

Original Article

Impact of Health Education on Footwear Practices in Reducing Low Back Pain among Patients in Rivers State, Nigeria

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ABSTRACT

Background: Joint dysfunction and increased pressure on the spinal discs can also occur, leading to disc degeneration or herniation and further stressing the lower back. **Objective:** The study aimed to investigate the impact of health education on footwear practices in reducing low back pain among patients in Rivers State, Nigeria. Low back pain is a common issue that affects many individuals and can be influenced by various factors, including footwear choices. **Methods:** The study included a sample of 50 participants from the University of Port Harcourt Teaching Hospital (UPTH) consisting of 45 individuals with nonspecific low back pain and 5 patients diagnosed with spinal stenosis. Participants were selected using stratified and non-proportional sampling techniques from a population of 170 individuals at UPTH. The Health Education Impact on Footwear Practices and Low Back Pain Questionnaire (HEIFPLBPQ) was used as the main instrument. Descriptive and inferential statistics were employed to analyze the collected data. **Results:** The findings indicated that the health education intervention programme had a significant impact on both footwear practices and the reduction of low back pain among the patients. Participants gained knowledge about important factors such as body mass index, comfort/style, foot morphology, and affordability. Comfort/style was a priority for 40% of the participants, while 90% emphasized affordability in their footwear choices. The health education programme led to improvements in pain experiences, including decreased pain intensity and discomfort, as well as a reduction in pain exacerbation during ambulation. **Conclusion:** It was concluded that the health education programme resulted in notable improvements in pain experiences, including decreased pain intensity and discomfort, as well as a reduction in pain exacerbation during ambulation. It was recommended that to effectively address the needs of patients with low back pain, healthcare professionals and policymakers should customize health education interventions on footwear practices.

KEYWORDS

Health education; footwear practices; reducing low back pain; nonspecific low back pain; spinal stenosis

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INTRODUCTION

There is presently research endeavour underway, examining ill-fitting or substandard footwear, particularly with regard to the correlation between health education on footwear practices and the mitigation of low back pain. It has been observed that insufficient knowledge regarding footwear practices has the potential to prompt individuals to engage in practices that disrupt the biomechanics of the body [1], thereby altering one's gait pattern and leading to uneven weight distribution and heightened stress on specific areas of the feet. Consequently, this can result in foot discomfort and various conditions such as plantar fasciitis, arch pain, or heel spurs, all of which contribute to the manifestation of low back pain [2,3].

Stolt et al. [4] assert that health education on appropriate footwear selection enlighten patients about the profound impact of proper foot alignment and support in the prevention of low back pain. Patients are educated regarding the detrimental consequences of misalignment or inadequate support in their shoes [5], which can induce discomfort and pain. Moreover, they receive guidance on the optimal timing for replacing their footwear to ensure optimal foot support and cushioning. By prioritizing health education on appropriate footwear, some scholars [6,7] contend that healthcare professionals can expedite non-pharmaceutical or nonsurgical treatments to address low back pain and facilitate patients' recovery.

Inadequate knowledge regarding suitable footwear has been demonstrated to contribute to muscle imbalances, foot infections, and exacerbated low back pain among patients, regardless of their prolonged use of medications [8]. Therefore, as suggested by Menz et al. [9], it would be advisable to incorporate education on shoes with added depth and cushioning in the care of patients with low back pain. This approach may help prevent pressure points, reduce muscle tightness and spasms, and alleviate inflammation in the lower back [10]. For example, conducting educational sessions for patients with low back pain to correct foot alignment and provide additional support through comprehensive information on inserts tailored to patients' understanding and affordability can improve foot posture [11] and reduce stress on the lower back. Patients with flat feet can also benefit from education on choosing flats that enhance their arches, relieve pressure on kneecaps, and promote proper alignment [12]. This education is equally relevant for diabetic patients (Makiling & Smart, 2020), as inadequate footwear, regardless of medication, can significantly contribute to foot ulcers due to neuropathy and compromised circulation [13].

