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Physiotherapists' knowledge, attitude and practice of clinical prediction rules in low-back pain

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Abstract

Background and aim Clinical prediction rules (CPRs) are mathematical tools that are intended to guide clinicians in clinical decision making or predict a future outcome, but they seem rather unknown, under-utilized, or avoided by clinicians. This study aimed to assess knowledge, attitude, and practice of CPRs in low-back pain (LBP) among physiotherapists.

Methods A cross-sectional study involving 45 consenting specialist musculoskeletal physiotherapists from three public-funded teaching hospitals in Nigeria was carried out. An adapted validated questionnaire on facilitators and barriers to CPRs utilization, and a socio-demographic proforma were used to collect data. Descriptive and inferential statistics were employed to analyze data. Alpha level was set at $p < 0.05$.

Results Respondents were mostly males (71.1%), married (64.4%) and first-degree holders (55.6%). Twenty-eight (62.2%) of the respondents had above-average knowledge of CPRs in LBP. Rates for positive attitude towards, and utilization of CPRs were 37.8% and 15.6%. Knowledge and attitude about CPRs in LBP were not significantly influenced by socio-demographic factors ($p > 0.05$). However, there was a significant association between the utilization of CPRs and years of experience ($\chi^2 = 10.339$ $p = 0.016$).

Conclusion Most Nigerian physiotherapists had above-average knowledge, but a negative attitude and low utilization of CPRs in LBP. Clinicians' years of clinical experience influence the usage of CPR. There is a need to incorporate training in CPRs into undergraduate and continuous professional development programmes.

Keywords Physiotherapists, Knowledge attitude and practice, Clinical prediction rules, Low back pain

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Introduction

Low-back pain (LBP) has become an increasing problem worldwide, and the global ageing population has significantly contributed to its rising prevalence [1, 2]. Patients with LBP experience a wide range of symptoms, reduced functional capacity, and disability, which result in significant social and economic burden on the sufferer, society, health care systems, and government [1, 3]. Despite the plethora of treatments and healthcare resources allocated to LBP, its prevalence and burden continue to rise [4]. As a result, the management of LBP has been described as a "twentieth-century healthcare disaster" [5], thus inviting the need for innovative research and interventions on how to improve outcomes and well-being of the affected patients [6, 7].

There is evidence to suggest that poor LBP intervention outcomes are partly due to inappropriate clinical decision-making, clinical judgment, or clinical reasoning, as different health care providers do not necessarily share a common approach [8, 9]. Thus, there is advocacy that clinical decisions should be based on Evidence-Based Practice (EBP), which is considered the gold standard clinical method for clinicians in order to reach the best possible patient outcomes [10, 11]. However, making decisions solely based on EBP is sometimes tricky and is not often how clinical decisions are made in everyday practice, as some decisions need to be taken in the absence of clarity and certainty [12]. While reliance on EBP promotes standardization, clinical judgment seems not to have direct influence on practice [13, 14]. According to Accad and Francis, EBP may lower cognitive bias, but it lends a bias of its own because of the disposition to treat in line with population norms in place of personal needs [13]. Thus, the perception that clinical judgement and EBP are at variance with each other [15]. According to Sackett, "without clinical expertise, practice risk being tyrannized by evidence, for even excellent external evidence may be inapplicable to or inappropriate for an individual patient" [16]. Meanwhile, Karthikeyan and Pais advocate for appreciation and understanding of the concepts of evidence and judgment in clinical practice as a way of resolving this variance [15].

