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## Original Article

# Effect of Nursing Audit and Feedback on Orthopedic Patients' Care Outcomes in Selected Hospitals in Southeastern Nigeria

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### ABSTRACT

**Background:** Despite the proven benefits of audit and feedback interventions in record keeping, very few studies have examined its effect on patient outcomes when applied in nursing practice. **Objective:** This study examined the effect of nursing audit and feedback on orthopedic patients' outcomes in three tertiary hospitals in southeastern Nigeria. **Materials and Methods:** A single-group, pretest–posttest design was applied to a convenience sample of 150 orthopedic patients from November 2019 to March 2021. Data were collected using a structured questionnaire and analyzed with SPSS 25. **Results:** At baseline, the majority of the respondents rated their perceived general health (54.7%), physical function (60.7%), role performance due to physical limitations (55.3%), role performance due to emotional limitations (65.3%), vitality (38.0%), mental health (38.0%), and social function (45.3%) as fair, but rated their bodily comfort (44.7%) as poor. At 21 days after audit and feedback, the majority of the respondents rated their perceived general health (40.0%), role performance due to physical limitations (74.7%), mental health (58.0%), and social function (54.6%) as very good; physical function (60.7%) and role performance due to emotional limitation (50.7%) as good, but rated their vitality (44.7%) and bodily comfort (61.4%) as fair. Comparing between baseline and 21 days after audit and feedback revealed a significant improvement in perceived health status in all measured subdomains of health ( $P \leq 0.001$ ). **Conclusions:** Nursing audit and feedback is a feasible method of evaluating and enhancing patient outcomes. Audit and feedback should be considered by nurse managers for integration into routine clinical procedures.

**KEYWORDS:** Clinical, feedback, health status, Nigeria, nursing audit, orthopedics

## INTRODUCTION

As the healthcare system becomes more sophisticated, healthcare, patient safety, and quality management systems grow in importance.<sup>[1]</sup> Consequently, there is a rising interest in using patient-reported outcomes for audit and in providing feedback to care providers across the spectrum of healthcare services.<sup>[2]</sup> This is because the information derived from the administrative and routine clinical data

does not give a complete picture of service impact on patient health outcomes. Information given by patients regarding the effect of therapies on their health can be utilized to support patient-centered care decisions.<sup>[3]</sup>

It is generally established that orthopedic conditions have an impact on patients' health status and health-related quality of life as it could put people in hospital

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admission for several months.<sup>[4]</sup> Many studies have utilized questionnaire tools such as short form (SF)-8, SF-12, and SF-36 to assess patients' health conditions and the quality of life as an index score.<sup>[5,6]</sup> Meanwhile, reporting the distributions of each of the health dimensions of a person's health state may provide clinicians with more insight into the progress in health outcomes of people with orthopedic issues.<sup>[7]</sup> The dimensions assessed in orthopedics include general health, physical function, role performance due to physical limitations, role performance due to emotional limitations, vitality, mental health (depression), social function, and bodily comfort. Given the high healthcare cost of a long hospital stay, quality improvement and maintenance activities that could hasten patients' recovery to independent existence remain vital.

The published research on quality improvement interventions in healthcare emphasizes the efficacy of audit and feedback.<sup>[8]</sup> It is a two-part intervention that includes performance evaluation (audit) and feedback to care providers. The focus of audit and feedback is on the aspects of practice over which care providers are believed to have control and are held accountable.<sup>[9]</sup> The majority of the research findings on audit and feedback involve physicians. On that basis, some researchers speculate that nurses' responses to such interventions may differ from those of other types of health care professionals due to their responsibilities and the structure of nursing care activities.<sup>[10]</sup> Considering that nurses frequently work in groups, it is anticipated that quality improvement changes would occur uniformly at both the individual and collective levels. These changes may necessitate communication, cohesiveness, and coordination within the nursing team. Conventionally, nursing procedures are audited on a procedure-by-procedure basis, thus making audit and feedback interventions with this group of professionals more difficult and time-consuming. The research team in this study hypothesized that changing the emphasis on audit and feedback using patient-reported health outcome data may offer promise for strengthening individual and collective responsibility within nursing teams and may result in improved patient-reported health outcomes.

The research question for this study was crafted in the PEO format. The PEO is an acronym for population, exposure, and outcome. The research question is thus: among long-stay orthopedic patients (P), what is the effect of nursing audit and feedback (E) on the health outcomes status after 21 days of intervention (O)? This study aimed to examine the effect of nursing audit and feedback on orthopedic patients' care outcomes in selected tertiary hospitals in southeastern Nigeria.