Therefore, regardless of the category of low back pain patients, provisions for orthopedic and well-fitted athletic shoes are available. Such shoes offer arch support [5], cushioning, and a spacious toe box, effectively addressing the underlying causes of foot cushioning, absorbing shock during physical activities [5,9], and reducing lower back discomfort [5]. Comprehensive health education is a cost-effective solution to address this issue. However, the effectiveness of health education on footwear practices may vary depending on location, lifestyle as well as categories of the low back pain. While general knowledge suggests that health education can help maintain good posture and prevent discomfort, there is limited research on the effectiveness of footwear education specifically for managing different categories of low back pain, especially in developing regions. Therefore, this study was aimed at investigating impact of health education on footwear practices in reducing low back pain among patients in Rivers State, Nigeria.

MATERIALS AND METHODS

Study design

This study used a mixed research method, combining a pretest-posttest quasi-experimental design and a descriptive survey design [14], to investigate the impact of health education on footwear practices in reducing low back pain among patients in Rivers State, Nigeria. The sample included 50 participants selected from a population of 170 individuals at the University of Port Harcourt Teaching Hospital (UPTH) using stratified and disproportionate sampling techniques [15]. The sample consisted of 35 patients from the general outpatient clinic department (GOPD) and 15 patients from the spine physiotherapy unit. All participants were diagnosed with low back pain and met specific inclusion criteria, such as age between 18-60 years, experiencing low back

pain for 3 months, having a medical diagnosis, and no underlying pathology or recent surgery. Exclusion criteria were applied to exclude individuals with mental instability, underlying pathology, infection, or spinal fracture. Non-specific low back pain patients were 45 in number while the remaining 5 were spinal stenosis patients. The study utilized the Health Education Impact on Footwear Practices and Low Back Pain Questionnaire (HEIFPLBPQ) as the primary data collection instrument, ensuring its validity and reliability through expert review and test-retest methods. Ethical Clearance was sought from the Ethics committee in the University of Port Harcourt (UPH) and University of Port Harcourt Teaching Hospital (UPTH). Approvals were given with reference number: UPH/CEREMAD/REC/MM77/058 (for UPH) and UPTH/ADM/90/S.11/V.XI/1054 (for UPTH). The research questions were analyzed using mean and standard deviation, while the hypothesis was tested using ANCOVA and simple percentage at a significance level of 0.05. The study achieved high return rates of 100%, indicating excellent compliance from all respondents in completing the surveys.

Literature Review

Health education plays a pivotal role in promoting overall well-being and preventing various health issues, as reported by Ozoemena et al. (2019). One area of focus, identified by Makiling and Smart (2020) in conjunction with McBride et al. [16], Paige et al. [17], and Ahmad-Sharoni et al. [18], is health education intervention programmes that center on footwear practices. It is recognised that the optimal functioning of the feet is vital for maintaining proper body alignment and preventing muscle and joint imbalances throughout the body, including the lower back. These imbalances can lead to discomfort, malaise, and referred pain in distant areas such as the lower back, as noted by Ubom and Achalu [19]. Joint dysfunction and increased pressure on the spinal discs, which can result in disc degeneration or herniation, are potential consequences of suboptimal foot functioning (pronated feet), according to Goradia and Shimpi [20]. This, in turn, amplifies the strain on the lower back. Additionally, foot injuries or infections have been identified as contributing factors to the development of low back pain, as reported by Deshmukh et al. [21]. Individuals may unconsciously adjust their posture and movement patterns to compensate for foot issues, exerting strain on the back muscles and spine. These findings underscore the significance of addressing footwear practices in the management of low back pain. In this regard, comprehensive health education, encompassing specific guidance on appropriate footwear choices, can serve as a cost-effective solution for preventing and reducing low back pain. As highlighted by Ubom and Onyezere [19], health education can assist individuals in maintaining good posture and alleviating discomfort.