In the bid to imbed EBP, Clinical Prediction Rules (CPRs) have also been advocated as part of the ways to ease the challenges associated with clinical decision-making in patients with LBP [17–19]. Clinical prediction rules are diagnostic, prognostic, or interventional/prescriptive mathematical tools that are intended to guide clinicians in clinical decision-making [20, 21]. Also, CPRs are tools developed to guide clinicians in utilizing evidence in diagnosis or prognosis, or when predicting a response to a particular intervention in patient management [22, 23]. Furthermore, CPRs assist clinicians in making quick decisions that may normally be subjected to underlying biases [24]. Generally, CPRs are developed using multivariate statistical methods and are designed to examine the predictive ability of selected groupings of clinical variables [25, 26]. The rules are algorithmic in nature and involve condensed information that identifies the smallest number of indicators that are statistically diagnostic to the targeted condition [27]. Accordingly, the number of derived or validated CPRs is increasing [27], especially in musculoskeletal rehabilitation [28, 29].

Typically, CPRs are classified as diagnostic, prognostic or prescriptive [30]. Diagnostic CPRs are focused on predictive factors related to a specific diagnosis. Prognostic CPRs are designed to predict an outcome such as success or failure [19], while those designed to target the most effective interventions are known as prescriptive CPRs [31]. The use of appropriately validated and tested CPRs is one way of implementing EBP for diagnosis and prognosis in clinical practice [27, 32]. Despite the potential of CPRs in patients' management, emerging studies indicate that they are under-utilized, unknown, and biased [33, 34]. The application of CPRs in the management of LBP is evolving [35, 36]. For instance, Haskins et al. [35] synthesized different diagnostic CPRs developed to streamline the LBP subtypes and found five tools in this regard. Furthermore, a recent systematic review by Hill and colleagues found five new diagnostic CPRs in LBP [36]. However, the applicability and accuracy of CPRs in LBP management are still low as some of these tools are in the early stage of development with limited external validity [35, 36]. Nonetheless, the integration of CPRs in LBP has been shown to meet some gaps in the clinical practice of professionals managing LBP and also help with projecting clinical outcomes of patients with LBP [35]. Currently, the use of CPRs among physiotherapists in sub-Sahara Africa has not been explored. Utilization of CPRs in a low-resource setting like Sub-Saharan Africa may save time and resources by eliminating unnecessary tests, improving referral system, and enabling prompt initiation of assessment and treatment. Therefore, this study aimed to assess knowledge about, attitude towards, and use of CPRs in LBP care among Nigerian physiotherapists.

Materials and methods

This cross-sectional study recruited specialist musculoskeletal physiotherapists in Osun State Nigeria. Following earlier recommendations [37] and to obtain expert judgement on knowledge about, attitude towards, and use of CPRs, physiotherapists with at least 3 years of clinical experience and those with a postgraduate degree or having attended continuous professional development training in musculoskeletal or orthopaedic

physiotherapy were adjudged as being experts in musculoskeletal physiotherapy and were included. The physiotherapists were recruited from the three public-funded teaching hospitals- Obafemi Awolowo University Teaching Hospital Complex, Ile-Ife; Westley Guild Hospital, Ilesa; and Ladoke Akintola University Teaching Hospital, Osogbo, Nigeria. The sample size for this study was calculated using the Cochrane's sample size, $n_0 = Z^2$ x p x q/ $(e)^2$; where n_0 is the sample size, z is 95% confidence level = 1.96, p is the estimated population proportion (0.4), q is 1-p, and e is the margin of error (0.05) [38]. Thus, $n_0 = (1.96)^2 \times 0.4$ x (1–0.4)/ $(0.05)^2 = 369$. With the use of Finite Population Correction for Proportions,

$$n = \frac{n_0}{\frac{1+(n_0-1)}{N}}$$

Where N is the number of specialist musculoskeletal physiotherapists. Bello and colleagues reported a proportion of 118 specialist musculoskeletal physiotherapists in the six geographical zones of Nigeria [39], thus yielding approximately 20 for a zone. Thus, n = 369/19.4 = 19 specialist musculoskeletal physiotherapists. In all, 45 musculoskeletal physiotherapists were recruited. Ethical approval for this study was obtained from the Health Research Ethic Committee Institute of Public Health Obafemi Awolowo University Ile-Ife, Nigeria (IPH/OAU/12/1776). Administrative permission was obtained from the Heads of Departments of the selected hospitals. Written informed consent was obtained from the respondents following full disclosure of the purpose of the study.