## MATERIALS AND METHODS

### Ethical consideration

This study adhered strictly to the provisions of the Helsinki Declaration. Ethical approval to carry out this study was obtained from the Institutional Review Board of the Nnamdi Azikiwe University, Awka, Nigeria. Administrative permission to conduct the study was obtained from the administration of the selected hospitals. The purpose of the study, potential risks and benefits, and rights were explained to the respondents. The respondents were briefed on the voluntary nature of this study, and they provided written consent before data collection. Collected data were protected and shared with no one else than the attending nursing team.

### Study design

A pretest–posttest design with one group was employed on consenting patients admitted into the orthopedic wards of the selected tertiary hospitals in southeastern Nigeria.

### Study area

This study was conducted in southeastern Nigeria and involved the states of Anambra, Ebonyi, and Abia. The tertiary hospitals used for the study were the Nnamdi Azikiwe University Teaching Hospital Nnewi (Anambra), Federal Teaching Hospital (FETH) Abakaliki (Ebonyi), and Federal Medical Centre Umuahia (Abia). The study was conducted from November 2019 to March 2021.

### Study population

All patients admitted into the orthopedic wards of the selected hospitals made up the study population. The yearly admission rate across the three selected hospitals was estimated by averaging all admissions into the orthopedic wards for 5 years (2013–2017); hence, an average of 231 orthopedic admissions was computed.

### Sample size determination

The sample size was calculated using the single population proportion formula mathematically stated as  $n = [Z^2 \cdot P(1-P)] \div d^2$ , where  $n$  = minimum sample size,  $Z$  (normal distribution constant at 80% power) = 1.96,  $P$  (prevalence of best guess) = 0.5, and  $d$  (precision) = 0.05. A minimum sample size of 384 was computed. A 10% nonresponse rate was added using the nonresponse formula,  $n^* = n \div (1-p)$ , where  $n^*$  = final sample size and  $p$  = possible nonresponse of 10%. A final sample size of 427 was computed. Given that the population is less than 10,000, a finite population sample size correction formula was applied as thus  $nc = N \div (1 + [N/n^*])$ , where  $nc$  = corrected sample

size, N (population) = 231, n\* (final sample size) = 427. A corrected sample size of 149.9 (approximately 150) was computed.

### Sampling technique

The convenience sampling technique was applied in the selection of consenting respondents across the selected hospitals. The sampling was repeated every 4 months until the required sample size was reached. Patients above 18 years and admitted to the orthopedic wards were included in this study. Patients with obvious mental illness were excluded from this study.

### Data collection method

The independent and dependent variables in this study were conceptualized to be the nursing audit/feedback and health status of respondents, respectively. Audit and feedback as a variable was operationalized as a summary of nurses' performance over a specified period that is given to them (nurses) in a written form with recommendations for further clinical action. After at least 20 days of patient admission into the orthopedic ward, the research team together with the orthopedic nurse manager assessed the patients' baseline health status in relation to the documented nursing care (audit) and then developed written feedback that was submitted to the nursing team within 72h. Postintervention assessment of patients' health outcomes was done after 21 days.

### Study materials

A structured questionnaire that was designed by the research team was used to collect data. The questionnaire comprises a sociodemographic data section (age, sex/gender, marital status, educational level, occupation, and days of admission) and a health outcomes section, which extracted information on general health, physical function, role performance due to physical limitations, role performance due to emotional limitations, vitality, mental health (depression), social function, and bodily comfort. To check for content validity, the instrument was submitted to five expert nurse researchers drawn from five public universities within the southeastern part of Nigeria. The agreement between the experts was 0.83. The questionnaire was further pretested on 30 patients admitted into the orthopedic ward of a tertiary hospital outside the study area and a Cronbach's alpha coefficient of 0.78 was computed. Informed consent was obtained from all enrolled respondents before baseline and postintervention data collection. The research team ensured data completeness and consistency on each day of data collection. To limit

bias in this study, the respondents were blinded to the exact date set for postintervention assessment.

### Data analysis

Collected data were entered into SPSS 25 for data analysis (SPSS 25, Statistical Products and Service Solutions version 25, IBM, Chicago, USA). Descriptive statistics such as frequency and percentages were computed. Nominal/categorical data from the baseline and postintervention information were tested for differences in group proportions using chi-square statistics. The test of hypotheses was done at a 5% significance level.

## RESULTS

A total of 150 respondents were enrolled in this study. The respondents were predominantly between 35 and 39 years of age (37.3%), male (62.7%), and single (78%). About 45% of them had secondary school education as their highest educational attainment. The majority of them was commercial motorcycle riders (27.3%) and had spent 40–59 days in the orthopedic ward. About two in five of the respondents (45.3%) were cared for in the orthopedic ward of FETH Abakaliki. The background sociodemographic characteristics of the respondents are summarized in Table 1.

