthesis of these mediators is COX, and there are two main isoforms of the enzyme COX-1 and COX-2. COX-2 is expressed in inflamed tissues as a result of stimulation of cytokines and is also present in lesser extent in healthy organs, including the kidneys.

This group of drugs includes Aspirin Ibuprofen, Brufen, Indometacin, Diclofenac Sulindac Naproxen, Paracetamol, Piroxicam etc. these drugs have adverse effects following prolonged use or following overdose. Some of the adverse effects of NSAIDs are as follows, they cause gastrointestinal bleeding and ulceration and the patient may present with melena and hematemesis if blood loss is not prevented it leads to anaemia, they are associated with higher incidence of myocardial infarction and stroke. In the kidney the cause sodium retention, reduced renal blood flow and renal failure especially in patient with conditions associated with vasoconstrictor catecholamine and angiotensin ii release such as congestive heart failure, cirrhosis. In addition NSAIDs may cause interstitial nephritis and hyperkalemia. Prolonged analgesic abuse over a period of years is associated with papillary necrosis and chronic renal failure. Other adverse effects include bronchospasm, especially in asthmatics, skin rashes and other [1]

Problem statement

Even though the factors that influence the abuse of NSAIDs and Paracetamol are well established in Zambia there is not much research that has been done to ensure the prevalence and effects of abuse of these drugs are established, more over most of the researches that has been conducted concerning this topic has been conducted either in north America or Europe therefore there is need that research is conducted in Zambia to have a well-established information that will help improve the results of treatment of pain by using non-steroidal anti-inflammatory drugs. Most studies done on this topic did not give conclusive information regarding some variables such educational level, income and their influence on the abuse of NSAIDs.

A research conducted in Romania on the prevalence and pattern of NSAID and Paracetamol use revealed that the results obtained were contradictory to those done in Spain and USA on a similar research. It showed that there are only few studies evaluating the role

of other social variables, like the educational level of patients, in the use of NSAIDs. The higher the level of patient's education, the greater the chance to a higher monthly income, that can contribute to health improving through healthier behaviours or through differentiated access to health care. Regarding this issue the results of the previous studies are quite contradictory: a study in Spain showed that individuals with higher-income were more likely to take OTC analgesics while another study conducted on American adults revealed that subjects with lower-income had fewer chances to use OTC-type NSAIDs than those with higher incomes. It also can be considered that, a higher income allows an intellectual greater consumption of OTC analgesics while individuals with low incomes cannot afford the purchase of NSAIDs as OTC drugs [2].

Justification

Despite having well established side effects, lack of information in Zambia concerning the abuse of NSAIDs, the response from few sample of people asked concerning the use of NSAIDs indicated that the abuse of NSAIDs could be very high Therefore the need to do a research concerning this topic. This project will also help in determining the risk factors associated with the prevalence of NSAIDs abuse cases, and whether gender and educational level affect the abuse of NSAIDs as studies done did not bring out conclusive results as to whether educational level will increase or reduce the abuse of over the counter drugs which include NSAID. It will also provide the information that can help in the analysis of social economic, environmental behavioral determinants so as to minimize the abuse of these drugs among the people in the society. It will also provide guidance for policy legislation and finance and mostly important for the development and monitoring of effective public health interventions that will target primary preventions of NSAIDs abuse.

Conceptual frame work

There are several factors that contribute to the abuse of NSAID, these include knowledge about the side effects, chronic pain, and level of income, increased age and access to over the counter drugs. These can be illustrated by the diagram below (Figure 1).

