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Changes in Self-Reported Medication Safety Practices Following a Structured Nurse-Led Educational Programme Among Surgical Outpatients in Southwest Nigeria

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ABSTRACT

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Declaration:

Authors' Contributions:

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Background: Medication safety is essential for surgical patients whose medication regimens frequently change during the perioperative period. Polypharmacy increases medication complexity and associated risks, highlighting the importance of structured patient education.

Objective: To evaluate the effectiveness of a structured educational programme on medication safety and polypharmacy among surgical outpatients at University College Hospital, Ibadan, Nigeria.

Methods: A one-group quasi-experimental pretest-posttest design was employed. Of 117 planned participants, 111 completed both assessments. Data were collected using a structured questionnaire assessing medication-safety knowledge, polypharmacy knowledge, reported practices, and influencing factors. The programme comprised four modules covering medication knowledge, safety practices, polypharmacy awareness, and simplified STOPP/START-based medication review, delivered in English and Yoruba. Descriptive statistics and paired-samples t-tests were used ($p < 0.05$).

Results: Medication-safety knowledge improved significantly (mean difference = -2.703 , 95% CI: -2.894 to -2.512 ; $p < 0.001$; Cohen's $d = 2.66$). Polypharmacy knowledge increased from 7.00 ± 2.76 to 10.66 ± 1.17 (mean difference = -3.658 , 95% CI: -4.117 to -3.199 ; $p < 0.001$; $d = 1.50$). Medication-safety practice scores increased from 8.60 ± 1.46 to 9.50 ± 1.01 (mean difference = -0.892 , 95% CI: -1.134 to -0.649 ; $d = 0.69$).

Conclusion: Significant improvements in medication-safety knowledge, polypharmacy knowledge, and reported practices were observed following the educational programme. These findings support structured medication education in perioperative care, although the uncontrolled study design limits causal attribution.

Keywords: Medication safety; Polypharmacy; Patient education; Surgical outpatients; Perioperative care; Nigeria.

INTRODUCTION

Medication safety is a central component of quality healthcare. Preventable medication-related harm can occur during prescribing, dispensing, administration, monitoring and patient self-management. The World Health Organization (WHO) identifies medication safety as a major patient-safety priority and emphasizes patient engagement, medication information, safe transitions of care and system-level strategies (World Health Organization, 2017, 2024). Surgical patients require particular attention because medication regimens often change before surgery, during admission and after discharge. Analgesics, antibiotics, anticoagulants and other perioperative medicines may be added to those used for chronic conditions, creating opportunities for omissions, duplication, interactions and misunderstanding. Medication reconciliation, patient education and multidisciplinary interventions can reduce medication discrepancies and related problems among adult medical and surgical patients (Manias et al., 2020).

Polypharmacy adds further complexity. Multiple medicines may be clinically justified, yet unnecessary, duplicated or poorly monitored medicines increase risk. Systematic reviews link medication review, patient education and multidisciplinary approaches with improved appropriateness of medication use (Cooper et al., 2021; Rankin et al., 2018). Prospective evidence has also associated multimorbidity and polypharmacy with adverse drug reactions (Osanlou et al., 2022). These challenges are especially relevant in resource-constrained settings where staffing, documentation, reconciliation and patient counselling may be inconsistent. Intervention-based evidence among adult surgical patients in Nigeria remains limited. This study therefore evaluated a structured nurse-led educational programme addressing medication knowledge, medication-safety practices, polypharmacy awareness and simplified medication-review principles among surgical outpatients at University College Hospital, Ibadan.

Aim

To evaluate the effectiveness of a structured educational programme on medication-safety and polypharmacy knowledge among surgical outpatients at University College Hospital, Ibadan, Nigeria.

Objectives

1. Assess pre- and post-intervention knowledge of medication safety.
2. Assess pre- and post-intervention knowledge of polypharmacy.
3. Evaluate pre- and post-intervention medication-safety practices.