At baseline, the majority of the respondents rated their perceived general health (54.7%), physical function (60.7%), role performance due to physical limitations (55.3%), and role performance due to emotional limitations (65.3%) as fair. More so, they rated their perceived vitality (38.0%), mental health (38.0%), and social function (45.3%) as fair. Additionally, they rated their perceived bodily comfort (44.7%) as poor. The respondents' health status at baseline is summarized in Table 2.

At 21 days after audit and feedback, the majority of the respondents rated their perceived general health (40.0%), role performance due to physical limitations (74.7%), mental health (58.0%), and social function (54.6%) as very good. Furthermore, they rated their perceived physical function (60.7%) and role performance due to emotional limitations (50.7%) as good. Moreover, they rated their perceived vitality (44.7%) and bodily comfort (61.4%) as fair. The respondents' health status at 21 days after audit and feedback is summarized in Table 3.

A comparison between the respondents' health status at baseline and 21 days after audit and feedback revealed a significant improvement in perceived health status on all measured subdomains ( $P \leq 0.001$ ) as summarized in Table 4.

**Table 1: Sociodemographic characteristics of the respondents, n = 150**

| Variable                          | f   | %    |
|-----------------------------------|-----|------|
| Age                               |     |      |
| 25–29                             | 17  | 11.3 |
| 30–34                             | 42  | 28.0 |
| 35–39                             | 56  | 37.3 |
| 40–49                             | 21  | 14.0 |
| 50–54                             | 14  | 9.3  |
| Sex/gender                        |     |      |
| Male                              | 94  | 62.7 |
| Female                            | 56  | 37.3 |
| Marital status                    |     |      |
| Single                            | 117 | 78.0 |
| Married                           | 33  | 22.0 |
| Educational status                |     |      |
| Primary                           | 27  | 18.0 |
| Secondary                         | 68  | 45.3 |
| Tertiary                          | 55  | 36.7 |
| Occupation                        |     |      |
| Trader                            | 9   | 6.0  |
| Commercial taxi/bus driver        | 22  | 14.7 |
| Commercial rickshaw driver        | 36  | 24.0 |
| Commercial motorcycle rider       | 41  | 27.3 |
| Farmer                            | 17  | 11.3 |
| Unemployed                        | 25  | 16.7 |
| Days of hospital stay at baseline |     |      |
| 20–39                             | 61  | 40.7 |
| 40–59                             | 42  | 28.0 |
| 60–79                             | 28  | 18.7 |
| 80–99                             | 19  | 12.7 |
| Health institutions               |     |      |
| NAUTH Nnewi                       | 43  | 28.7 |
| FETH Abakaliki                    | 68  | 45.3 |
| FMC Umuahia                       | 39  | 26.0 |

f = frequency, FMC = Federal Medical Centre, n = sample, NAUTH = Nnamdi Azikiwe University Teaching Hospital, % = percentage

## DISCUSSION

This study assessed the effect of nursing audit and feedback on orthopedic patient care outcomes. At baseline in this study, more than half of the respondents reported a fair status of general health, physical function, and role performance due to physical limitations. This finding could be because a number of the respondents had splints on certain parts of their bodies resulting in a reduced range of motion. This finding was in line with a Polish study, which found that orthopedic patients with unilateral hip arthroplasty will experience a significant reduction in lower limb flexion, abduction, adduction, and most importantly external rotation.<sup>[7]</sup> Moreover, less than half of the respondents rated their vitality, mental health, social function, and role performance due to emotional limitations

as fair. This finding corroborates a Canadian study that found that mild depression symptoms were common among orthopedic patients undergoing care for ankle arthritis.<sup>[11]</sup> The similarity in findings was not surprising as the loss of locative ability among orthopedic patients may trigger the loss and grieving process of adaptation.<sup>[12]</sup> The perceived bodily comfort among the respondents in this study was rated to be poor at baseline. Owing to the chronic nature of some orthopedic conditions, this finding was quite expected. This finding supports the Polish study that noted that chronic musculoskeletal conditions cause severe pain and considerable limitation in patients' mobility. All put together, the respondents reported health concerns in all dimensions of their health status. The finding was also in line with a Slovenian study, which revealed that orthopedic conditions affect all dimensions of the patient's health-related quality of life.<sup>[4]</sup>