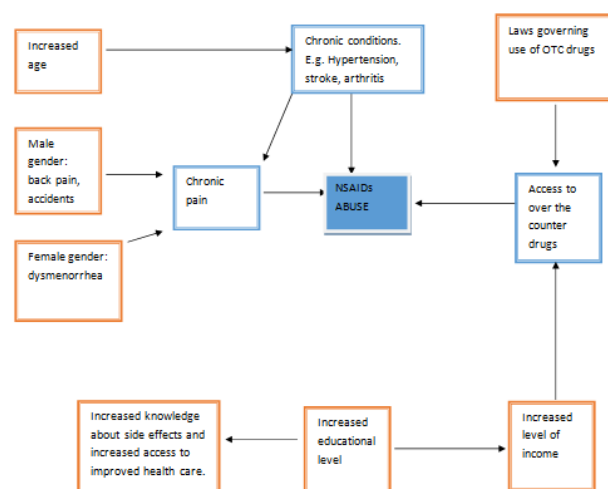


Figure 1. The side effects, chronic pain, and level of income, increased age and access to over the counter drugs.

Research instruments measurements

Eight variables were identified of in this proposal of which three of these variables were dependent variables and five of which were independent variables

Dependent variables

NSAIDs abuse: this is an improper use of NSAIDs which result from long term use for treatment of pain or by overdose.

Independent variables

Chronic pain is defined as the pain that lasts for more than twelve weeks. This pain may be sharp, dull, causing a burning or itching sensation in the affected areas

Chronic conditions: These are human conditions or diseases that are persistent or long lasting in their effects or a disease that comes with time. the term chronic is applied when the disease lasts for more than three months

Access to over the counter drugs: over the counter drugs are medicines that are sold directly to the consumer without prescription from the health care professional, as opposed to the prescription drugs, which may be sold only to the consumer possessing a valid prescription.

Gender: is defined as either of the two sexes that is male or female

Age: is defined as the length of time that the person has live (Table 1).

Age group	Age ranges
Children	3-17 years
Young adults	18-30 years
Middle aged adults	31-45 years
Older adults	Above 45 years

Table 1. Age group.

Laws governing the use of over the counter drugs: a law is defined as a system of rules that are created and enforced through social or governmental institution to regulate conduct

Level of education: is defined as the highest level of school one has attained this may be primary secondary or tertiary level (Table 2).

None	
Primary	Grades 1-7
Secondary	Grades 8-12
Tertiary	Higher education

Table 2. Educational levels.

Level of income: is defined as the amount of monetary or other returns either earned accruing over a given period of time. In this research it is taken as high income or low income based on the assumption that those that have attained higher education may have

a high monthly income and those with lower education may have low monthly income.

The standardized questionnaire will be developed based on the objectives of the research. The questionnaire in this questionnaire will aim at gathering information regarding respondent knowledge about the factors leading to the prevalence of NSAIDs abuse.

- Part one- social demographic characteristics of participants; which will cover factors such as age, sex and level of education
- Part two- reasons for participants to use NSAIDs or Paracetamol
- Part three- question about the type of NSAIDs they use. In this part the participant will be guided
- Part four- questions about the number of tablets taken and the period which they have been taken
- Part five- will contain signs and symptoms associated with prolonged use and overdose of NSAIDs. The participant will be guided (Table 3).

	S.No.	Variables	definition	Scale
dependent variable	1.	NSAID abuse	NSAIDs abuse: this is an improper use of NSAIDs which result from long term use for treatment of pain or by overdose	Abuse 1=Yes 2=No
Independent variables	1.	gender	either of the two sexes that is male or female	1=Male 2=female
	2.	Chronic pain	Is defined as the pain that lasts for more than twelve weeks. This pain may be sharp, dull, causing a burning or itching sensation in the affected areas	1=mild 2=moderate 3=severe
	3.	Educational level	is defined as the highest level of school one has attained.	1=primary 2=secondary 3=tertiary
	4.	Access to the counter drugs	Over the counter drugs are medicines that are	1=access 2=no access

		sold directly to the consumer without prescription from the health care professional, as opposed to the prescription drugs, which may be sold only to the consumer possessing a valid prescription.	
5.	Laws governing the use of OTC drugs	law is defined as a system of rules that are created and enforced through social or governmental institution to regulate conduct	1=Present 2=absent
6.	Income	Is defined as the amount of monetary or other returns either earned accruing over a given period of time.	1=lower, 2=higher
7.	Age	is defined as the length of time that the person has live	1=<18years 2=18-30years 3=31-45years 4=45years

Table 3. Scale and measurements.