METHODOLOGY

Study Design and Setting

A one-group quasi-experimental pretest–posttest design was used. The study was conducted at the Surgical Outpatient Clinic of University College Hospital (UCH), Ibadan, a tertiary teaching hospital affiliated with the University of Ibadan. The surgical outpatient service was selected because patients commonly experience medication changes across the perioperative period.

Study Population and Eligibility

Adult surgical patients (aged ≥ 18 years) attending the surgical outpatient clinics who were receiving multiple medications and provided written informed consent were eligible. Critically or medically unstable patients, those with severe cognitive or psychiatric impairment limiting participation, those with severe communication impairment without support, and those who declined or withdrew consent were excluded.

Sampling and Sample Size

A minimum sample size of 117 was calculated using the formula for comparing two paired means (or a paired-samples t-test), factoring in a 95% confidence level, 80% statistical power, an estimated standard deviation of differences of 13, and an expected mean difference of 5. To account for potential attrition, dropouts, or incomplete responses, a 10% inflation was added, bringing the initial recruitment target to 117 participants. Of the 117 patients initially enrolled and baseline-assessed via convenience sampling, 111 successfully completed both the educational

modules and the post-intervention assessment. Six participants were excluded from the final analysis due to incomplete post-intervention questionnaire data or loss to follow-up (attrition rate of approximately 5.1%), yielding a final analyzed sample of 111.

Intervention and Data Collection

Data collection occurred in three phases. The structured educational programme was delivered by perioperative nurses in face-to-face sessions conducted in both English and Yoruba to ensure full comprehension. The curriculum was divided into four distinct modules: (1) Medication knowledge and understanding, (2) Medication-safety practices, (3) Polypharmacy awareness, and (4) Simplified STOPP/START-based medication review, each module was discussed per week. Each participant received identical educational content, standardized illustrative materials, and interactive guidance over the course of the sessions (incorporating 30–45 minutes dedicated to interactive discussion and Q&A per module). Following the completion of the intervention modules, a post-intervention assessment utilizing the identical structured questionnaire was administered to all 111 participants within 2 to 6 weeks.

Instrument

A structured questionnaire was used. Section A covered sociodemographic and clinical characteristics. Section B (Medication-Safety Knowledge) comprised 12 items scored 0 or 1 (score range: 0–12). Section C (Polypharmacy Knowledge) comprised 12 items (score range: 0–12). Section D (Medication-Safety Practices) comprised 10 items rated on a 5-point Likert scale. Higher scores indicate greater knowledge and safer practices. Mean scores are interpreted as average correct responses per participant out of the total possible items." The instrument and educational modules were informed by the literature and STOPP/START principles and underwent face and content review by nursing, pharmacy and medical experts. Test–retest reliability was examined with 12 participants; Cronbach's $\alpha \geq 0.70$ was accepted.

Statistical Analysis

Data were analysed using IBM SPSS Statistics version 26. Frequencies and percentages were used to summarise categorical variables, while means and standard deviations were used for continuous variables. Paired-samples t-tests were conducted to compare pre-intervention and post-intervention outcome scores among participants who completed both assessments. The distribution of the within-participant difference scores was examined to assess the normality assumption. Statistical significance was set at a two-sided p-value of less than 0.05. Mean differences were calculated as pre-intervention minus post-intervention. Where appropriate, effect sizes for paired observations and their 95% confidence intervals were reported alongside the mean differences and corresponding p-values. Overall result showed that Medication-Safety Knowledge: Mean difference = -2.703 , 95% CI $[-2.894, -2.512]$, $p < 0.001$, Cohen's $d = 2.66$ (indicating a very large effect size). Polypharmacy knowledge increased from 7.00 ± 2.76 to 10.66 ± 1.17 (mean difference -3.658 , 95 % CI -4.117 to -3.199 , $p < 0.001$), Cohen's $d = 1.50$. Medication-safety practice scores increased from 8.60 ± 1.46 to 9.50 ± 1.01 (mean difference -0.892 , 95 % CI -1.134 to -0.649 , $p < 0.00$, Cohen's $d = 0.69$).

