

Selected topical medications: Patterns, knowledge and preference in clinical practice among Nigerian physiotherapists

Onigbinde Ayodele Teslim¹, Olatipe Christianah Folake¹, Tarimo Nesto², Mukoka Grace³

¹Department of Medical Rehabilitation, College of Health Sciences, Obafemi Awolowo University, Ile-Ife, Osun State, Nigeria

²Department of Physiotherapy, Malawi Against Physical disabilities, P. O. Box 256, Blantyre, Malawi

³Department of Physiotherapy, College of Medicine, University of Malawi, Blantyre, Malawi

Email address:

ayotesonigbinde@yahoo.co.uk (A. T. Onigbinde)

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Abstract: Application of topical medication remains an essential component of clinical physiotherapy practice but previous reports have revealed poor knowledge of medications among Nigerian physiotherapists. Also, there are arrays of topical medications available but there is envelope of doubts on what determines the choice of Nigerian physiotherapists. The primary aims of this study were to investigate the pattern and preference of selected topical medications in clinical practice among physiotherapists. A structured self administered questionnaire was administered to 200 physiotherapists in purposively selected hospitals in Southwest, Nigeria. Descriptive statistics of mean, standard deviation and percentages were used to analyze the data. The results showed that most physiotherapists were familiar with diclofenac sodium (92.0%) and methyl salicylate (92.5%) while very few were familiar with dexamethasone, zinc oxide, magnesium sulphate, capsaicin and naproxen (27.0%, 34.5%, 35.0%, 36.0% and 37.0%) respectively. The results also showed that 56.5% and 63.5% of physiotherapists were correct about functions of diclofenac sodium and glucosamine sulphate respectively. Only 8%, 20.5% and 2.5% physiotherapists knew the functions of magnesium sulphate as an analgesic and as a muscle relaxant; and lidocaine as an anesthetic agent. The results further revealed that 34.0% and 17.0% chose menthol and dexamethasone respectively as their least preferred topical medications and they based their choice mostly on efficacy, active ingredients in the drugs and reported efficacy by patients. Most physiotherapists (63.3%) were not correct about the dominant ions present in the selected topical medications. We concluded that physiotherapists in this study were mostly familiar with diclofenac sodium and methyl salicylate but diclofenac was the most preferred topical medication in clinical practice. There was general poor knowledge on functions and dominant ionic charges in the topical medications.

Keywords: Topical Medications, Physiotherapy, Preference, Knowledge, Efficacy

1. Introduction

There are several topical medications but of utmost importance to physiotherapists are analgesics, Non-steroidal anti-inflammatory drugs (NSAIDs) and muscle relaxants [1]. Topical analgesics have been observed to provide effective analgesia with reduced systemic drug levels [2]. Topical application of NSAIDs had been reported to provide bioavailability and plasma concentrations of between 5% and 15% when compared to those which are delivered through the systemic [3].

There is a paradigm shift towards utilizing a local effect in pain management especially for common neuropathic and musculoskeletal conditions [4]. Considering the potential adverse end-organ effects, the American College of Geriatrics cautioned the use of oral NSAIDs and COX-2 inhibitors among geriatrics; topical analgesics was recommended as an option [5]. Topical analgesics are in different formulations which include: creams, drops, foam, gel, ointment, plaster or patches and sprays [6]. The active ingredients in most are Benzocaine, Camphor, Capsaicin, Diphenhydramine, Hydrocortisone, Lidocaine, Menthol,

Methyl salicylate, Pramoxine, and Trolamine salicylate [7].

There are still uncertainties in appropriateness and dosage specification for topical NSAIDs [1], [8]. Effort had been made to provide quantification for topical cream and gel using Finger Tip Unit (FTU). Finlay et al and Long and Finlay defined FTU as the amount of ointment, cream or other semi-solid dosage form expressed from a tube with a 5mm diameter nozzle, applied from the distal skin crease to the tip of the index finger of an adult as a determinant for dose of topical medications and one FTU has been reported to be equivalent to 0.5mg [9], [10].