Instrument

A questionnaire on knowledge, attitude, and practice of CPRs was developed. Some items of this tool were largely gleaned from related previous studies delineating the facilitators and barriers to utilization of CPRs in physiotherapy practice by Légaré et al. [40], Cabana et al. [41], and another related qualitative study by Haskins et al. [23]. The tool was tested for its face and content validity by experts. Evolution of potential enablers and barriers to CPRs uptake among health professionals has helped in formulating concepts underlying knowledge, attitudes, and practices of CPRs [23]. The four-sectioned questionnaire was used to assess the knowledge, attitude, and practice of CPRs about LBP, as well as the socio-demographic profiles of the respondents. The questionnaire was structured in the five-point likert scale format (1 = Strongly agree (SA), 2 = Agree (A), 3 = Undecided (U), 4 = Disagree (D), 5 = Strongly disagree (SD)) (See appendix). Questions 1 – 7 (n = 7) were used to elicit knowledge of CPRs about LBP, Questions 8–14 (n = 7) were used to assess information about attitudes towards CPRs about LBP, and Questions 15 – 20 (n = 6) were used to obtain information about the practice of CPRs about LBP.

Data analysis

To simplify the analysis, we combined SA and A as "agree", and combined D and SD as "disagree". Knowledge items identified as "agree" were coded as '1', while disagree and undecided were coded as '0'. The scores were then ranked as follows: below average (< 3), average (3), and above average (> 3). Attitude items marked as "agree" were coded as '1', while disagree and undecided were coded as '0'. Additionally, attitude items were further categorized as negative (< 4) and positive (4–7). Similarly, practice scores marked as "agree" were coded as '1', while disagree and undecided were coded as '0'. Practice items were then classified as unacceptable (< 4) and acceptable (4–6). Descriptive statistics of frequency and percentages were used to summarize the data and to synthesize the level of knowledge about, attitude towards and use of CPRs. Chi-square test was used to assess the association among physiotherapists' knowledge, attitude, practice and socio-demographic characteristics. Level of significance was set at $p < 0.05$. The IBM SPSS (Version 21) was used for statistical analysis.

Results

There was 100% response rate in this study as all respondents (45) completed the questionnaire. Majority of the respondents were males (71.1%), 26.7% had practiced musculoskeletal physiotherapy for between 11–15 years, while 55.6% had Bachelor's degrees in physiotherapy (Table 1). Ninety-one percent (91.1%) of the respondents agreed that CPRs assist clinicians in determining the likelihood of a certain diagnosis, and 82.2% agreed that CPRs help clinicians identify which patients have a higher likelihood of success for a given intervention in comparison to an alternate intervention. The proportion of the respondents that were unaware of CPRs in LBP was 46.7% (Table 2). Table 3 presents the frequency distribution of responses on the attitude of physiotherapists on CPRs in LBP. Around half of the respondents disagreed that: CPRs in LBP do pose any form of threat to professional autonomy (53.3%); using LBP CPRs will not lead to improved patients' outcome (53.3%) and using LBP CPRs will not lead to improved health care processes (60%). Very few (11.1%) of the respondents submitted that the set of guidelines constituting the CPRs in LBP were quite unclear and impractical to follow. One-third (33.3%) of the respondents reported lack of motivation for practice of LBP CPRs (Table 4). More than half of the respondents disagreed that: LBP CPRs are difficult to understand and

Table 1 Socio-demographic variables of the respondents (N = 45)

Variable	Frequency	Percentage
Age (years)		
30	14	31.1
30–40	13	28.9
40	18	40
Sex		
Male	32	71.1
Female	13	28.9
Qualification		
BMR/BPT	25	55.6
M.Sc./Ph.D	20	44.4
Experience level(years)		
≤ 5	15	33.3
6–10	11	24.4
11–15	12	26.7
≥ 16	7	15.6

use (57.8%), as well as, that LBP cannot be tried or experimented (51.1%) (Table 4). Only 22.2% of the respondents disagreed that CPRs oversimplify the complexities of LBP in the management of their patients (Table 4). However, 11.1% of them admitted that they inadvertently omit implementing CPRs in LBP in patient's management.

