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ASSESSMENT OF NURSES' KNOWLEDGE ABOUT POSTOPERATIVE PAIN MANAGEMENT IN ORTHOPAEDIC PATIENTS VIEW AS PART OF PATIENT SAFETY

Ocena wiedzy pielęgniarek w zakresie bólu pooperacyjnego dokonywana przez pacjentów po zabiegach ortopedycznych jako element bezpieczeństwa pacjenta

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A - Koncepcja i projekt badania, B - Gromadzenie i/lub zestawianie danych, C - Analiza i interpretacja danych, D - Napisanie artykułu, E - Krytyczne zrecenzowanie artykułu, F - Zatwierdzenie ostatecznej wersji artykułu

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Abstract (in Polish):

Cel pracy

Celem pracy była ocena wiedzy pielęgniarek w zakresie bólu pooperacyjnego dokonywana przez pacjentów po zabiegach ortopedycznych jako element bezpieczeństwa pacjenta.

Materiał i metody

W pracy zastosowana została metoda sondażu diagnostycznego. Narzędziem badawczym był kwestionariusz ankiety. Badanie obejmowało 180 pacjentów oddziału Urazowo – Ortopedycznego Wojewódzkiego Szpitala Zespolonego w Płocku po zabiegach operacyjnych. Byli to pacjenci po zabiegach planowych oraz pacjenci po urazach. 51% badanych stanowiły kobiety.

Wyniki

Dane uzyskane z analizy przeprowadzonych badań pozwalają ustalić, że wielowymiarowa opieka pielęgniarska minimalizuje ból pooperacyjny przyspieszając tym samym proces zdrowienia. Pokazuje też iż nadal należy przeprowadzać szkolenia przed i po dyplomowe z zakresu profilaktyki bólu u hospitalizowanych pacjentów.

Badanie ankietowe przeprowadzone na 180 pacjentach Oddziału Urazowo-Ortopedycznego w Płocku miało na celu ustalenie postrzegania opieki pielęgniarskiej przez pacjentów w zakresach: ogólne zadowolenia z opieki, dostępności leków przeciwbólowych, udzielania informacji o dolegliwościach bólowych przed i po zabiegu operacyjnym, jak również bieżącej oceny nasilenia bólu u pacjenta po zabiegu operacyjnym.

Wnioski

Ból pooperacyjny wydłuża proces zdrowienia; ważną rolę w odczuwaniu bólu po zabiegu ma edukacja podjęta przez pielęgniarki przed zabiegiem operacyjnym. Rolą pielęgniarki powinno być nauczenie pacjentów kontroli bólu m.in. przy użyciu skali NRS i VAS, przed zabiegiem , uwzględniając wiek i wykształcenie pacjentów. Regularne podawanie leków przeciwbólowych poprawia jakość życia pacjenta pacjenta.

Abstract (in English):

Aim

The aim of this study is an assessment of nurses' knowledge of post-operative pain management by patients after orthopaedic surgeries as part of patient safety.

Material and methods

In this study a diagnostic questionnaire has been utilised. The study surveyed 180 in-patients of the Trauma and Orthopaedic Department of the Voivodeship Policlinic Hospital in Plock after surgeries both scheduled and traumatic. 51% of the group were women.

Results

The data obtained from the analysis establishes that multidimensional nursing care minimizes post-operative pain thus accelerating the healing process. It also shows that it is still necessary to carry out pre- and post-diploma training on pain prevention in hospitalized patients.

A questionnaire survey of 180 patients at the Trauma and Orthopaedic Unit in Plock was carried out to determine patients' perceptions of nursing care in the following areas: overall satisfaction with care, availability of analgesics, provision of information about pain before and after surgery, and ongoing assessment of the patient's pain intensity after surgery.

Conclusions

Postoperative pain prolongs the healing process; education undertaken by nurses before surgery has an important role in postoperative pain. The role of the nurse should be to teach patients about pain control using tools such as NRS and VAS before surgery, taking into considerations patient's age and education. Regular administration of pain medication improves the patient's quality of life.

Short title
Ocena wiedzy pielęgniarek w zakresie bólu pooperacyjnego

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Introduction

An estimated 310 million surgical procedures are performed worldwide each year [1]. Effective perioperative analgesia is a fundamental right of the patient, while also reduces postoperative complications and the time and cost of hospitalization.