Topical rubefacient produces counterirritant effects by irritating pattern of sensory activity that diminishes pain intensity; it also reduces local blood flow. Salicylates act via these mechanisms and are used for arthritic and rheumatic pain [11]. Analgesics and non-steroidal anti-inflammatory drugs (NSAIDs) are the most common pharmaceuticals for alleviating the pain and reduced function of musculoskeletal conditions [12].

There appears to be indiscriminate use of both analgesics and NSAIDs among Nigerian physiotherapists. It appears they based prescription on which of topical NSAIDs or analgesics is readily available. Also, there is dearth of data on the most preferred in terms of efficacy and usefulness in physiotherapy practice. Furthermore, physiotherapists utilize iontophoresis in patient's management and this requires appropriate knowledge of ionic charges in topical medications. The aims of this study are to investigate the prescription pattern of topical medications, and determine the most preferred topical medication among Nigerian physiotherapists.

2. Materials and Methods

2.1. Study Settings

The study settings are 5 Teaching hospitals, 2 State hospitals and 2 Private hospitals. Others are 1 Private clinic, 2 Physiotherapy training schools, 1 Federal medical centre and 1 National orthopaedic hospital in southwest, Nigeria.

2.2. Research Design

This study was a cross sectional exploratory survey design. The respondents provided the required information at the specific arranged period [13].

2.3. Sampling Technique

They were sample of convenience from 14 purposively selected health institutions.

2.4. Sample

The sample comprised 200 practicing physiotherapists (110 males and 90 females). The major inclusive criteria were that the respondent must have the current practicing license, and must be fully employed at the time of the study. The participants must be willing to participate; and also

willing to complete the questionnaire at arranged time and returned it immediately. Physiotherapists who were not licensed or unwilling to participate in the study were excluded.

2.5. Instrument

A self administered questionnaire was used for this study. It was a modification of the questionnaire used by Onigbinde et al [14]. The modification was the inclusion of familiarity and drug preference in tabulated form into the original questionnaire. To allow for respondents differing educational backgrounds, the questions were kept as simple as possible. The questionnaire was divided into 4 sections namely:

A. Demographics and academic related data:

This comprises eight questions that required demographic information and academic related data from the participants such as gender, age, work setting, update on knowledge etc

B. Patterns and Knowledge of Topical analgesics and NSAIDs:

This consists of nine-columned questions assessing physiotherapists' knowledge, familiarity and effects of the listed drugs namely:

Piroxicam (feldene gel), diclofenac sodium (voltaren gel), methyl Salicylate (Neurogesic), menthol, ketoprofen (ketonal gel), Ibuprofen (ibruca gel), lidocaine gel, naproxen, zinc oxide paste, glucosamine Sulphate (urah cream), magnesium sulphate gel, capsaicin and dexamethasone cream.

C. Preference Ratings of Selected Topical Analgesics and NSAIDs:

This section consists of questions on the preferred ratings of physiotherapists on these selected drugs in terms of clinical efficacy. It was divided into three categories: the most preferred, preferred and least preferred options respectively. Also, this section inquires reasons for the preferring chosen options.

D. Knowledge of Dominant Ion of Selected Topical Analgesics and NSAIDs:

This section consists of questions on knowledge of dominants ion of the topical medications.

Prior to the main study, a draft of the modified questionnaire was pilot tested. Five physiotherapists from Obafemi Awolowo University, who were not part of the main study, were implored to assess the new questionnaire. They examined the questionnaire for simplicity, viability and precision. They also ensured that the questionnaire reflects the underlying concept and objectives of the study [15]. Changes were made based on their responses and the revised questionnaire was used for the main study

2.6. Procedure

The ethics and Research committee of Institute of Public Health Obafemi Awolowo University Ile-Ife, Osun State, Nigeria granted approval for the study (IPH/OAU/12/159). Permission was also granted by the heads of physiotherapy department at each work setting.

