

RELATIONSHIP BETWEEN MUSCULOSKELETAL PAIN AND ANALGESICS CONSUMPTION IN A RURAL AGRARIAN COMMUNITY IN SOUTH-WEST NIGERIA: IMPLICATIONS FOR RENAL FUNCTION AND HEALTH POLICY FORMULATION

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ABSTRACT

Introduction: Consumption of analgesics in agrarian communities is high with potential risks for renal failure and gastritis. We set out to determine prevalence of musculoskeletal pain and analgesic use, and their association to adverse effects. **Materials and methods:** A descriptive study of adults at a screening exercise in *Laoso* village, Ondo State, Nigeria. Data on musculoskeletal pain, analgesics usage and side effects were collated using interviewer-administered questionnaires. Urinalysis was conducted using *Combi-10* strips. **Statistical Analysis:** Data was analyzed using SPSS-IBM version 20.0. Chi-square was used to determine association between categorical variables ($p < 0.05$). **Results:** A total of 155 adults (M:F=1:1.32) with mean age of 38.3 ± 14.9 years were studied. One hundred and two (65.8%) were farmers while 67.7% had musculoskeletal pain; mostly affecting the lower back (32.4%). One hundred and eleven subjects (74.0%) used mixture of analgesics ("asapo"). The median duration of use of analgesics was 2 years. Nineteen (12.2%) had used "asapo" daily for at least one year. One hundred and eleven (79.9%) procured their drugs from patent medicine stores. Fifty one subjects (34.9%) admit having peppery epigastric pain. Forty subjects (39.6%) had proteinuria of 30mg/dl. There was association between presence of musculoskeletal pain and use of "asapo" ($P=0.048$). There was association between use of "asapo" and presence of gastritis ($P=0.021$). There was no association between occupational type and presence of musculoskeletal pain ($P=0.304$). **Conclusion:** The prevalence of musculoskeletal pain is high among rural dwellers and is associated with increased use of analgesics. Chronic use of analgesics showed no association to proteinuria.

KEYWORDS: Musculoskeletal pain, analgesics, *asapo*, Nigeria, farmers.

INTRODUCTION

Musculoskeletal pain has become a global menace. In Nigeria, it ranked highest among farmers at 89.4%, a figure which compares closely to 91.3% in other developing nations.^[1-3] Unfortunately, rural sub-Saharan Africa is characterized by poorly-equipped and scantily staffed health infrastructure leading to a high patronage of un-qualified healthcare providers and un-supervised use of medications amongst which analgesics rank high in many communities.^[4-5]

Analgesic prescription and sale are largely unregulated in Africa. They are mainly peddled by hawkers (door-to-door, road-side, market square and in commercial buses), patent medicine dealers and pharmacy shops that are mostly run by business men who have no formal training in pharmaceutical practice. They are commonly sold as a mixture of different analgesic preparations and/or brands

which usually include Non-Steroidal Anti-inflammatory Drugs (NSAIDs), acetaminophen, caffeine, and/or codeine. In Southwest Nigeria, this phenomenon is popularly referred to as "asapo" (or "akapo") or "mixture" in *Pidgin English*. Their rationale is that such combinations offer better efficacy than when used singly.

Quantifying analgesic abuse in Nigeria has proven difficult as most users are unaware of the identity and dose per tablet of these analgesics. Oversight function by relevant regulatory pharmaceutical and governmental bodies is also deficient. Local records show that in 2004, The prevalence of analgesic abuse was 22.6% in Jos, North-Central Nigeria while in 2010, 28.59% of subjects took analgesics for ailments that were unrelated to their indications.^[6-7] In Ghana, data obtained from 23 substance abuse treatment centers showed that 44.8% chose analgesics as their primary substance of abuse.^[8]

Analgesics are associated with NSAIDs-induced gastritis and chronic kidney disease (CKD).^[9] However, the prevalence of analgesic nephropathy in Nigeria and Africa has not been fully elucidated due to paucity of studies.^[10] Majority of analgesic-related CKD studies are low level case reports or case series. Only a little over half a dozen case-controlled studies have been conducted so far by different authors in Europe, Australia and North America.^[11-16] Incidentally, only two of them show association between analgesic abuse and renal failure.^[15,16]

To the best of our knowledge, there exists no study to quantify analgesic consumption and their association to adverse effects in our setting. We therefore conducted this study to determine prevalence of musculoskeletal pain and analgesic use, and association (if any) with common adverse effects such as renal failure and gastritis among dwellers of a predominantly agrarian community.