Postoperative pain is a consequence of surgery. Scientific evidence suggests that the level of pain experienced by patients is unnecessarily high. Over the past two decades the evidence also shows nurses possess suboptimal knowledge of assessment and effective pain management [2].

Effective pain management should be multidimensional. Evaluation of the quality of nursing care by patients and its analyses enable the introduction of new solutions and modification of existing ones. It also has an impact on improving the quality of medical services provided in the units which in turn improves patient safety. The highest intensity of pain occurs on the first day after surgery, then it decreases. In assessing the severity of pain and the effectiveness of the introduced therapy, pain assessment scales play an important role.

1. Visual Analogue Scale (VAS) is graphical – a 10 cm section, starting at 0 meaning no pain, while the other end (at 10) means unbearable pain. The results are compared between successive measurements and pain therapy is adjusted accordingly.

2. Numerical Rating Scale (NRS) involves asking the patient about the presence of pain on a scale from 0 (no pain) to 10 (unbearable pain).

3. Verbal Rating Scale (VRS) is a descriptive scale. The patient interprets the pain using the following terms: no pain, mild pain, moderate pain, severe pain and unbearable pain. It is most commonly used in the elderly, patients with impaired vision or children under 5 years old. Verbal signals of pain include the patient complaining of pain. Non-verbal ones include sighing, moaning and crying, as well as facial expressions: twisting and biting lips, clenching teeth. The patient's body appears highly tense, motor restlessness is evident, attempts to put pressure or massaging the painful area, sleep disturbance, lack of appetite, possibly accompanied by clinical symptoms such as sweating, vomiting, nausea, pallor of the skin or redness of the face, constriction of the pupils, changes in blood pressure, heart rate or respiratory rate [3].

Pain is a major concern in the postoperative orthopaedic setting; Effective pain assessment tools are important aspects of pain management [3, 6]. A key role in minimizing pain plays the nursing staff – the part of treatment team spending the most time with patient after their surgery. The nursing staff operate with up-to-date knowledge and experience also in terms of patient safety during hospital stay, hence should systematically participate in life-long training/qualification courses. Such training provides means for the nurses to correctly use scales to measure pain intensity, have adequate knowledge of pharmacology, use modern methods of pain control, keep adequate records, and participate in patient education [5].

Nursing activities in pain prevention involve engaging and educating the patient primarily in the preoperative period. After surgery, they focus on preventing pain and postoperative complications. The nurse monitors the severity of pain using the presented scales several times a day, both at rest and during movement.

Patient education in pain prevention should continue throughout the patient's stay in the unit – both before and after surgery. It is also a form of preparation for self-management of pain by the patient at home. Nursing interventions should be documented in the patient's medical record [6, 7].

Aim

The purpose of the study was to assess the nurses' knowledge working in orthopaedic wards and appropriately relay to patients in regards to their orthopaedic surgery and postoperative pain management as an element of patient safety.

Material and research methods

The study utilised a self-administered questionnaire consisting of 31 questions addressed to the orthopaedic inpatients aimed at assessment of the knowledge they received from the nurses regarding pain prevention, subjective assessment of pain, pain intensity scale, reduction of pain after receiving medication, possibility of obtaining information about pain, quality of nursing care, and sociodemographic questions. Two pain intensity scales (VAS and NRS) were also used.

The research described in this study has been approved by the Bioethical Committee of the Mazovian Public College no KB/PIEL-II58.2022 and the Director of the Voivodeship Policlinic Hospital DON.07021.15.MK

To verify the relationship between variables on nominal scales, a χ^2 independence test was used. Statistical significance threshold has been set to $p < 0,05$.

Results

The survey included 180 respondents, 51% of whom were women. The largest group was between 51 and 60 years old (29%). The smallest number of respondents was between 25 and 30 years old (11%).

Just over fourth of the respondents (26%) declared vocational or primary education and 36% declared secondary education. Similar percentage (38%) declared higher education.

The respondents declared varied living areas with 26% living in rural areas, 19% in town up to 10.000 residents, and 18% living in towns up to 20.000 residents. Remaining participants live in cities with more than 250.000 residents (17%) and 21% live in the Plock city proper.