The aims of the study were explained to each participant

and they were assured of confidentiality of information given while consent form was also signed them. In other to maintain anonymity; participants' names were not required on the questionnaire. The questionnaire was completed within the participant's convenient time as there was no time limit specification. The questionnaire was completed in presence of the main investigator in order to avoid cheating and interaction with colleagues as this may affect outcome of individual knowledge.

The questionnaire were collated and entered into SPSS, version 17 in a private and password protected computer which only members of the research team have access to. Responses were obtained from two hundred and twenty (220) physiotherapists in total, out of two hundred seventy (270) copies of questionnaire that were distributed. Thirty respondents refused to submit copies of their questionnaires after completion, and no specific reason was given for their action. We assumed that it might be due to very poor knowledge of listed medications. Thus, there was a response rate of 81.5%. But only 200 were analyzed, representing an overall response rate of 74.10% as twenty (20) copies of the questionnaire were invalidated due to inconsistencies and failure to comply with essential instructions.

2.7. Data Management

Descriptive statistics of mean, standard deviation, frequency and percentages were used to analyse the data. Data analysis was carried out using statistical package for social sciences software version 17.

3. Results

Table 1. Demographic profile and academic related data

Variables	Frequency n=200	Percentage
Age (years):	22 – 27	48
	28 – 33	59
	34 – 39	46
	40 and above	47
Highest Qualification:	Bachelors degree	145
	Masters degree	43
	Doctorate degree	12
Experience:	1 – 5 years	84
	6 – 10 years	50
	11 – 15 years	29
	15 – 20 years	24
	Greater than 20 years	13
Work Settings:	Private Hospital	16
	State Hospital	37
	Teaching Hospital	106
	Academics	6
	Others	35
Seeking for knowledge:	Yes	108
	No	90

One hundred and ten (55%) respondents were male while ninety (45%) were female; and one hundred and six

respondents (53.0%) were working at teaching hospitals. The age, range, highest qualification and years of experience are represented in Table 1. Seventy-three respondents (35.7%) recently updated their knowledge on topical medications and ninety respondents (45.0%) sought educational information. The frequency of knowledge update is also presented in table 1. Most respondents relied on seminar presentations by drug companies to update their knowledge. The professional body (Nigeria Society of Physiotherapy) and the regulatory organ in Nigeria (Medical Rehabilitation Registration Board) were the least source of gaining knowledge (Figure 1).

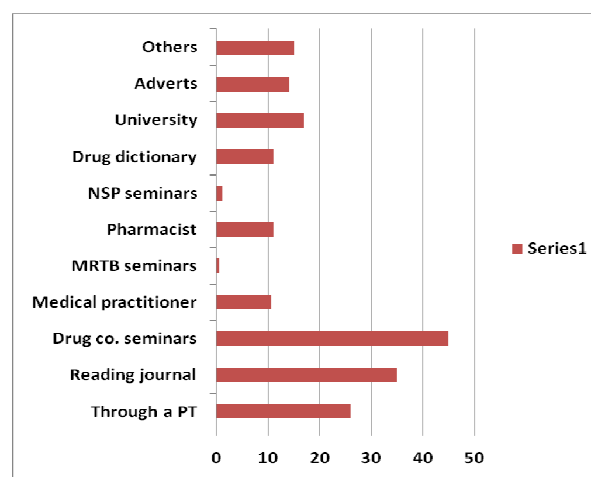


Figure 1. Sources of updating topical medication knowledge. Key: MRTB - Medical rehabilitation therapy board. NSP - Nigerian Society of Physiotherapy, Drug co. - Drug companies

3.1. Familiarity and Knowledge with Selected Topical Medications

One hundred and eighty four (92.0%), 185 (92.5%), 70 (35%), 54 (27%) respondents were familiar with diclofenac sodium, methyl salicylate, magnesium sulphate and zinc oxide respectively. Only few physiotherapists were familiar with zinc oxide, dexamethasone, magnesium oxide, capsaicin and naproxen. The frequency of respondents' familiarity to listed drugs is presented in figure 2. Only 95 (47.5%) and 113 (56.5%) respondents could correctly identify piroxicam, and diclofenac sodium as NSAIDs, however, 127 (63.5%) respondents were correct about the effect of glucosamine sulphate on cartilage synthesis (Table 2).