Literature Review

Non-steroidal anti-inflammatory drugs are drugs that block cyclooxygenase enzymes (COX) and reduce prostaglandins through the body as a consequence ongoing pain, inflammation and fever are reduced [3]. In other words NSAIDs are analgesic antipyretic and anti-inflammatory drugs. They are commonly used in pain treatment, and as first line drugs for treatment of different medical situations in the obstetrics and gynecology. Their anti-inflammatory properties make them most useful in the management of disorders in which pain is related to the intensity of the inflammatory process. Most currently available traditional NSAIDs act by inhibiting prostaglandins G/H synthetase enzymes known as cyclo-oxygenases. These two convert

arachidonic acid to the unstable intermediates prostaglandins G2 and prostaglandins H2 and lead to thromboxane A2 and a variety of prostaglandins which contributes to pain. At high concentrations, NSAIDs are known to reduce production of superoxide radicals, induce apoptosis, and inhibit the expression of adhesion molecules, decrease nitric oxide synthetase, pro-inflammatory [4].

Other uses of NSAIDs are primary dysmenorrhea which is a cyclic menstrual pains, menorrhagia defined as prolonged (more than 7 days) or heavy (more than 80mL) cyclic menstruation, Pain or heavy bleeding with intrauterine device (IUD), Pain associated with abortion, it has also been discovered that NSAIDs can induce reversible infertility in human, underlining the observation that COX inhibition prevents normal reproductive processes, NSAIDs as tocolytics [5].

A feasibility study conducted over four general practices in Scotland to improve prescribing safety in primary care identified patients prescribed both NSAIDs and anti-platelet. When their medication was reviewed by a GP, the prescription could be changed in one-third of cases. Another study using pharmacists also showed the effectiveness of systematic procedures to identify and reduce inappropriate prescribing. NSAIDs are readily available over the counter and patient education forms an essential part of any risk-reduction strategy with co-prescription of a proton pump inhibitor to patients >65 years or at high risk of GI complications [6].

Objectives

The objectives of this study was to establish the prevalence and causes of Non-steroidal anti-inflammatory drugs (NSAIDs) and Paracetamol abuse among the local people of Ndola city

General objectives: To determine the causes, associated risk factors and prevalence of NSAIDs abuse cases among the people in the city of Ndola.

Specific objectives:

- To establish the prevalence of NSAIDs paracetamol abuse
- To identify common drugs used
- To identify group of people commonly affected
- To establish risk factors associated with NSAIDs and Paracetamol abuse

Research questions: The following questions will be addressed

- Which is the most common drug are abused
- What is the most common group of people are affected. Based on age, educational level, and sex
- What is the reason why people abuse NSAIDs
- To what extent are NSAIDs abused
- What are the side effects that most people experience after using the drug

Methodology

The study will be conducted in Ndola city among the local populations. The study will be a cross will be targeted during the day from 08:00hours to 16:00hours

Study population

The study population will comprise of different classes of people of different age who are 15 years or older, both males and females with different backgrounds in the community and at institutions of learning sectional study looking at the prevalence of abuse of NSAIDS among the local people of Ndola city. Several methods will be used to collect data. These include the use of questionnaires, person to person interviews with the people of different educational back ground in Ndola [7].

Inclusion criteria: All individuals who were 18years old or older are included

Exclusion criteria: All individuals who were younger than 18 years are excluded

Study design

The research design was the cross-sectional study in which the exposure and outcome will be determined simultaneously.

Sample determination

The estimated population of Ndola is 531 000. The following formula will be used to determine the sample size: statistical program for epi info version. Using the information in the table, the sample size (to be randomly selected) needed for Ndola city was 385 this sample will be systematically randomly selected using the formula $1/k$ where k is the sample size (Table 4).