Similarly, Asada et al. [22], Lu et al. [23], and Maher et al. [24] have acknowledged that nonspecific low back pain is a prevalent condition affecting individuals globally. It is characterized by pain and discomfort in the lower back without a specific underlying cause. In the same vein, Pergolizzi and LeQuang [25] have remarked that health education on footwear practices can play a significant role in managing nonspecific low back pain. La Trobe University in Akhaddar [26] further adds that by promoting awareness of proper footwear choices and providing guidance on maintaining good posture, health education can alleviate symptoms and enhance overall spinal health. These findings are supported by the conclusions of Siedentop and Van der Mars [27], who emphasized the importance of education in preventing and managing nonspecific low back pain. Apart from nonspecific low back pain, footwear practices can also impact spinal stenosis [21]. Spinal stenosis refers to the narrowing of the spinal canal, which can lead to compression of the spinal cord and nerves, resulting in low back pain, as noted by Akhaddar [26]. Health education on footwear practices can provide individuals with spinal stenosis with information on supportive footwear that alleviates pressure on the spine, as highlighted by Alamam et al. [6]. Similarly, Helfand [28] observed that appropriate footwear choices can contribute to reducing pain and improving mobility in individuals with spinal stenosis.

Theoretical Framework

In 2015, Icek Ajzen revitalized the postulated theory of planned behaviour. According to this theory, an individual's behaviour is determined by their intention to engage in the said behaviour,

which is influenced by their attitude, subjective norms, and perceived behavioural control [29]. In the context of investigating the impact of health education on footwear practices as a means of reducing low back pain among patients in Rivers State, Nigeria, this theory serves as a foundation for examining the key factors that influence the adoption of proper footwear practices. These factors are then juxtaposed with the impact of health education among patients suffering from nonspecific low back pain and spinal stenosis in Rivers State, Nigeria. Consequently, the theory provides valuable insights into how attitudes, social norms, and perceived control can be targeted through health education interventions for individuals with low back pain. The concept of the study is based on the impact of health education on footwear practices in reducing low back pain among nonspecific low back pain and spinal stenosis patients in Rivers State, Nigeria. This is represented in Figure 1.