Tables 5, 6 and 7 show the results on the association between each of knowledge, attitude and practice of CPRs in LBP with socio-demographic characteristics. Based on summation of knowledge items, respondents' scores were classified as having below average (< 50%) (31%), average (50–75%) (6.7%) and above average (˃75%) (62.2%) level of CPRs. Based on summation of attitude items, respondents' scores were classified as having negative (62.2%) or positive (37.8%) attitude towards CPRs. Based on summation of practice items, respondents' scores were classified as having acceptable (< 50%) (15.6%) or unacceptable (≥ 50%) (84.4%) practice of CPRs. There were no significant ($p > 0.05$) association between each of knowledge and attitude of physiotherapists about CPRs in LBP with socio-demographic variables (Tables 5 and 6). Furthermore, the result showed no significant ($p > 0.05$) association between practice of CPRs and each of gender, qualification and age (Table 7). However, there was significant ($p < 0.05$) association observed between years of experience and practice of CPRs (Table 7). The association among respondents' variables of knowledge, attitude

Table 2 Responses on correct knowledge of clinical prediction rules in low back pain (N = 45)

SN	Knowledge of CPRs in low back pain	n (%)
1	CPRs help clinicians quantify the likelihood of a particular diagnosis given the presence or absence of certain signs and symptoms	41 (91.1)
2	CPRs help identify which patients do not require further testing for a particular diagnosis given the presence or absence of certain signs and symptoms	33 (73.3)
3	CPRs help clinicians identify which patients have a higher likelihood of success for a given intervention in comparison to an alternate intervention	37 (82.2)
4	CPRs help clinicians quantify the likely clinical outcome for an individual given the presence or absence of certain signs and symptoms	33 (73.3)
5	CPRs cannot help clinicians identify which patients may not require intervention	25 (55.6)
6	I am unaware of the existence of low back pain CPRs	21 (46.7)
7	Insufficient knowledge of the content of low back pain CPRs helps to enable its application	20 (44.4)

Key: *CPRs* Clinical prediction rules

Table 3 Responses on attitude about clinical prediction rules in low back pain (N = 45)

SN	Attitude of CPRs in low back pain	Agree n (%)	Neutral n (%)	Disagree n (%)
1	Aversion to using low back pain CPRs due to the term 'rule' implying an authoritative influence on decision making	13 (28.9)	20 (44.4)	12 (26.7)
2	Low back pain CPRs are a threat to professional autonomy	7 (15.6)	14 (31.1)	24 (53.3)
3	Development of the CPRs was biased	4 (8.9)	25 (55.6)	16 (35.6)
4	Low back pain CPRs are unclear or impractical to follow	5 (11.1)	16 (35.6)	24 (53.3)
5	I am in disagreement with low back pain CPRs in general	5 (11.1)	15 (33.3)	25 (55.6)
6	Using low back pain CPRs will not lead to improved patient outcomes	7 (15.6)	14 (31.1)	24 (53.3)
7	Using low back pain CPRs will not lead to improved health care processes	5 (11.1)	13 (28.9)	27 (60)

Key: *CPRs* Clinical Prediction Rules

Table 4 Responses on practice of clinical prediction rules in low back pain (N = 45)

SN	Practice of CPRs in low back pain	Agree n (%)	Neutral n (%)	Disagree n (%)
1	Low back pain CPRs oversimplify the complexities of the clinical encounter	13 (28.9)	22 (48.9)	10 (22.2)
2	Inadvertently omitting to implement low back pain CPRs	5 (11.1)	30 (66.7)	10 (22.2)
3	Low back pain CPRs are difficult to understand and use	4 (8.9)	15 (33.3)	26 (57.8)
4	Lack of motivation to use low back pain CPRs or change one's habit	15 (33.3)	21 (46.7)	9 (20.0)
5	Perceived inability to reconcile patient's preferences with the use of low back pain CPRs	13 (28.9)	20 (44.4)	12 (26.7)
6	Low back pain CPRs cannot be tried or experimented	8 (17.8)	14 (31.1)	23 (51.1)