Total population for Ndola	531 000 as in 2019. Estimated current population 550 000
Level of confidence measure (z)	1.96(at 96% confidence)
Margin of error(d2)	5%
Baseline level of indicators (p)	50%
Design effect	2.00 as no information on previous survey is available

Table 4. The information required for computing the sample size.

Individuals in the target population will be selected randomly. And data will be collected using a questionnaire through interviews

Study period

This study will be conducted over a period of seven months from February to August in which the information will be collected and analyzed.

Work plan

- This project is intended to be carried out in a period of about 5 months in the year 2020
- The data will be collected by the use of questionnaires
- This will be done daily for a period of about two months
- Participants will be target form 08:00hrs to 16:00hrs See appendix: action plan

Practical aspects

The study will be done as outlined above. More information about research period has been given in the appendix on the action plan.

Data analysis

The method of data analysis was frequency tables and frequency tables and graphs, the chi-square method

Ethical consideration

Written request to conduct the study was sent to the ethical body, in this case it is Tropical disease research center. The ethical body (TDRC) was assured the confidentiality and data generated will not be used for other purposes apart from those specific in the study protocol. The city authorities in this case Ndola city cancel was notified about the research and a written consent shall be gotten to conduct a research

The respondents who took part in the study will be explained to; in detail about the research and the respondents were allowed to decide whether to participate or not in the study hence ensuring the right of self-determination and autonomy. A verbal consent was accepted if the respondents agreed to take part in the study. The respondents were treated with full respect and their right to privacy and confidentiality shall be observed. Data collected was stored with care that it will not be accessed by anyone apart from the researcher

Study limitations

This study could not give us information on the time taken for the effects of NSAIDs abuse to appear. It did not show how the effects of abuse occur.

Results

Demographics

A total of 371 questionnaires were handed over and about 96.4 of the sample population and questions one to question three were about the demographics gender, age and education level attained all of the 371 responded giving a response rate of 100%.

Variables		Frequency	Percentages
gender	male	173	46.4
	female	198	53.6
	total	371	100
	Below 18 years	13	3.5
	18-30	235	63.3
	31-45	69	18.6
	Above 45	54	14.6
	total	371	100
Educational level	illiterate	3	0.8
	primary	51	13.7
	secondary	121	32.6

tertiary	196	52.8
total	371	100

Table 5. Demographics.

Information about pain killer use

The following results were obtained from question 4 to question 11

The prevalence of pain killer use

Out of 371, 89.1% use pain killers 10.9% do not use pain killers

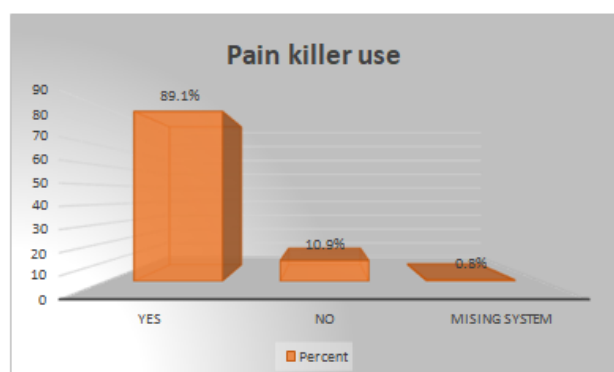


Figure 2. Pain killers' use.

Discussion

Demographics

Out of 371 respondents 198 were females which makes 53.4% and 173 were male which make up to 46.6%. Out of 371 respondents 54 were old age which is about 14.6%, 69 were middle age which make up 18.6%, 235 were young adults which make up 63.3% only 13 were below 18 years old which made up 3.5% these were not supposed to be included in this study seeing that they were under the age of our focus. However they were put here because they responded to the questionnaire. Out of 371 respondents, 196 were of tertiary education which made 52.8%, 121 were of secondary education which made up of 32.6%, 51 were of primary education which made 13.7%, the remaining 3 were illiterate which 0.8% was their percentage.