MATERIALS AND METHODS

Study location: The study was conducted in *Laoso* village in Ondo West Local Government Area of Ondo State, Southwest Nigeria. It is a farming settlement comprising of various camps such as *Bolorunduro*, *Agobabagarra* and *Topin* among others with an estimated population of 5,000 people. Its only link to the nearest City is a 2,500km road which is mostly un-tarred. It is served by one Primary Healthcare Centre (manned by a Community Health Extension Worker), eight patent medicine shops and two make-shift clinics which are run by auxiliary nurses.

Study design: A descriptive, cross-sectional study conducted during a community screening exercise in July, 2016.

Inclusion criteria: All consecutive adults aged ≥ 18 years were recruited.

Exclusion criteria: Individuals less than 18 years, who were analgesics-naïve or had used analgesics for less than six months were excluded.

Procedure: At least 3 sensitization visits were made to the community head before and public announcement was made by the local town crier. Participants filled in the questionnaires after an informed consent. We collated information on their bio-data, location of musculoskeletal pain, type of pain relievers used, frequency and duration of use and, their side effects. Questionnaires were administered by trained personnel comprising of 3 medical doctors, 6 nurses, 3 health information managers and 2 medical laboratory technicians.

Blood pressure (BP) was measured with the mercury sphygmomanometer (*Accosons, Germany*) on the right arm after about 5 minutes of rest with subjects in the

sitting position. Hypertension was classified according to the seventh Joint National Committee Report on Detection, Evaluation and treatment of High Blood pressure (JNC 7) report.^[17] Subjects found to have high BP were asked to rest for at least one hour and the measurement was repeated before the exercise was concluded.

Spot urinalysis was conducted using the *Combi-Uriscreen® 10SL* strips on clean catch mid-stream urine samples after due instructions. Those with proteinuria of $\geq 1+$ (30mg/dl) were referred to our facility for a repeat test.

Definitions

Mixture of analgesics (“asapo” or “akapo” or “mixture”): combination of a minimum of two different NSAIDs with or without caffeine, codeine, paracetamol or herbal mixture.

Presence of symptoms of gastritis: positive answer to the question, “do you experience peppery, piercing or burning epigastric upper abdominal pain that is relieved by use of antacid and/or any of H2-receptor blocker or proton pump inhibitor?”

Diagnosis of gastritis: positive response to the question, “have you been told by a medical doctor that you have peptic ulcer before?”

Ethical approval: Ethical approval was received from the Ethics Research Committee of the State Specialist Hospital, Ondo State.

Statistical Analysis: Data was analyzed using the Statistical Package for Social Sciences (SPSS) version 20.0 by IBM. Results were presented in tabular form. Discrete variables were presented as frequency and percentages. Continuous variables were presented as means and standard deviation. Chi-square was used to determine association between categorical variables. P value < 0.05 was taken as significant.

RESULTS

A total of 155 adults aged 18 to 80 years were studied. There were sixty seven males (43.2%) and 88 (56.8%) females (M:F=1:1.32). One hundred and two (65.8%) were farmers. Their mean age was 38.3 ± 14.9 years. Their mean systolic and diastolic blood pressures were 120.1 ± 20.9 mmHg and 73.2 ± 13.0 mmHg respectively. One hundred and five had musculoskeletal pain (67.7%); mostly affecting the lower back (32.4%), general body (24.3%) and chest (10.8%) (table 1). The median duration of analgesic use was 2 years (range: 6months-40 years).