At 21 days after audit and feedback, this study found that more than half of the respondents rated their general health, role performance due to physical limitations, mental health, and social function as very good. Furthermore, about half of the respondents rated their physical function and role performance due to emotional limitations as good. In contrast, they rated their perceived vitality and bodily comfort as fair. This reflected an improvement from the baseline information, which could be a result of the implementation of the audit and feedback intervention. This finding is in line with an Indian study that found that audit and feedback significantly reduced a surgical site infection rate among orthopedic patients, thereby improving the patients' health outcomes and quality of life.<sup>[13]</sup> The potential for audit and feedback to decrease wound infections could be that care providers are stimulated by the audit and feedback to carry out routine hand hygiene activities more frequently as documented in an Irish study.<sup>[14]</sup>

This study found a significant improvement in patient health outcomes between baseline and at 21 days after nursing audit and feedback. The reason for the noted improvement in patient health status outcomes could simply be a result of time maturation (passage of time) as the respondents recuperate. Nevertheless, an alternative explanation is that it is due to the resultant effect of the audit and feedback, where nurses return to their patients to correct care deficiencies identified during the nursing audit and reported on feedback. This finding corroborates with a French study, which found that an audit and feedback intervention can substantially improve the quality of nursing care and patient outcomes in the areas of assessment of renal

**Table 2: Respondents' health status at baseline, n = 150**

| Variable   | Responses |           |           |           |           |
|--|-----------|-----------|-----------|-----------|-----------|
|  | Poor      | Fair      | Good      | Very good | Excellent |
|  | f (%)     | f (%)     | f (%)     | f (%)     | f (%)     |
| General health<br>How would you rate the current state of your general health?   | 21 (14.0) | 82 (54.7) | 43 (28.7) | 4 (2.6)   | -         |
| Physical function<br>How would you rate the current state of your ability to perform moderate activities?  | 48 (32.0) | 91 (60.7) | 11 (7.3)  | -         | -         |
| Role performance due to physical limitation<br>How would you rate the current state of your ability to perform self-care and grooming activities for yourself?                     | 27 (18.0) | 83 (55.3) | 31 (20.7) | 5 (3.3)   | 4 (2.7)   |
| Role performance due to emotional limitation<br>How would you rate the current state of your ability to perform activities carefully without being affected by emotional concerns? | 36 (24.0) | 98 (65.3) | 11 (7.4)  | 2 (1.3)   | 3 (2.0)   |
| Vitality<br>How would you rate the current state of your ability to feel peaceful, happy, and full of energy?  | 54 (36.0) | 57 (38.0) | 31 (20.7) | 6 (4.0)   | 2 (1.3)   |
| Mental health<br>How would you rate the current state of your ability to not become overwhelmed by feelings of downcast and blues?   | 32 (21.3) | 57 (38.0) | 51 (34.0) | 8 (5.4)   | 2 (1.3)   |
| Social function<br>How would you rate the current state of your ability to partake in social interactions without interference from your physical health or emotional problems?    | 61 (40.7) | 68 (45.3) | 17 (11.3) | 3 (2.0)   | 1 (0.7)   |
| Bodily comfort (pain)<br>How would you rate the current state of your ability to perform routine daily activities without pain?  | 67 (44.7) | 36 (24.0) | 17 (11.3) | 24 (16.0) | 6 (4.0)   |

f = frequency, % = percent

**Table 3: Respondents' health status at 21 days after audit and feedback, n = 150**

| Variable   | Responses |           |           |            |           |
|--|-----------|-----------|-----------|------------|-----------|
|  | Poor      | Fair      | Good      | Very good  | Excellent |
|  | f (%)     | f (%)     | f (%)     | f (%)      | f (%)     |
| General health<br>How would you rate the current state of your general health?   | 11 (7.3)  | 22 (14.7) | 57 (38.0) | 60 (40.0)  | -         |
| Physical function<br>How would you rate the current state of your ability to perform moderate activities?  | -         | 59 (39.3) | 91 (60.7) | -          | -         |
| Role performance due to physical limitation<br>How would you rate the current state of your ability to perform self-care and grooming activities for yourself?                     | 19 (12.7) | 10 (6.7)  | 5 (3.3)   | 112 (74.7) | 4 (2.6)   |
| Role performance due to emotional limitation<br>How would you rate the current state of your ability to perform activities carefully without being affected by emotional concerns? | 35 (23.3) | 30 (20.0) | 76 (50.7) | 4 (2.7)    | 5 (3.3)   |
| Vitality<br>How would you rate the current state of your ability to feel peaceful, happy, and full of energy?  | -         | 67 (44.7) | 33 (22.0) | 48 (32.0)  | 2 (1.3)   |
| Mental health<br>How would you rate the current state of your ability to not become overwhelmed by feelings of downcast and blues?   | 2 (1.3)   | 4 (2.7)   | 15 (10.0) | 87 (58.0)  | 42 (28.0) |
| Social function<br>How would you rate the current state of your ability to partake in social interactions without interference from your physical health or emotional problems?    | 1 (0.7)   | 2 (1.3)   | 64 (42.7) | 82 (54.6)  | 1 (0.7)   |
| Bodily comfort (pain)<br>How would you rate the current state of your ability to perform routine daily activities without pain?  | 11 (7.3)  | 92 (61.4) | 5 (3.3)   | 36 (24.0)  | 6 (4.0)   |