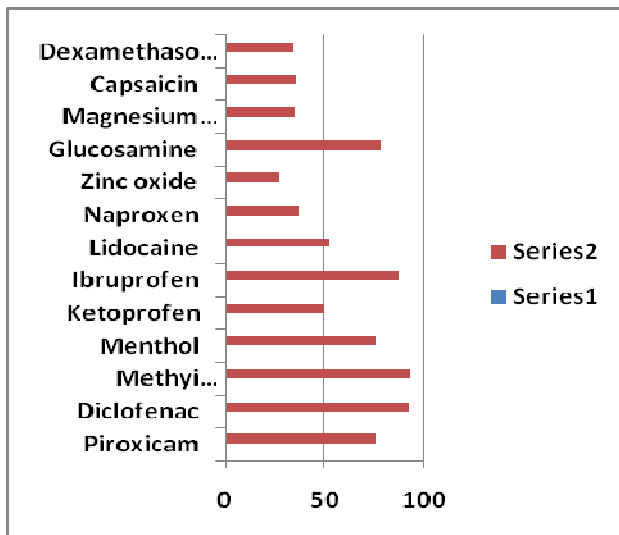
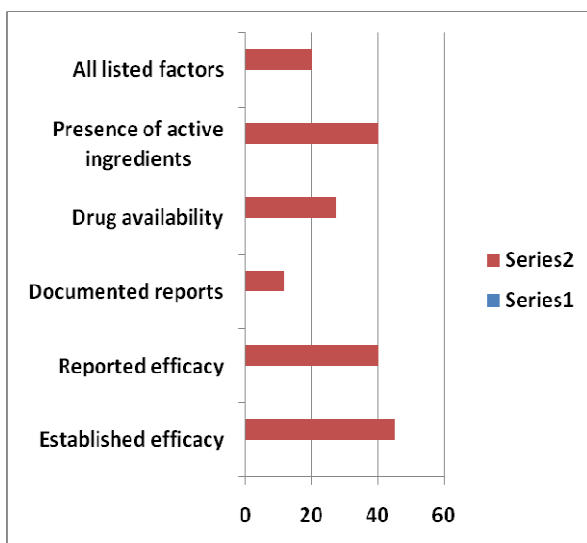
Furthermore, only 16 (8%) and 41 (20.5%) respondents were correct about the roles of Magnesium sulphate as an analgesic and a muscle relaxant respectively. The frequency distribution and percentages of other drugs are summarized in the Table 2. Preference for selected topical medications

One hundred and thirteen (113) respondents (56.5%) chose diclofenac sodium as the most preferred topical medications. Also, 89 (44.5%), 81 (40.5) respondents chose glucosamine sulphate and methyl salicylate respectively as the most preferred drugs. For the least preferred option, 68 respondents (34.0%) chose menthol, 34 respondents (17.0%) chose dexamethasone while 32 respondents (16%) chose capsaicin. The summary of preferences is presented in Table 3.

Table 2. Frequency distribution of respondent's knowledge about functions/roles of selected drugs

Drugs	NSAIDs		Analgesics		Other effects	
	F	%	F	%	F	%
Piroxicam	95	47.5	73	36.5	-	-
Diclofenac	113	56.5	95	47.5	-	-
Salicylate	64	32.0	130	65.0	-	-
Menthol	-	-	101	50.5	-	-
Ketoprofen	65	31.5	50	25.0	-	-
Ibuprofen	105	52.5	98	49.0	5	2.5
Lidocaine	-	-	70	35.5	-	-
Naproxen	35	17.5	38	19.0	-	-
Zinc oxide	-	-	-	-	20	10
Glucosamine sulphate	-	-	30	15.0	127	63.5
Magnesium	-	-	16	8.0	41	20.5
Capsaicin	-	-	41	20.5	-	-
Dexamethasone	28	14.0	-	-	-	-