One hundred and eleven subjects (74.0%) used mixture of analgesics (“asapo”). Nineteen (12.2%) of the subjects had used “asapo” daily for at least one year (table 3). Out of this sub-group, there were ten females (52.6%) and

nine males (47.4%); eleven young people (57.9%), six middle-aged (31.6%) and two elderly people (10.5%) respectively; eleven (57.9%) were farmers while eight (42.1%) were non-farmers; ten (52.6%) had secondary education while four (21.1%) and five (26.3%) subjects had primary education and none respectively.

More than 10% of subjects admit using all types of pain relievers either in combination or singly. One hundred and eleven (79.9%) subjects procured their drugs in patent medicine stores. Fifty one subjects (34.9%) admit having peppery epigastric pain while 24 (16.3%) had been told by a doctor that they had gastritis. Forty subjects (39.6%) had proteinuria of 1+ (30mg/dl) only (table 2).

Table 4 shows association between the presence of musculoskeletal pain and use of mixture of analgesics ($P=0.048$); between use of mixture of analgesics and presence of gastritis ($P=0.021$) as well as prior diagnosis of gastritis ($P=0.011$). Tables 4 and 5 show there was no association between occupational type and presence of musculoskeletal pain ($P=0.304$) or use of analgesics ($P=0.374$). There was no difference in the experience of gastritis between daily and occasional users of analgesics ($P=0.403$) as shown in table 6.

Table 1: Demographics of subjects at a screening exercise in *Laoso* village, Southwest Nigeria.

Parameter	Frequency	Percentage
Age range (years)		
18-45	113	72.9%
46-64	26	16.8%
≥65	16	10.3%
Gender		
Male	67	43.2%
Female	88	56.8%
Marital status		
Single	28	18.1%
Married	127	81.9%
Occupation		
Farming	102	65.8%
Others (trading=37, student=8, artisan=7, apprentice=1)	53	34.2%
Religion		
Christianity	147	94.8%
Islam	2	1.3%
Not stated	6	3.9%
Educational status		
Not educated	49	31.6%
Primary	46	29.7%
Secondary and above (3 subjects had tertiary education)	60	38.7%

Table 2: Pattern of musculoskeletal pain, analgesic use and side effects among subjects.

Occupation	Frequency	Percent
Farming	65	67.0%
Trading	21	21.7%
Students	3	3.1%
Artisans	6	6.2%
Civil Servants	1	1.0%
Apprentice	1	1.0%
Total	97	100.0%
Parts of body	Frequency	Percentage
Lower back (spine)	36	32.4%
Ankle	1	0.9%
Unspecified general body pain	27	24.3%
Chest	12	10.8%
Hand	5	4.5%
Head	11	9.9%
Leg	8	7.2%
Joints	5	4.5%
Knee	4	3.6%
Pelvis	1	0.9%
Medication for pain relief (n=150)		
Herbs only	66	44.0%
Mixture of analgesics ("asapo") only	111	74.0%
Paracetamol only	59	39.3%
Paracetamol and herbs	7	4.7%
Paracetamol and "asapo"	10	6.7%
"asapo" and herbs	20	13.3%
Paracetamol, herbs and "asapo"	16	10.7%
Frequency of Use of "mixture of analgesics (111)		
At least once daily	26	23.4%
2-3 times weekly	28	25.2%
Weekly	18	16.2%
Occasionally	39	35.1%
Sources of analgesics		
Over-the-Counter (Patent medicine)	111	79.9%
Health center	7	5.0%
General hospital	12	8.6%
Private hospital	9	6.5%
Side effects profile		
Presence of peppery abdominal pain (n=146)	51	34.9%
Diagnosis of peptic ulcer disease (n=147)	24	16.3%
Presence of proteinuria 1+ (n=101)	40	39.6%

Table 3: Frequency and duration of use of analgesics among subjects in Laoso village, Southwest Nigeria.