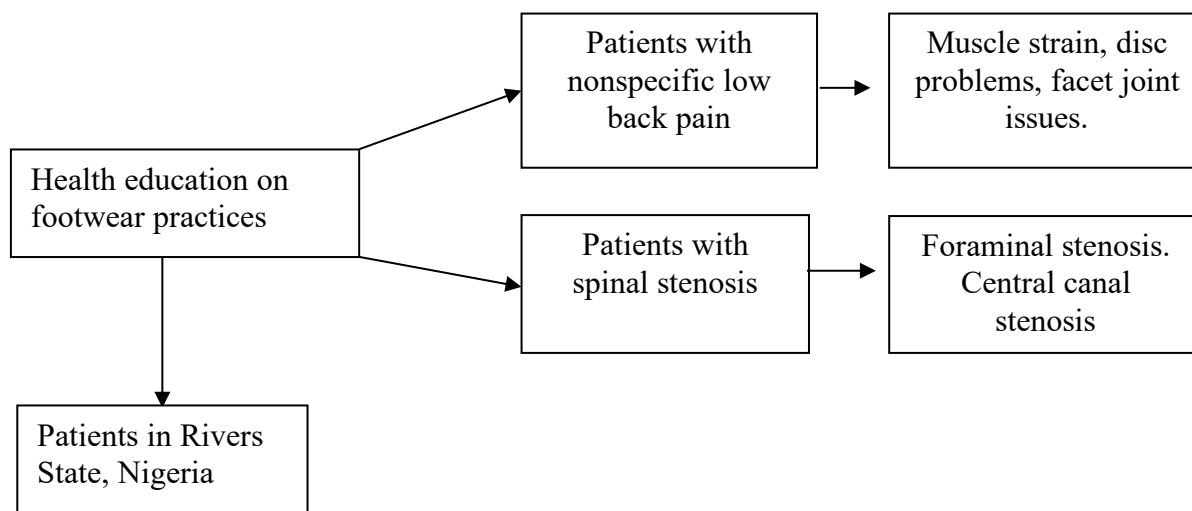


Figure 1. The representation of the study's conceptual framework

RESULTS

Impact of health education on footwear practices in reducing low back pain

Based on the pre-test and post-test mean and standard deviation scores for pain-related items indicate an overall improvement in mean scores. The mean gain values range from 0.49 to 1.33, showing improvement across different pain-related items. The post-test cluster mean (2.62) is higher than the pre-test means (1.79), indicating a positive impact on low back pain reduction through improved footwear practices. Standard deviation values (0.51 for post-test and 0.15 for pre-test) suggest moderate variability within the data. Summary of Mean and Standard Deviation scores on the impact of health education on footwear practices in reducing low back pain among patients suffering from nonspecific low back pain in Rivers State presented in Table 1a and the impact of health education on footwear practices in reducing low back pain among patients suffering from spinal stenosis presented in Table 1b.

Key factors that influence the adoption of proper footwear practices among patients with nonspecific low back pain and spinal stenosis in Rivers State

Findings show that attitudes and beliefs about back pain influenced footwear practices for 40% of patients with nonspecific low back pain, while psychosocial factors influenced practices for 80% of patients with spinal stenosis. Age was identified as a factor for both groups, with 66% of patients with nonspecific low back pain and 60% of patients with spinal stenosis recognizing its influence. A significant percentage of patients in both groups acknowledged the impact of footwear practices on low back pain level, with 71% and 80% considering it, respectively. BMI and high-arched foot were recognized by a lower percentage of patients with nonspecific low back pain (33% and 10%) compared to patients with spinal stenosis (60% and 40%). Both groups

acknowledged the influence of comorbidities (80%), and patients with nonspecific low back pain emphasized comfort/style (40%) and affordability (90%), while patients with spinal stenosis prioritized comfort/style (60%) and affordability (80%). The impact of health education on footwear practices in reducing low back pain among patients suffering from spinal stenosis in Rivers State presented in [Table 2](#).

Table 1a. Impact of health education on footwear practices in reducing low back pain

No.	Items	Pre-Test		Post-Test		Mean Gain
		Mean	SD	Mean	SD	
1.	Pain that radiates from the lumbar region to the knee.	2.04	0.23	2.95	0.70	0.91
2.	Pain that radiates from the lumbar region to the feet.	2.00	0.21	2.63	0.59	0.63
3.	Pain that exacerbates in the lumbar region during walking.	1.83	0.15	2.77	0.61	0.94
4.	Muscular spasms in the lumbar region.	2.07	0.26	2.56	0.48	0.49
5.	Cramping sensations in the calves.	1.68	0.11	2.51	0.44	0.83
6.	Experiencing pain in the lumbar region while attempting to perform intricate motor tasks with the lower extremities.	1.15	0.07	2.48	0.42	1.33
7.	Experiencing pain in the lumbar region while attempting to perform intricate motor tasks with the feet.	1.74	0.13	2.45	0.40	0.71
Cluster Mean/SD		1.79	0.17	2.62	0.52	0.83

Table 1b. The impact of health education on footwear practices in reducing low back pain among patients suffering from spinal stenosis in Rivers State

No.	Items	Pre-Test		Post-Test		Mean Gain
		Mean	SD	Mean	SD	
1.	Pain that radiates from the lumbar region to the knee.	1.29	0.13	1.80	0.63	0.51
2.	Pain that radiates from the lumbar region to the feet.	1.22	0.10	1.54	0.38	0.32
3.	Pain that exacerbates in the lumbar region during walking.	1.24	0.11	1.68	0.45	0.44
4.	Muscular spasms in the lumbar region.	1.33	0.19	1.50	0.31	0.17
5.	Cramping sensations in the calves.	1.21	0.10	1.74	0.55	0.53
6.	Experiencing pain in the lumbar region while attempting to perform intricate motor tasks with the lower extremities.	1.53	0.28	1.82	0.61	0.29
7.	Experiencing pain in the lumbar region while attempting to perform intricate motor tasks with the feet.	1.27	0.12	1.80	0.63	0.53
Cluster Mean/SD		1.16	0.15	1.70	0.51	0.40