Keys: F - Frequency

**Figure 2.** Respondent's familiarity**Figure 3.** Reasons for preference**Table 3.** Frequency distribution of Preference of selected topical medications in terms of efficacy in clinical practice (Multiple Choice Questions)

Medications	Most Preferred		Preferred		Least Preferred	
	F	%	F	%	F	%
Piroxicam	44	22.0	79	39.5	11	5.5
Diclofenac	113	56.5	52	26.5	2	1.0
Methyl Salicylate	81	40.5	76	38.0	23	11.5
Menthol	20	10.0	58	29.0	68	34.0
Ketoprofen	7	3.5	51	25.5	29	14.5
Dexamethasone	4	2.0	35	17.5	34	17.0
Ibuprofen	48	24.0	79	39.5	19	9.5
Zinc Oxide	5	2.5	25	12.5	28	14.0
Lidocaine	13	6.5	42	21.0	27	13.5
Naproxen	9	4.5	36	18.0	20	10.0
Glucosamine	89	44.5	38	19.0	10	5.0
Magnesium sulph	7	3.5	29	14.5	29	14.5
Capsaicin	2	1.0	38	19.0	32	16.0

Keys: F frequency

On the question on what their preferences is (are) based on in relation to its efficacy in clinical practice, 90 respondents (45%) based their preference on known efficacy while 80 respondents (40%) based it on reported efficacy by patients and 23 respondents (11.5%) based it on documented reports. The frequency distribution and percentages of reasons for preference are represented in Figure 3.

3.2. Knowledge of the Dominant Ions Presents in the Selected Topical Drugs

Most respondents were unable to provide answers to the questions that were asked on dominant ion available in the topical formulations of the medications. Only few respondents were able to answer out of which a larger percentage of the respondents were incorrect. The results of knowledge of ions of the selected drugs are represented in Table 4.

Table 4. Frequency distribution on knowledge of selected topical medications

Medications	Positive (+ ve)		Negative (- ve)	
	F	%	F	%
Piroxicam	50	25.0	15	7.5*
Diclofenac	77	38.5	16	8.0*
Salicylate	52	26.5	30	15.0*
Menthol	33	6.5	32	16.0
Ketoprofen	35	17.5	20	10.0*
Ibuprofen	47	23.5	22	11.0*
Lidocaine gel	27	13.5*	29	14.5
Naproxen	25	12.5	19	9.5*
Glucosamine sulphate	45	22.5*	34	17.0
Zinc oxide	38	19.0*	26	13.0
Capsaicin	18	9.0	26	13.0*
Magnesium Sulphate	44	22.0	25	12.5*
Dexamethasone	23	11.5	19	9.5*

*Frequency of respondents who gave correct answers

4. Discussion

Pain management requires inter and multidisciplinary approaches (Algiatry) in order to alleviate and improve the

quality of life of those living with pain ([16], [17], [18]. Persistent acute and unrelieved pain results to chronic pain which subsequently leads to anatomical and genetic changes in the nervous system [19]. Previous reports favoured NSAIDs as the commonest drugs used in the management of pain [12] [20]. Topical anaesthetics and analgesics have physiological effects on the peripheral nerves and soft tissue underneath site of application and it is now evidence based in clinical practice that they are as effective as those administered through oral route [21], [22]. Transdermal application of NSAIDs and analgesic techniques using massage, iontophoresis and phonophoresis remains key tools for the management of pain. Although, transdermal massage and phonophoresis are easily applied with appropriate skills, iontophoresis requires an in-depth knowledge of bio-active ingredients/ionic charges of drugs.

Almost half of the respondents did not show keen interest in seeking educational knowledge of topical medications while few updated their knowledge in relevant pharmacology areas. This contradicted the reports of Onigbinde *et al* where most physiotherapists showed interest in improving their pharmacology knowledge, although, this previous study investigated physiotherapist's opinion on becoming supplementary prescribers of oral and inject-able drugs and this might have stimulated their interest [1]. Amongst those that had quest for gaining knowledge, most respondents attended seminar presentations organized by drug companies, read journals and interacted with colleagues in order to improve their knowledge of topical medications. The professional body (NSP), the registration board of Nigeria (MRTRB) and training institutions which are recognised organs to train and organize continuing education programme might have been redundant as only very few respondents chose them as source of acquiring knowledge.