Ethical Considerations

Ethical approval was obtained from the Institute of Medical Research and Training (IMRAT), College of Medicine, University of Ibadan (UI/EC/26/0140). Institutional permission was granted by University College Hospital authorities. Written informed consent was obtained. Participation was voluntary; responses were coded; confidentiality was maintained; and the study involved no invasive procedures.

RESULTS

Participants Demographic Characteristics

111 participants completed both assessments. Mean age was 47.0 ± 16.4 years; 69.4 % were female, 52.3 % had tertiary education and 61.3 % were married. General surgery accounted for 63.1 % of procedures; 57.7 % of participants were in the preoperative stage. Doctors were the main reported source of medication information (52.3 %), followed by pharmacists (33.3 %) and nurses (10.8 %). The largest medication-use category was 3-4 prescribed medicines (40.5 %).

Table 1: Sociodemographic data

Characteristic	n	%
Age ≥60 years	28	25.2
Female	77	69.4
Tertiary education	58	52.3
Married	68	61.3
General surgery	70	63.1
Preoperative stage	64	57.7
Doctor as medication-information source	58	52.3
Taking 3–4 prescribed medicines	45	40.5

Primary Outcome Comparisons

Medication-safety knowledge improved significantly after the intervention. The proportion classified as having good medication-safety knowledge increased from 48.6% before the intervention to 79.3% after the intervention. Polypharmacy knowledge also increased significantly. Medication-safety practice scores improved from 8.60 ± 1.46 to 9.50 ± 1.01 , while the proportion classified as having good practices increased from 44.1% to 56.8%.

Table 2: Comparison of Pre- and Post-Intervention Outcome Scores

Outcome	Pre Mean $\pm$ SD	Post Mean $\pm$ SD	Mean difference	95% CI	p
Medication-safety knowledge	7.56 $\pm$ 1.24	10.26 $\pm$ 0.93	-2.703	-2.894 to -2.512	<0.001
Polypharmacy knowledge	7.00 $\pm$ 2.76	10.66 $\pm$ 1.17	-3.658	-4.117 to -3.199	<0.001
Medication-safety practices	8.60 $\pm$ 1.46	9.50 $\pm$ 1.01	-0.892	-1.134 to -0.649	<0.001

At baseline, important knowledge gaps concerned drug-drug and herbal-medicine interactions. Only 36.9% recognized that taking two medicines together could cause harmful interactions, and 46.8% recognized that herbal medicines could interact with prescribed medicines. After the intervention, these proportions increased to 80.2% and 87.4%, respectively. Similarly, recognition that all current medicines should be disclosed to healthcare professionals was 94.6% after the intervention.

For polypharmacy, baseline recognition of medication-related problems and adverse drug reactions was limited. After the intervention, 88.3% recognized the increased risk of adverse drug reactions, 89.2% recognized drug-drug interaction risk, 95.5% recognized the need for careful review among older or medically complex patients, and 92.8% recognized that medication review can identify unnecessary, duplicated or potentially harmful medicines. Medication-safety behaviours were generally strong at baseline, particularly taking medicines at the prescribed time (97.3%), checking medication names (91.9%) and seeking clarification when instructions were not understood (91.9%). Lower baseline agreement was reported for informing professionals about herbal/traditional medicine use (71.1%) and consulting professionals before using non-prescribed medicines (75.7%). After the intervention, 80.1% reported informing professionals about herbal/traditional remedies, 81.1% reported checking with professionals before using non-prescribed medicines, and 94.6% reported informing professionals about unexpected medication reactions.

DISCUSSION

The principal finding was a statistically significant improvement in medication-safety knowledge after the nurse-led programme, from a mean of 7.56 to 10.26 out of 12, this mirrors findings by international and regional studies Manias et al., 2020; Mortelmans, (2025), where structured nurse-led counseling bridged critical knowledge gaps regarding

herbal-drug and drug-drug interactions (which rose from baseline lows of 36.9% to over 80%). In resource-constrained settings like UCH Ibadan, where verbal communication during busy outpatient clinics can sometimes leave gaps in patient comprehension, embedding structured, bilingual (English/Yoruba) nurse-led reinforcement directly tackles polypharmacy risks and unmonitored traditional remedy use common among surgical cohorts in Southwest Nigeria. These specific gaps responded well to structured education. The result is consistent with Manias et al. (2020), who identified patient education and reconciliation as effective strategies, and with WHO emphasis on patient engagement and medication information (World Health Organization, 2017, 2024). It also aligns with Mortelmans, (2025) who reported improved knowledge and confidence after individualized nurse-led counselling. Polypharmacy knowledge improved substantially.