In the survey 38% of respondents admitted that they had had other orthopaedic surgery before and 64% of participants had been in the unit due to an emergency or injury.

Regarding preoperative education on postoperative pain management 69.4% responded "yes" and "rather yes", while 30.67% of respondents responded in negative. "Rather not" and "definitely not" options had been selected by 21.7% of participants.

In the pain-relief medication part of the survey the paracetamol as a painkiller was mentioned by 88% of respondents, Ketonal was indicated by 81%, and metamizole by 78%. 62% of respondents were also familiar with Tramal and morphine (53%). Patients were allowed to indicated several drugs. Detailed data on familiarity with pain-killers are shown in Table 1.

Table 1. Patients' familiarity with pain medications.

Medications familiar to surveyed patients	No of records	%
Paracetamol	159	88,3
Ketonal	145	80,6
Metamizol	141	78,3
Tramal	112	62,2
Morphine	95	52,8
Others	24	13,3

In the further part of the questionnaire 52% surveyed patients admitted to have little to no knowledge about pain measuring tools. Most commonly named tool was NRS (39%). VAS had been marked by 28,9% of participants and just 11,7% marked VRS. The respondents were allowed to mark more than one answer. Detailed data on pain measurement tools familiarity had been presented in Table 2.

Table 2. Tools used for pain measurement.

Pain measuring tool	No of records	%
VAS (visual-analogue)	52	28,9
NRS (numerical)	70	38,9
VRS (verbal)	21	11,7
I do not know any of the above	93	51,7

In the part questioning the respondent on their current pain level mean value given on NRS was 5,04 (SD=1,78), and 4,94 on VAS (SD=1,71). Difference between scales indicated by the same patient was statistically significant ($t_{(179)}$=2,653; $p<0,05$).

The overall satisfaction had been calculated as a sum of scored points in the questions about nurse care. The „yes, I am satisfied" answer scored a 4, while „no, I am definitely not satisfied" scored a 1. Answer „I do not know" was not taken into consideration.

The greatest difference in pain scoring had been noted in the first half of the scale, where score 4 had been chosen on VAS by 32% of respondents and on NRS by 26% of respondents. The care satisfaction correlated negatively with pain intensity grade – the higher the satisfaction from received nursing care, the lower the pain intensity had been scored both on NRS (rho=-0,188) and VAS (rho=-0,243). The correlation is slightly stronger in VAS case (Table 3).

Table 3. Spearman's Rho correlation between satisfaction from received nursing care and pain intensity grading.

		Satisfaction from care
NRS	*rho*	-,188*
	p	,011
VAS	*rho*	-,243**
	p	,001

Most of the respondents in the 51-60 years age group (77,4%) reported to be informed by nursing staff about the intensity of postoperative pain (according to age and education) prior to surgery , while 42.1% of respondents in the 25-30 years age group answered "no" or "I do not know". There was no statistically significant difference between groups ($\chi^2_{(8)}$=9,693; p>0,05).

Respondents in the 51-60 years age mostly reported being informed by nursing staff about pain intensity measurement methods (69,8%), while "no" and "I do not know" was marked by 43,1% of the 25-30 years age group. There was no statistically significant difference between groups ($\chi^2_{(8)}$=12,611; p>0,05).

Most (81,1%) respondents agreed to have been informed about postoperative pain treatment, while „no" and „I do not know" was answered by 31,6% of 25-30 years age group. However, the χ^2 analysis did not indicate statistically significant difference between groups in this question ($\chi^2_{(8)}$=4,962; p>0,05).

Patients from elementary to higher educational levels mostly indicated having been told about postoperative pain. In the group with higher education the percentage was the highest (78,3%), with 67,2% with secondary education and 59,5% with elementary education.

Most negative answers („no" and „I do not know") were given by patients with vocational and elementary education (40,5%). Detailed data on relationship between relayed medical information and patient's education level has been presented in the Table 4.

Table 4. Knowledge relayed to patients by medical staff versus patient's education level.