Information about pain killer use

Out of 371, 89.1% use pain killers 10.9% do not use pain killers. This is in agreement with previously documented information that the majority of people use common pain killers mainly NSAIDS and paracetamol. The most commonly use pain killers were found to be Brufen, Panadol and Diclofenac with their percentages as 27.2%, 32.9% and 28.7% respectively together they make up to 88.8% of all pain killer users. Interestingly, according to Zambia medicine regulatory authority, diclofenac is regulated not be sold in shops. This finding indicates that regulation is not enforced.

Out of 329, 92.7% of people take normal dose which 2 pills or less, 7.3% of people abuse the Spain killers as they take more than 2 pills per dose, 2 of the people did not respond. The most common

dosage was 2 tablets which made 84.2%. of 327, 14.4% take every day, 7.6% take every week, 5.5% take every 2weeks 55 about 16.8% take every month and 55.7% take occasionally, here we see that the prevalence of abuse is high as 14.4 percent however In other studies this information was not indicated. Out of 331, 32.2% get from the hospital, 40.8% buy from the pharmacy, and 26.9% buy from shops this shows that a large percentage of people prescribe these drugs by themselves this give a greater chance of abuse and misuse. 309, 93.9% use drugs as a result of pain, 5.5% use it without pain, 2 which is 0.5% use it for other reasons 2 did not respond to this question basing on the reasons for use we found that 6.0% of people abuse these drugs. Therefore on average 9.23% of the population abuse NSAIDS and Paracetamol. This means that in very 1000 population, there are 92 people abusing NSAIDS and Paracetamol. Out of 317,

72.9 % experienced side effects only 27.1% experienced no side effects. This is in agreement with other studies conducted on this subject. Out of 312, 20.2% had mild pain, 56.1% have moderate pain 23.4%

have severe pain 1 0.3% they did not know 19 did not respond to the question. here we see that about 20.2% of people use the drugs to treat mild pain which might not necessarily need treatment however there might be other reasons as to why they treat mild pain with pain killers one of it being not able to grade the pain so we cannot conclude that they all abuse. 317, 72.9 % experienced side effects only 27.1% experienced no side effects.

Social demographic factors associated with pain killer use

From the above results there was no significant relationship between sex and pain killer use as the p value was more than 0.05(p value=0.159) however the results revealed that females use pain killers more than males. The relationship between age group and pain killer use was not significant as the p value was greater than 0.05(p value=0.364) however old age (above 45 years old) use pain killers more than other ages this is in agreement with the study conducted in Korea. Education had no influence on the number of pills taken by the participants as the p value was more than 0.05(p value=0.213) however the people with secondary education abuse drugs more than these without education, primary education and tertiary education.

Conclusion

From the results we can conclude that on average about 9.23% of the population abuse pain killers however no factor was identified to contribute the abuse of these drugs further studies on this topic will help to establish the factors responsible for abuse of these pain killer drugs. Although Zambia medicines regulatory authority (ZAMRA) regulate the use of many drugs in the Zambian shops and pharmacies it is seems like no emphasis has been put to regulate the use of pain killers because there is no regular inspection concerning this issue.

Recommendations

Based on my finding from this research I recommend that the Zambia medicines regulatory committee should step up there inspections of shops and drug stores possibly to limit the sale of pain killers to pharmacies that have a qualified pharmacists who can guide the people who buy pain killers on the dosage and duration of taking pain killers, the ZAMRA also should start conducting health education to educate the people about the side effects of using and abusing pain killers.

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How to cite this article: Kaliba Kelwin. "The Prevalence and Causes of Non-Steroidal Anti-Inflammatory Drugs and Paracetamol Abuse among the Local People of Ndola City ." *J Clin Res* 5 (2021) : 31239