Participants gained better understanding of adverse-drug-reaction risk, interactions and the value of medication review. These gains support Rankin et al. (2018) and Cooper et al. (2021), who emphasised structured review plus education, and are consistent with Osanlou et al. (2022) on the association between polypharmacy and adverse outcomes. Medication-safety practice scores also rose significantly. Simple adherence behaviours were already common; greater improvement occurred in disclosure of herbal remedies and consultation before non-prescribed medicine use, areas previously identified as weak. Education that enables active patient participation is therefore more useful than information transfer alone. Because this study utilized a one-group pretest–posttest design without a concurrent control group, the observed improvements reflect changes occurring after the educational programme rather than definitive proof of intervention-only causation. External factors, maturation, or clinical interactions could contribute to these shifts, highlighting the need for future randomized controlled trial. The outcomes measured were knowledge and self-reported practices rather than objectively observed errors, adverse events or readmissions.

IMPLICATIONS FOR NURSING AND PERIOPERATIVE PRACTICE

Structured medication-safety education should be incorporated into routine perioperative nursing care at admission, preoperative preparation, postoperative care and discharge. Attention should be given to drug–drug and herbal–medicine interactions, complete medication disclosure, missed-dose management and adverse-reaction reporting. Nurses should encourage patients to maintain an accurate list of all prescribed, over the counter and traditional medicines. For complex regimens, collaboration among nurses, doctors and pharmacists remains essential because education alone cannot address every system-level risk. Perioperative Nurses can help address these risks by incorporating structured medication education into preoperative assessment, patient counselling and discharge preparation. Emphasis should be placed on obtaining a complete medication history, explaining medication schedules, encouraging disclosure of herbal and non-prescribed medicines, and advising patients to seek professional guidance when uncertain about medication use.

LIMITATIONS

- Single tertiary hospital setting limits generalizability.
- One-group pretest–posttest design without concurrent control restricts causal inference.
- Self-reported practices may be influenced by social-desirability bias.
- Post-intervention assessment captured short-term change only.
- Knowledge and reported practices, not direct clinical outcomes (errors, adverse events, readmissions), were measured.

CONCLUSION

The nurse-led educational programme was followed by statistically significant improvements in medication-safety knowledge, polypharmacy knowledge and reported medication-safety practices among surgical outpatients at University College Hospital, Ibadan. Baseline gaps concerning interactions, herbal-medicine use and selected safety behaviours were substantially reduced. Structured medication education should form part of perioperative nursing

care, operating within a wider system that includes reconciliation, accurate documentation, effective communication, medication review and multidisciplinary collaboration.

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AUTHOR CONTRIBUTIONS (CRediT)

Adesina Folasade Abimbola: Conceptualization, methodology, investigation, data collection, formal analysis, writing - original draft, and writing – review and editing.

Dr. Parvin Mozafari: Supervision and academic guidance throughout the research process.

Both authors reviewed and approved the final manuscript.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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DATA AVAILABILITY

The data generated and analysed are not publicly available because they contain participant information subject to ethical and confidentiality requirements. Anonymized data may be made available from the corresponding author upon reasonable request and subject to institutional approval.

ETHICAL APPROVAL

Ethical approval was obtained from the Institute of Medical Research and Training (IMRAT), College of Medicine, University of Ibadan (UI/EC/26/0140). Written informed consent was obtained from all participants.

ARTIFICIAL INTELLIGENCE USE DECLARATION

Artificial-intelligence tools were used to assist with language refinement, structuring and editing. The authors reviewed and revised all content and take full responsibility for the accuracy, integrity and originality of the manuscript. AI tools were not used to fabricate data, analyse results or generate research findings.

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