Frequency of use of mixture of analgesics	Duration of use of mixture of analgesics				
	<1 year	1-5 years	6-10 years	11-40 years	Total (N=94 [#])
Daily	3 (3.2%)	9 (9.6%)	2 (2.1%)	8 (8.4%)	22 (23.4%)
2-3 times/week	7 (7.4%)	7 (7.4%)	7 (7.4%)	3 (3.2%)	24 (25.6%)
Once a week	2 (2.1%)	8 (8.4%)	2 (2.1%)	6 (6.4%)	18 (19.1%)
Occasionally	5 (5.3%)	10 (10.6%)	4 (4.3%)	11 (11.7%)	30 (31.9%)

[#]Not all users of analgesics mixture volunteered duration of use

Table 4: Association between use of mixture of analgesics and socio-demographic factors.

Socio-demographic factors	Use of mixture of analgesics	Did not use mixture of analgesics	Chi square P value
Gender			
Male	34 (54.0%)	29 (46.0%)	0.508
Female	48 (55.2%)	39 (44.8%)	
Occupation			
Farming	55 (56.1%)	43 (43.9%)	0.374
Others	27 (51.9%)	25 (49.1%)	
Level of education			
Primary and below	53 (57.0%)	40 (43.0%)	0.364
Secondary and above	29 (50.9%)	28 (49.1%)	
Age			
18-45 years	82 (72.6%)	31 (27.4%)	0.727
46-64 years	17 (65.3%)	9 (34.7%)	
≥65 years	12 (75.0%)	4 (25.0%)	
Presence of musculoskeletal pain			
Yes	61 (74.4%)	21 (25.6%)	0.048*
No	41 (60.3%)	27 (29.7%)	
Presence of peppery abdominal pain	34 (68.0%)	16 (32.0%)	0.021*
Previous diagnosis of gastritis	19 (79.2%)	5 (20.8%)	0.011*
Presence of proteinuria ≥1+	20 (52.6%)	18 (47.4%)	0.356

Table 5: Association between occupational type and presence of musculoskeletal pain.

Occupation	Presence of Musculoskeletal pain	Absence of Musculoskeletal pain	Chi square P value
Farming	71 (69.6%)	31 (30.4%)	0.304
Others	34 (64.1%)	19 (35.9%)	

Table 6: Association between duration and frequency of NSAIDs use versus presence of gastritis.

Frequency	Presence of gastritis	Absence of gastritis	Chi square P value
Daily	8 (42.1%)	11 (57.9%)	0.403
Occasionally	9 (36.0%)	16 (64.0%)	

DISCUSSION

Demographics

Majority of our subjects were young and single. This is perhaps due to the designation of *Laoso* village as an agricultural settlement thus resulting in migration of youths in search of means of livelihood from the urban setting to *Laoso*. Farming was the predominant occupation among our subjects as expected considering that it is an agrarian community. Also, non-farmers in rural Nigeria are known to combine farming in one form or another with their primary occupation. Educational level was unsurprisingly low.

Prevalence of musculoskeletal pain

The most common type of pain was chronic musculoskeletal pain with a prevalence of 67.7%. This is lower than 80% reported among rural farmers in Igbo-Ora, Southwest Nigeria and 91.3% in Korea.^[3-4] Musculoskeletal pain was most predominant among farmers compared to other occupational groups in our study. This is similar to findings in a Swedish study where farmers reported significantly more symptoms affecting the hands and forearms, low back, and hips than did the non-farmers (Odds Ratio=1.51 at 95% CI 1.13–2.03).^[18] A high workload, which includes those especially associated with lifting, carrying loads, bending and twisting, and exposure to vibrations has been linked

to an increased risk of acquiring low back pain among farmers.^[19]

However, there was no significant difference in its prevalence among farmers and other occupational groups in this study unlike earlier findings as highlighted in a review by Osborne *et al.*^[20] This may be explained by the fact that both groups share a strenuous lifestyle and physically demanding nature of work. These shared factors involve enormous use of body parts and joints such that daily activities that are associated with body-distorting postures such as stooping, crouching, kneeling, bending and twisting cumulatively result in painful musculoskeletal disorders. Also, because of poor road network and unavailability of a well-planned rural-urban transportation system, these people are forced to trek long distances with heavy loads on their heads, around their necks, back or shoulders.