Key: *CPRs* Clinical Prediction Rules

Table 5 Influence of socio-demographic factors on physiotherapists' knowledge of clinical prediction rules in low back pain (N = 45)

Variable	Knowledge of Clinical Prediction Rule				
	Below Average n (%)	Average n (%)	Above Average n (%)	χ^2	*P*-value
Age (years)					
30	3 (21.4)	1 (33.3)	10 (35.7)	4.1	0.386
30–40	5 (35.7)	2 (66.7)	6 (21.4)		
40	6 (42.9)	0 (0)	12 (42.9)		
Sex					
Male	10 (71.4)	3 (100. 0)	19 (67.9)	1.3	0.506
Female	4 (28.6)	0 (0)	9 (32.1)		
Qualification					
BMR/BPT	9 (64.3)	3 (100.0)	13 (46.4)	4.8	0.30
M.Sc	5 (35.7)	0 (0)	12 (42.9)		
Ph.D	0 (0)	0 (0)	3 (10.7)		
Experience (years)					
≤ 5	4 (28.6)	2 (66.7)	9 (32.1)	2.9	0.818
6–10	3 (21.4)	1 (33.3)	7 (25.0)		
11–15	4 (28.6)	0 (0)	8 (28.6)		
≥ 16	3 (21.4)	0 (0)	4 (14.3)		

Key: *BMR* Bachelor of Medical Rehabilitation (physiotherapy), *BPT* Bachelor in Physiotherapy

Table 6 Influence of socio-demographic factors on physiotherapists' attitude of clinical prediction rules in low back pain (N = 45)

Variable	Physiotherapists' Attitude		χ^2	*P*-value
	Negative n (%)	Positive n (%)		
Age (years)				
30	9(32.1)	5(29.4)	0.637	0.727
30–40	9(32.1)	4(23.5)		
40	10(35.8)	8(47.1)		
Sex				
Male	18(64.3)	14(82.4)	1.681	0.195
Female	10(35.7)	3(17.6)		
Qualification				
BMR/BPT	16(57.1)	9(52.9)	0.142	0.931
M.Sc	10(35.7)	7(41.2)		
Ph.D	2(7.2)	1(5.9)		
Experience (years)				
≤ 5	10(35.7)	5(29.5)	1.353	0.717
6–10	7(25.0)	4(23.5)		
11–15	8(28.6)	4(23.5)		
≥ 16	3(10.7)	4(23.5)		

and practice of CPRs is presented in Table 8. There were no significant associations among the variables ($p > 0.05$).

Discussion

This study aimed to assess knowledge about, attitude towards and use of CPRs in LBP care among Nigerian physiotherapists. From the findings, Nigerian physiotherapists had requisite theoretical knowledge of CPRs in LBP. This assertion is based on the fact that majority of them had good level of knowledge of CPRs in LBP. This finding is comparable with the report by Haskins et al. in which most of the participants in their study were aware of CPRs in LBP [23]. It is adducible that the age of the respondents in this study may have contributed to this finding. This is because younger professionals such as those within the age group 20–40 and with less than 15 years of experience have been reported to desire knowledge about a wide range of topics [42]. However, no significant association was observed between physiotherapists' knowledge of CPRs in LBP and socio-demographic characteristics.