Hypothesis Confirmation

There is no significant difference in the mean scores of patients with nonspecific low back pain as well as spinal stenosis pertaining to the impact of health education on footwear practices in reducing low back pain among patients in Rivers State, Nigeria. The ANCOVA results in [Table 3a](#) and [Table 3b](#) provide information on the significant difference in mean scores of patients with nonspecific low back pain and spinal stenosis regarding the impact of health education on footwear practices in reducing low back pain in Rivers State, Nigeria. For patients with nonspecific low back pain ([Table 3a](#)), the analysis showed a significant difference in mean scores. The pre-test variable influenced the outcome, and the group variable (receiving health education)

had an impact on footwear practices and reducing low back pain. For patients with spinal stenosis (Table 3b), the analysis also showed significant differences in mean scores.

The pre-test variable did not significantly influence the outcome, but the group variable had an impact on footwear practices and reducing low back pain among spinal stenosis patients. These results support the alternate hypothesis (H_1) that there is a significant difference in the mean scores of patients with nonspecific low back pain and spinal stenosis regarding the impact of health education on footwear practices in reducing low back pain in Rivers State, Nigeria. ANCOVA result for pre-test and post-test analysis on the significant difference of the impact of health education on footwear practices in reducing low back pain among non-specific low back pain patients in Rivers State presented in Table 3a and ANCOVA result for Pre-Test and Post-Test Analysis on the significant difference of the impact of health education on footwear practices in reducing low back pain among spinal stenosis patients in Rivers State presented in Table 3b.

Table 2. Key factors that influence the adoption of proper footwear practices among patients with nonspecific low back pain and spinal stenosis in Rivers State

No.	Item	Non-Specific low back Pain Patients (n = 45) (%)	Spinal Stenosis Patients (n = 5) (%)
1.	Patients' attitudes and beliefs about their back pain (psychosocial factors).	40	80
2.	Patients' age.	66	60
3.	Patients' low back pain level.	71	80
4.	Patients' body mass index (BMI).	33	60
5.	Flat foot (<i>Pes Planus</i>).	75	60
6.	High-arched foot (<i>Pes Cavus</i>).	10	40
7.	Neutral foot.	15	-
8.	Comorbidities.	80	80
9.	Personal values (comfort/style).	40	60
10.	Personal values (affordability).	90	80

Table 3a. Pre-Test and Post-Test test results related to the impact of health education on footwear practices in reducing non-specific low back pain

Source	Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Pre-test	29.17	1	29.17	30.35	0.117*	0.413
Group	58.06	1	58.06	60.47	0.001*	0.584
Error	41.33	43	0.96			
Total	128.56	45				

Remarks: * indicates statistical significance at $p < 0.05$

Table 3b. Pre-Test and Post-Test results regarding the impact of health education on footwear practices in reducing low back pain among patients with spinal stenosis

Source	Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Pre-test	20.11	1	20.11	1.18	0.207*	0.282
Group	34.48	1	34.48	2.02	0.013*	0.403
Error	51.23	3	17.08			
Total	105.82	5				

Remarks: * indicates statistical significance at $p < 0.05$

DISCUSSIONS

Impact of Health Education on Footwear Practices in Reducing Low Back Pain among Patients Suffering from Nonspecific Low Back Pain and Spinal Stenosis

It was found that that implementing a health education intervention programme focusing on footwear practices had a significant impact on patients suffering from nonspecific low back pain

and spinal stenosis. The programme led to improvements in various aspects of pain experiences, including reduced pain that radiates from the lumbar region to the knee and feet, less discomfort and intensity of pain, and decreased pain exacerbation during walking. These findings are supported by research that emphasizes the importance of appropriate footwear in reducing foot-related pain [30–32]. Additionally, the programme resulted in a reduction in muscular spasms in the lumbar region and fewer instances of cramping sensations in the calves, which can be attributed to the education received on proper footwear practices [33–35]. However, it is worth noting that patients with non-specific low back pain showed better improvement compared to patients with spinal stenosis. This difference in improvement can be attributed to the underlying condition and its impact on pain experiences, highlighting the need for further research in understanding the specific challenges faced by patients with spinal stenosis and developing tailored interventions to address their unique needs [36,37]. In contrast, a study by Lynch et al. [38] observed limited improvement in pain experiences among patients with spinal stenosis when engaging in health education intervention programmes.