Did the medical personnel give you the information about postoperative pain?	Patient's educational level N=180					
	Vocational or elementary		Secondary		Higher	
	N=47	%	N=64	%	N=69	%
Yes	28	59,55	43	67,2	54	78,3
I do not know	6	12,8	5	7,8	5	7,2
No	13	27,7	16	25,0	10	14,5

A third of the respondents (28,9%, 29,7% of women and 28,1% of men) declared pain management measures provided by nurses 1-2 times per day, while 50,6% of respondents (47,3%

of women and 53,9% of men) reported pain being managed by nurses 3-4 times per day. Just above 20% (20,5% of respondents, 23,05% of women and 18% of men). The χ^2 analysis showed no statistical significant difference between groups in regards to number of pain management events provided by nurses ($\chi^2_{(2)}$=1,005; p>0,05). Detailed data has been presented in the Table 5.

Table 5. Number of pain management events provided by nurses in relation to patient's gender.

Number of pain management events provided by nurses vs patient's gender	Gender					
	F+M	%	Women		Men	
	n=180		n=91	%	n=89	%
1-2 times per day	52	28,9%	27	29,7%	25	28,1%
3-4 times per day	91	50,6%	43	47,3%	48	53,9%
Pain was not managed	37	20,5%	21	23,05%	16	18,0%

When stratified by age, 52,9% of respondents in the 25-40 years age group and 52,8% from 51-60 years age group reported postoperative pain had been assessed by nurses 3-4 times per day, while 1-2 times per day reported 33,3% patients in the 41-50 years age group and 32,4$ of patients over 60 years of age. Even though 20,5% of 41-50 years age group and 22,6% of 51-60 years age group declared no assessment of postoperative pain of any kind, there was statistical significance between results when stratified by age ($\chi^2_{(6)}$=1,283; p>0,05). Detailed data on pain assessment events stratified by age group had been presented in the Table 6.

Table 6. Pain assessment provided by nurses stratified by patient's age.

Pain assessment events stratified by age group	Age groups (years)							
	25-40		41-50		51-60		Over 60	
	n=51	%	n=39	%	n=53	%	N=37	%
1-2 times per day	14	27,5%	13	33,3%	13	24,5%	12	32,4%
3-4 times per day	27	52,9%	18	46,2%	28	52,8%	18	48,6%
Pain was not measured	10	19,6%	8	20,5%	12	22,6%	7	18,9%

About third of patients with elementary, secondary and higher education (27,7%, 29,0%, and 29,7% respectively) were highly satisfied with pain medication availability and overall nursing care. "Rather satisfied" was 60,9% of patients with higher education. Overall dissatisfaction with pain medication availability and overall nursing care was 19,1% of respondents with vocational education and 12,5% with secondary education, as well as 1,1% with higher education. As presented in Table 7, statistical analysis showed no relation between satisfaction with medication availability and overall nursing care and educational level of the patients ($\chi^2_{(4)}$=2,076; p>0,05).

Table 7. Satisfaction with pain medication availability and overall nursing care and educational level of the patients.

Satisfaction with medication availability and overall nursing care and educational level of the patients	Patient's educational level N=180					
	Vocational and elementary		Secondary		Higher	
	N=47	%	N=64	%	N=69	%
Definitely satisfied	13	27,7%	19	29,7%	20	29,0%
Rather satisfied	25	53,2%	37	57,8%	42	60,9%
Do not know/rather dissatisfied	9	19,1%	8	12,5%	7	10,1%

Specially requested medication had been given, according to the survey results, to about 70% of the repsondents regardless of their respective education (answers „definitely yes" and „rather yes"). About 24% of patients did not receive specially requested pain medication or were unable to answer the question (29,8% with vocational/primary education, 26,5% with secondary education, and 17,4% with higher education). The was no statistically significant relationship between obtaining requested pain medication and patient's education ($\chi^2_{(4)}$=5,155; *p*>0,05).

About 30% of respondents (29,8% with vocational and elementary, and 29,7% with secondary, 26,1% with higher education) reported being given pain medication without requesting it marking the survey "definitely yes" answer. A "rather yes" answer to being given pain medication without requesting it had been marked by 56,5% of patients with higher education, while 29,8% of patients with elementary and vocational education did not receive pain medication without requesting it or were unable to answer the question (compared to 26,5% of patients with secondary education and 17,4% of patients with higher education). As presented in Table 8, the statistical analysis showed no relationship between patient's level of education and receiving pain medication without requesting it. ($\chi^2_{(4)}$=4,148; *p*>0,05).