More than half of the physiotherapists in this study had negative attitude towards CPRs in LBP. Moreover, their attitude about CPRs in LBP was not influenced by socio-demographic characteristics. In line with the findings of this study, Haskins et al. found that physiotherapists had negative attitude towards CPRs in LBP

Table 7 Influence of socio-demographic factors on physiotherapists' practice of clinical prediction rules in low back pain (N = 45)

Variable	Physiotherapists' Practice		χ^2	*P*-value
	Unacceptable n(%)	Acceptable n(%)		
Age (years)				
30	14(36.8)	0	3.748	0.154
30–40	10(26.4)	3(42.9)		
40	14(36.8)	4(57.1)		
Sex				
Male	27(71.1)	5(71.4)	0.000	0.984
Female	11(28.9)	2(28.6)		
Qualification				
BMR/BPT	22(57.9)	3(42.8)	1.019	0.601
M.Sc	14(36.8)	3(42.8)		
Ph.D	2(5.3)	1(14.3)		
Experience (years)				
≤ 5	15(39.5)	0	10.339	0.016*
6–10	9(23.7)	2(28.6)		
11–15	7(18.4)	5(71.4)		
≥ 16	7(18.4)	0		

* indicates significant association

[23]. To underscore clinicians' bias of CPRs, Graham et al. opine that the word "rule" in clinical prediction rules sound authoritative rather than helping to make informed decision [43]. Contrary to the finding of this present study, Haskins et al. found an inverse association between attitude about CPRs in LBP and years of experience of physiotherapists [23]. It was observed that clinical experience tends to obviate the need for CPRs in LBP as physiotherapists mostly will follow faster tracks that work better for them. Karstens et al. [44] and Adje et al. [45] have earlier reported similar findings among physiotherapists with the use of prognostic tools and questionnaire in the management of LBP.

Most of the physiotherapists in this study did not incorporate CPRs into their routine clinical practice. Only 15% of physiotherapists in this study utilized CPRs in LBP in making informed decision. However, an association was found between practice of CPRs in LBP and years of experience. This finding is indirectly corroborated by the "non-significant association between years of experience and attitude towards clinical prediction rules" displayed by physiotherapists which would ultimately serve as a barrier to the uptake of EBP culture requiring utilization of tools such as the CPRs in patient management. It is implied from this study that the higher number of years of clinical experience, the less likely to utilize CPRs in LBP for patient's management.

Anecdotally, there were more male musculoskeletal physiotherapists in the study settings, which may account for higher representation in the sample. This pattern typically reflects previous reports in Nigeria that identified physiotherapy as a male dominated profession unlike what obtains in most other countries [46–51]. However, the findings of this study showed that gender did not significantly influence knowledge, attitude and utilization of CPRs in LBP among the physiotherapists. Also, the responding physiotherapists in this study were mostly within the age group of 20 to 40 years. Based on observation, older physiotherapists in the study settings do not seem to readily want to participate in research studies. This limits the generalizability of the study findings. Similar observation has been reported in other studies that older physiotherapists, especially those in private settings are less enthusiastic to participate in studies than younger ones [52, 53].

Conclusion

Most Nigerian physiotherapists had a good knowledge, but negative attitude and low utilization of CPRs in LBP. There is a need to incorporate training in CPRs into undergraduate and continuous professional development programs. Furthermore, health policy and department administrators should encourage their clinicians to incorporate CPRs into their routine clinical practice.

Table 8 Chi-square test of association between physiotherapists' knowledge, attitude and practice of clinical prediction rules in low back pain. (N = 45)

Variable		Physiotherapists' Knowledge			χ^2	*P*-value
		Below Average n (%)	Average n (%)	Above Average n (%)		
Attitude	Negative	7(50)	3(100)	18(64.3)	2.762	0.251
	Positive	7(50)	0	10(35.7)		
Practice	Unacceptable	13(92.9)	2(66.7)	23(82.1)	1.589	0.452
	Acceptable	1(7.1)	1(33.3)	5(17.9)		

Supplementary Information

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Supplementary Material 1.

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All authors read and approved the final manuscript.

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Availability of data and materials
The datasets used and/ or analysed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate
Ethical approval was obtained from the Ethical Review Committee, Institute of Public Health, Obafemi Awolowo University, Ile-Ife, Nigeria.

Consent for publication
Not applicable.

Competing interests
No competing interests to declare.

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