Majority of the respondents were familiar with diclofenac sodium, methyl salicylate and glucosamine sulphate but diclofenac was the most preferred topical medication being used in clinical practice. In a recent study by Onigbinde *et al*; patients with musculoskeletal dysfunctions also reported that oral diclofenac was the most prescribed NSAID among health professionals; hence, this is corroborating the importance of both oral and topical diclofenac in clinical practice, probably due to its efficacy [23].

The respondents were familiar with menthol, contrarily; it was among the least preferred medications. There is similarity in frequencies of respondents on non-familiarity and least preference for capsaicin, zinc oxide, dexamethasone, lidocaine, naproxen; and magnesium sulphate despite their importance in clinical physiotherapy practice. There are reports buttressing the relevance of these least preferred topical medications in practice. Capsaicin (0.025% - 0.25% concentration) and menthol are major ingredients in most topical analgesics [24] [25]. Capsaicin plays key role in the management of pain associated with diabetic neuropathy, osteoarthritis and psoriasis [26]. Combination of capsaicin cream (0.075%) and lidocaine iontophoresis had been reported to be effective in alleviating pain in a diabetic

patient with neuropathy [27]. Similarly, Onigbinde *et al* reported that lidocaine iontophoresis decreased the pain intensity experienced by patients during application of mobilization techniques while Baskurt *et al* and reported that iontophoresis and phonophoresis of naproxen are equally effective in the treatment of lateral epicondylitis [28] [29] [30].

Amongst the medications that respondents have less familiarity and least preference in clinical practice are magnesium sulphate which has analgesic and relaxant properties; zinc oxide that has vasodilatory and anti-septic effects; and dexamethasone with anti-inflammatory effect especially in the procedure of iontophoresis [1], [31], [32]. Similarly, menthol has analgesic properties which are mediated through a selective activation of k-opioid receptors and blocking of voltage-sensitive sodium channels, reducing neural activity that may stimulate muscles [33], [34]. We attributed poor familiarity and non-preference for these topical medications to lack of quest for further knowledge among the physiotherapists.

Less than half of the physiotherapists were able to identify Piroxicam as an NSAID despite the familiarity, while only 2.5% of respondents could identify lidocaine as an anaesthetic agent. These are in line with reports of Kumar and Grimmer's who reported poor knowledge of drugs among Australian physiotherapists [35]. However, majority of the respondents were correct about function of glucosamine sulphate as enhancing cartilage synthesis. Reports have favoured glucosamine's ability to facilitate the production of cartilage and enhancing joint functions [3], [37]. There was rationale choice of topical medications among the physiotherapists as most respondents favoured efficacy in clinical practice, presence of active ingredients in the drugs and reported efficacy by patients as reasons for their preferences while few respondents based their preferences on drug availability at the department and documented reports.

Most respondents showed poor knowledge of dominant ion in topical formulations of these drugs despite the claim that they recently update their knowledge, and this finding has been similar trends in most previous studies [1], [8], [14]. This finding implied that Nigerian physiotherapists have not been making concerted efforts to improve their knowledge of pharmacology because previous studies were conducted in almost the same clinical settings. Adequate knowledge of dominant ions in drugs are vital for the process of iontophoresis and medical technology is re-focusing towards increasing interest in enhancement of drug penetration through iontophoresis [14].

We concluded that physiotherapists were most familiar with diclofenac sodium, methyl salicylate and glucosamine sulphate but diclofenac was the most preferred topical medication in clinical practice. Only few physiotherapists have adequate knowledge about functions of most of these drugs despite their familiarities with them. There was general poor knowledge of dominant ionic charges in the listed drugs. We recommend training programmes on

relevant aspects of pharmacotherapy that will enhance clinical practice for Nigerian physiotherapists.

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