Table 8. Patient's level of education and receiving pain medication without requesting it.

Receiving pain medication without requesting it	Patient's education N=180					
	Vocational and elementary		Secondary		Higher	
	N=47	%	N=64	%	N=69	%
Definitely yes	14	29,8%	19	29,7%	18	26,1%
Rather yes	19	40,4%	28	43,8%	39	56,5%
No/I do not know	14	29,8%	17	26,5%	12	17,4%

The overall satisfaction from received care was the lowest among patients living in towns under 10.000 residents with 32,4%, while 59,6-62,2% patients from countryside, Płock city proper and other cities over 250.000 residents reported being satisfied.

A „not sure" answer about overall satisfaction from nursing care during their hospitalisation at orthopaedic ward was most common in patients living in cities between 10.000 and 20.000 residents (28,1%), while dissatisfaction had been reported most commonly by patients living in cities up to 10.000 residents (44,1%). As presented in Table 9, there is some statistical relations between overall satisfaction of the patient and their living setting ($\chi^2_{(8)}$=14,192; *p*=0,077).

Table 9. Overall satisfaction and efficacy level of received nursing care depending on place of patient's residence.

Overall satisfaction and efficacy level of received nursing care depending on place of patient's residence	Place of patient's residence N=180									
	Village		Town under 10.000 residents		Town between 10.000 and 20.000 residents		Płock (city over 100.000 residents)		City over 250.000 residents	
	N=47	%	N=34	%	N=32	%	N=37	%	N=30	%
Yes	28	59,6%	11	32,4%	19	59,4%	23	62,2%	18	60,0%
I do not know	8	17,0%	8	23,5%	9	28,1%	4	10,8%	4	13,3%
No	11	23,4%	15	44,1%	4	12,5%	10	27,0%	8	26,7%

Discussion

Pain relief helps improve the quality of care and provides patients with comfort and a sense of security. Therefore, high quality patient care in the postoperative period is a challenge for medical personnel including, above all, nurses [8].

Patients have the right to pain relief, but the barriers in assessing and managing patient pain in practice have not yet been overcame [9, 14]. Education of patients prior to surgery by nurses on the postoperative pain intensity scale – depending on the age of the patient – was rated highest by the group of 51-60 year-olds (77.4%) in our study, indicating that they received such knowledge prior to surgery. 47.5% of those aged 32-40 said they had not received such knowledge or knew nothing about it. Patients' subjective perception of pain, after surgery, was at an average level. Patients rated pain at level 4 (32%) on an analogue scale and 26% on a numerical scale. Studies by Rybicka and Baczewska with their team investigating the phenomenon of postoperative pain noted similar to ours results [10;11].

In the results of our study, 52%, of the surveyed patients admitted that they did not know tools for measuring pain. The most commonly known and mentioned tool by the respondents was the NRS (39%, n=70). The VAS was mentioned by 29% (n=52) of respondents, and the VRS by 12% (n=21). 49.5% of surveyed patients with primary vocational education indicated that no one had any discussion with them about pain before the procedure.

Pain is one of the most common clinical symptoms encountered by orthopaedic surgeons and rheumatologists, as it is one of the main reasons patients seek medical attention [12].

To choose the most appropriate tool for a given patient, nurses must be aware of available to them tools and their limitations. Patient populations are diverse and can include adults of all ages with acute, chronic or malignant pain and cognitive or physical impairments of various origins. There are times when the tool used is inappropriate for an individual patient or the patient cannot utilise the tool. Patients and nurses need to be educated about pain measurement tools to ensure their effective use [13].

In their study, Ene and Nordberg indicated that 40% of nurses reported they do not use a visual analogue scale and they do not assess pain both at rest and during patient's activity. Moreover, they reported a quarter of the nurses surveyed do not assess the effect of administered pain medication [15].

In the 25-40 years age group 52.9% of respondents and 52.8% in 51-60 years age group in our survey indicated that pain assessment was performed by nurses 3 to 4 times a day. One in three respondents in the two age groups, 41-50 years (33.3%) and 61 years and older (32.4%), specified that pain after surgery was assessed by nurses once or twice a day. According to 22.6% of patients in the 51-60 age group and 20,5% in the 41-50 years age group the pain was not assessed at all. However, there were no statistically significant differences in answers to the question according to the age of the respondents.