In terms of anatomical distribution, our study showed that 32.4% had low back pain which agrees with the range of 16 and 59% reported by Low *et al* in their review of low back pain in Africa.^[21] It is however lower than some reports from Nigeria where the prevalence ranged between 40% and 74.4%.^[3,22,24] This is likely due to differences in subject selection as these studies were restricted to a homogenous population of farmers while our study subjects included farmers and non-farmers. The prevalence obtained from our study is comparable to 39% reported among rural arboriginal Australian dwellers but higher than 24.5% among Latino farmers in California.^[25-26]

The lower prevalence rates of low back pain reported among North American farm workers may not be surprising as agricultural activities are largely mechanized in this society contrary to what obtains in Nigeria and other parts of Africa. For instance, driving tractors or other heavy equipment and standing at the counter (or at a machine) ranked higher than stooping, kneeling or crawling among risk factors for musculoskeletal pain in North America, the reverse of which is the case in Nigeria.^[26]

Magnitude of analgesics consumption

The prevalence of the use of mixture of analgesics (“asapo”) was 74% in this study. It is slightly higher than 68.1% reported earlier in a recent community based study in a rural village in Ondo State, Southwest Nigeria.^[27] However, in a similar study in semi-urban cities in the same State, a lower prevalence of 44.1% was obtained.^[28] It was even lower in urban metropolitan Jos, North central Nigeria (28.9%).^[6] This suggests that there may be some factors that determine use and abuse of analgesics by people such as occupational type, educational level, exposure to information flow about drug use and caution, and availability of social amenities that make living and working conditions easier in the urban setting.^[29,30]

Paracetamol (acetaminophen) was the second most commonly used medication in our study. This may be because it is readily available and affordable. We reported a frequency of 39.3% while Agaba reported 58.1% in metropolitan Jos, North-central Nigeria.^[6] In the urban setting where Agaba *et al* worked, use of paracetamol was higher than NSAIDs in contrast to the higher frequency of use of NSAIDs in our study. This may be explained by better exposure of urban dwellers to media enlightenment on appropriate use of analgesics. Rural dwellers usually receive their education on analgesics from ill-informed patent medicine vendors and “quacks” (usually referred to as “doctor” or “nurse” by the locals) whose primary goal is pecuniary gains.

Combination of paracetamol and mixture of NSAIDs (“asapo”): Our subjects frequently combined paracetamol with other pain remedies. About 7% of our subjects admit combining paracetamol and mixture of NSAIDs (“asapo”). This is a popular practice in Nigeria and other parts of Africa. The users of such combination drugs are of the belief that the more the variety of analgesics combined, the better and faster the efficacy. Our literature search did not reveal any study on this attitudinal factor in our setting although a similar pattern has been described among users of Over-the-Counter (OTC) medicines in America.^[31]

A recent review of hospital data demonstrated that although it is relatively safe and more efficacious to combine paracetamol and specific NSAIDs for specified diseases than using them alone, combination therapy should be limited to acute cases.^[32] One randomized controlled trial showed that by the 13th week, twice as many participants taking combination tablets of paracetamol and ibuprofen experienced greater decrease in haemoglobin compared to those on monotherapy.^[33]

Duration of analgesics usage and adverse effects

Over 12% of the subjects had used analgesics daily for one year while 5.2% had used daily for a least 10 years. This suggests unawareness of the adverse effects of analgesics and constant exposure to causes of musculoskeletal pain among the subjects. In a sub-analysis of those who had been on a mixture of analgesics daily for one year, 31.6% had developed gastritis while 15.8% had proteinuria (1+). However, there was no significant difference in the presence of side effects between those who used analgesics daily or occasionally. Our study was not able to derive the exact dosage of analgesics used by individuals considering the fact that this was a community based study where participants were not prepared for such detailed information and time constraint.