f = frequency, % = percent

**Table 4: Health status at baseline versus 21 days after audit and feedback, n = 150**

| Variables         | Responses |      |      |           |           | df | $\chi^2$ | P value* |
|-------------------|-----------|------|------|-----------|-----------|----|----------|----------|
|                   | Poor      | Fair | Good | Very good | Excellent |    |          |          |
|                   | f         | f    | f    | f         | f         |    |          |          |
| General health    |           |      |      |           |           | 3  | 88.7     | <0.001   |
| Baseline          | 21        | 82   | 43   | 4         | -         |    |          |          |
| Postintervention  | 11        | 22   | 57   | 60        | -         |    |          |          |
| Physical function |           |      |      |           |           | 2  | 117.6    | <0.001   |
| Baseline          | 48        | 91   | 11   | -         | -         |    |          |          |
| Postintervention  | -         | 59   | 91   | -         | -         |    |          |          |
| Role (physical)   |           |      |      |           |           | 4  | 175.3    | <0.001   |
| Baseline          | 27        | 83   | 31   | 5         | 4         |    |          |          |
| Postintervention  | 19        | 10   | 5    | 112       | 4         |    |          |          |
| Role (emotional)  |           |      |      |           |           | 4  | 85.9     | <0.001   |
| Baseline          | 36        | 98   | 11   | 2         | 3         |    |          |          |
| Postintervention  | 35        | 30   | 76   | 4         | 5         |    |          |          |
| Vitality          |           |      |      |           |           | 4  | 87.5     | <0.001   |
| Baseline          | 54        | 57   | 31   | 6         | 2         |    |          |          |
| Postintervention  | -         | 67   | 33   | 48        | 2         |    |          |          |
| Mental health     |           |      |      |           |           | 4  | 194.2    | <0.001   |
| Baseline          | 32        | 57   | 51   | 8         | 2         |    |          |          |
| Postintervention  | 2         | 4    | 15   | 87        | 42        |    |          |          |
| Social function   |           |      |      |           |           | 4  | 220.9    | <0.001   |
| Baseline          | 61        | 68   | 17   | 3         | 1         |    |          |          |
| Postintervention  | 1         | 2    | 64   | 82        | 1         |    |          |          |
| Bodily comfort    |           |      |      |           |           | 4  | 73.7     | <0.001   |
| Baseline          | 67        | 36   | 17   | 24        | 6         |    |          |          |
| Postintervention  | 11        | 92   | 5    | 36        | 6         |    |          |          |

df = degree of freedom, f = frequency, % = percent,  $\chi^2$  = chi square

\* $P < 0.05$  = significant

function, pressure ulcers, depression, and pain.<sup>[15]</sup> Furthermore, this finding supports an Australian study that found that nursing audit and feedback improved the quality of nursing care in the aspects of timely antibiotics administration and early and daily ambulation.<sup>[16]</sup> Moreover, the mechanism for such identified improvements in patient health status outcomes could be embedded in the potential for nursing audit and feedback to reinforce accountability for daily safety rounds as found in a study conducted in the USA.<sup>[17]</sup>

## CONCLUSION

This study found that nursing audit and feedback are required to enhance the recovery of long-stay orthopedic patients. This study suggests that the use of nursing care processes that incorporates audit and feedback is one method of evaluating and enhancing the quality of nursing care and improving patient outcomes.

## Limitation of the study

The absence of a control in this study limits the internal validity of a cause and effect conclusion. Nevertheless, the respondents were blinded to the audit and feedback

process and date of posttest, and their scores were paired in a bid to control bias in this study.

## Recommendation

Nurse managers and administrators should consider audit and feedback for integration into routine clinical procedures.

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Nil.

## Conflicts of interest

There are no conflicts of interest.

## Authors' contributions

JEA = conceptualization, data curation, drafting of article, and review of final article; AUC = conceptualization, data analysis, and review of final article; OGO = data curation and review of final article; IHO = data curation and review of final article; NEM = data curation and review of final article; CE = data analysis, drafting of article, and review of final article.

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