In our study 92.1% of men and 89,1% of women believed that pain treatment was an important part of therapy and accelerated the healing process (41.8% indicated "definitely yes", 47.3% "rather yes"). The remaining 11% of women and 7.9% of men answered "don't know" or "don't know anything about the subject". Evaluation of pain treatment, as an important part of therapy, in our study did not depend significantly on gender .

Chinese researchers Zuo and Guo wrote a review study, metaanalysis and systematic review on pain after orthopaedic surgeries. In their results they showed that the primary outcomes measurement tools were visual analogue scale (VAS) and morphine consumption [16].

In a study by Yıldırım patients were asked about their perception of nurses believing in patient's pain – 46% of patients responded that nursing staff "always believe" [17].

In our study, 73.6% of respondents trust that nurses believe patients about their pain. The opposite opinion was held by 3% of respondents and 21% had no opinion or did not know.

Nurses are responsible for the appropriate management of patients' postoperative pain [18]. In our study 57.8% of patients were satisfied with the availability of pain medication and overall nursing care. Similar results were presented by Jurczak in their 2015 work where satisfaction with the quality of care was reported by 56.6% of respondents [22].

Effective pain management has been recognized as a basic right of the patient, making it imperative that nurses, as medical personnel who spend the most time with the patient, be competent in pain management. Trained and experienced nurses should be able to act so that pain is treated at the right time and in the right way [20]. Baillie noted that pain assessment and control should be a priority in nursing, as pain is often underestimated and unrelieved. The pain is difficult to assess because it is complex and subjective, and many factors influence the assessment. A pain assessment tool can be invaluable because it can help the patient communicate pain, remove the subjectivity of assessment and promote a systematic approach. Many point out that individualized assessment is necessary to plan effective nursing interventions in pain, so assessment tools [21] and the knowledge that nurses should have are essential. Most of the patients surveyed in our study also said that regarding pain management was at a satisfactory level.

A study by Jurczak does not confirm these data. Survey respondents expected more comprehensive information on pain management and that the level of education should be significantly higher [22]. Results similar to those presented in the paper were obtained by Kolodziej where 80% of the surveyed group was comprehensively educated about the nature of postoperative pain and options for its management [26]. Pain management is recognized as an important indicator of health and health care quality accreditation standards and therefore the importance of quality pain management in postoperative care cannot be underestimated [23].

Pain management is a key issue for patients, and patients' perception of care is an important quality criterion for healthcare institutions. Pain remains a common problem in hospitals, and subsequently has a detrimental effect on patient's well-being. The conclusion of their study, which could also be extended this study, was that optimal pain management should be encouraged, with an emphasis on patient participation in decision-making, in order to improve the quality of care in hospitals[24].

The lowest pain prevalence score was recorded among our surveyed patients with primary education, with a mean score of 21.00. The highest score, on the other hand, was recorded among our study patients with secondary education - a mean of 22.29. Due to the level of significance ($p>0.05$), there was no statistically significant correlation of education with pain incidence scores and group membership among our study patients.

The relationship between gender and pain intensity was indicated by Rybicka in her study [27].

In addition to pain assessment, nurses' knowledge of effective pain management is important in reducing pain levels in postoperative patients. Buckley's review of the literature showed that nurses' treatment of postoperative patients was inadequate and needed further study. Francis and

Fitzpatrick (2013) found that the nurses' average knowledge score suggested that improvement was needed. This was reflected in the fact that patients' pain levels were moderate [24-28].

In contrast, Zhu N showed that patients are often not actively involved in acute pain management. The results showed that a knowledge deficit in pain management in patients and their caregivers showed a passive attitude and false cognition toward pain and pain medications. Nurses often play a supportive role, but it is difficult for them to understand their important role in facilitating patient involvement in pain management [29].

As Dunwoody said: "Few things we do for patients are more important to quality of life than pain relief."[30]

Results

1. showed us that education by nurses of patients after procedures
2. education by nurses of patients' pain levels, prior to surgery, plays an important role in patients' post-operative pain perception.
3. pain control using the NRS and VAS scales prevents an increase in pain intensity and provides a sense of security.

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