Key Factors that Influence the Adoption of Proper Footwear Practices among Patients with Nonspecific Low Back Pain and Spinal Stenosis

It was observed that patients with spinal stenosis express disapproval towards the use of neutral footwear. In contrast, both patient groups share a unanimous view regarding the significance of comorbidities as a crucial determinant in consenting to appropriate footwear practices for the alleviation of low back pain. Furthermore, personal values such as comfort, style, and affordability exert a notable influence on the adoption of suitable footwear practices. Patients who prioritize comfort and style are more inclined to select footwear that caters to their preferences and requirements [39]. Likewise, affordability plays a substantial role in the decision-making process concerning proper footwear practices. Notably, the findings indicate that patients with a positive attitude towards adopting appropriate footwear practices exhibit a higher likelihood of adhering to recommended guidelines.

This aligns with the discoveries made by Ahmed et al. [40], which underscore the influence of psychosocial factors on the effectiveness of back pain treatment at a group level. Older patients with low back pain and spinal stenosis exhibit a greater propensity for embracing proper footwear practices compared to their younger counterparts. This can be attributed to an enhanced awareness and understanding of the benefits associated with suitable footwear as individuals age, as proposed by Menz et al. [9]. The severity of low back pain also impacts the adoption of appropriate footwear practices, in line with the findings of Fan et al. [41], which highlight the correlation between pain levels and adherence to suitable footwear practices. Patients with higher BMI values are less inclined to adopt appropriate footwear practices.

This predicament may stem from the challenges faced in finding suitable footwear options that provide both comfort and support for individuals with higher body weights, as indicated by Perring et al. [36] in consonance with Sharma et al. [42] and Melancia et al. [43]. Additionally, foot morphology, including flat foot (*Pes Planus*) and high-arched foot (*Pes Cavus*), significantly influences footwear practices. Patients with different foot types may have diverse requirements when it comes to proper footwear, as elucidated by Lynch et al. [38]. Collectively, these factors contribute to the variations in the percentages of proper footwear practice adoption subsequent to health education intervention programmes targeting the reduction of low back pain among patients with nonspecific low back pain and spinal stenosis [33,34,42].

CONCLUSIONS

The aforementioned study delves into the profound impact of health education on footwear practices in mitigating low back pain amongst patients residing in Rivers State, Nigeria. The findings highlight not only the mean gain values but also the positive cluster mean associated with the implementation of health education on footwear practices, thus substantiating its efficacy in alleviating low back pain. Furthermore, the study identifies pivotal factors that significantly influence the adoption of appropriate footwear practices, encompassing attitudes, beliefs, psychosocial factors, age, comorbidities, and personal values such as comfort, style, and

affordability. Remarkably, the health education intervention programme engendered notable improvements across multiple dimensions of pain experiences, including diminished pain intensity and discomfort, as well as a reduction in pain exacerbation during ambulation. It is highly recommended that healthcare professionals and policymakers tailor their interventions to address the distinctive requirements of patients afflicted with spinal stenosis. Moreover, healthcare providers should conscientiously consider the impact of psychosocial factors, age, comorbidities, and personal values when imparting education to patients concerning the adoption of appropriate footwear practices as a means to mitigate low back pain.

CONFLICT OF INTEREST

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

AUTHOR CONTRIBUTIONS

Conceptualization, Methodology, Validation, Supervision, Formal analysis, Writing - Original Draft, Writing - Review & Editing: I.M.U; Software, Investigation, Resources, Writing - Original Draft., Visualization., Project administration: R.C.E. Resources, Validation, Methodology, Writing - Original Draft, Writing - Review & Editing: A.K.M.

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