Finding the true incidence of analgesic side effects in our setting has been difficult due to the complexity of conducting such studies and paucity of data. Our literature search did not reveal studies that have looked at the side effects of community abuse of analgesics. In our

study, 16.3% had been diagnosed to have gastritis prior to the study by health practitioners. The exact aetiology could not be ascertained, whether *Helicobacter pylori*, NSAIDs or both or any other aetiology. However, studies have shown that the prevalence of gastric or duodenal ulcers in patients taking NSAIDs regularly is approximated as 15% to 30%.^[34-35] In a study by Alatishe *et al* in which most of their subjects were either farmers, artisans or traders, NSAIDs-induced gastritis ranked third among the aetiologies for upper gastro-intestinal bleeding. Also, about 40% of their subjects volunteered a history of recent or chronic ingestion of NSAIDs.^[36]

In our study, 39.6% had proteinuria of at least 30mg/dl. This is similar to a prevalence of 35.9% reported in another study among rural dwellers in Ondo East Local Government Area of Ondo State but higher than 25.9% reported in semi-urban cities of Akure and Ondo in Nigeria.^[27-28] However, attributing this degree of proteinuria to use of NSAIDs alone cannot be substantiated as these studies did not conduct analysis to exclude other risk agents for proteinuria. Moreover, the method for protein quantification was semi-quantitative and they depended on only one spot test. What is however interesting is that the prevalence of proteinuria recorded in the rural areas in these parts of Ondo State was higher than in the urban setting.

There was a significant association between use of mixture of analgesics and presence of gastritis in our study but no association with presence of proteinuria. Other studies in the past have established a link between NSAIDs and gastritis.^[37-39] Acetylsalicylic acid or ibuprofen has been shown to produce gastrointestinal lesions that are readily observed on endoscopy in 20%-50% of normal subjects within one to seven days of therapy.^[40]

Chronic repeated intake of NSAIDs may hasten disease progression in patients with pre-existing kidney insufficiency. In a prospective population study of 10,184 patients with known CKD, regular NSAID use was associated with a moderately increased risk of a GFR decline greater than 15 mL/min/1.73 m² over 2.75 years follow-up (OR, 1.26; 95% CI, 1.04 to 1.53).^[41] Several smaller cohort and case control studies have supported these findings.^[42]

Determinants of analgesic abuse

The presence of musculoskeletal pain was significantly associated with the use of analgesics. The use of analgesics was higher among females, farmers, those with at most primary school education, and the elderly even though there was no statistical difference from their counterpart. This is contrary to other findings. For instance, in Turkey, in a study conducted across 15 cities, among 1909 adults, the prevalence of analgesic use was significantly higher in females (75.7%; $P < 0.05$), subjects within the age range of 45-54 years (81.4%; $P < 0.05$), rural dwellers (74.6%; $P < 0.05$), among the

illiterates (79.1%; $P > 0.05$), and in subjects of lower socioeconomic status (74.1%; $P > 0.05$). In that study, logistic regression showed statistically significant Odds Ratios for age groups, duration of education, socioeconomic status, and demographic regions ($P < 0.05$).^[43]

The apparent lack of significant association (except for presence of musculoskeletal pain) in our study may be explained by the fact that we only looked at a homogenous group of rural dwellers where they were almost all exposed to use of analgesics unlike other studies that looked to compare rural and urban communities or different areas in an urban setting.

CONCLUSIONS

The prevalence of musculoskeletal pain is high among rural dwellers and its presence is associated with use of analgesics. There is a high degree of analgesic abuse among rural dwellers with attendant risk of developing gastritis.

LIMITATIONS

We depended on subjective information provided by the subjects who were likely to confuse symptoms and diagnosis of gastritis even though we provided them with a careful description of the symptomatology of gastritis. We could not assess their renal function using validated serum markers such as creatinine or cystatin C.

RECOMMENDATIONS

We recommend studies that will quantify dosage of analgesics consumed in the community. More specific renal markers should be used for reliable evaluation of analgesic nephropathy. Government should cater for the health of farmers by making provision for mechanization of farms, provision of low interest loans and subsidies to farmers, proper staffing of health centers, efficient rural-rural and rural-urban road network, and transportation facilities for the rural communities.

CONFLICT OF INTEREST

Authors declare no conflict of interest.

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