Patient Confidence, Convincement & Positive Attitude Influencing the Quality Radio Visuographic Images

Dr. M. Srinivasa Raju[1], Saladi Sai Durga Likhitha[2], Dasari Divya Anantha Lakshmi[3], Namburi Buelah Chelsia[4], Modugumudi Raveena[5], Narra Smruthi[6]

[1]Professor and Head, Department of Oral Medicine and Radiology, St. Joseph Dental College, Duggirala, Eluru, Andhra Pradesh, India
[2,3,4]Postgraduate Student, Department of Oral Medicine and Radiology, St. Joseph Dental College, Duggirala, Eluru, Andhra Pradesh, India
[5,6]Intern, St. Joseph Dental College, Duggirala, Eluru, Andhra Pradesh, India

Corresponding Author: Saladi Sai Durga Likhitha, Postgraduate Student, Department of Oral Medicine and Radiology, St. Joseph Dental College, Duggirala, Eluru, Andhra Pradesh, India

Abstract

Introduction: Patient motivation and counseling play a key role in obtaining high-quality radiographs, as patient cooperation directly affects diagnostic accuracy. Age, education, and occupation are important factors that may influence the quality of radiographic outcomes. **Materials and Methods:** A total of 150 patients were included in the study and divided into three age groups: 18–29 years, 30–44 years, and above 45 years. Information regarding their education and occupation was also collected. All patients underwent radiographic procedures, and the quality of the radiographs was carefully assessed. **Procedure:** Patients were given proper instructions and counseling prior to radiographic exposure to improve their understanding and cooperation. Radiographs were then evaluated for clarity, positioning, and overall diagnostic value, and findings were compared across different groups. **Results:** The study showed that patients above 45 years had radiographs of comparatively lower quality when compared with the younger age groups. Education and occupation were also observed to influence patient cooperation and the resulting radiographic quality. **Conclusion:** Patient age, education, and occupation significantly affect the quality of radiographs. Older patients demonstrated more difficulty in producing good-quality radiographs. This highlights the importance of patient motivation and counseling as effective measures to enhance cooperation and achieve reliable diagnostic imaging.

Keywords: Patient Confidence, Positive Attitude, Radio Visuographic Images, Motivation, Counseling, Diagnostic Imaging

Introduction

Quality radiographs are fundamental to the accurate diagnosis and effective treatment of numerous medical and dental conditions. High-quality radiographs are indispensable for accurate diagnosis and effective treatment planning in both medical and dental practice. Radiographic imaging provides detailed visualization of internal anatomical structures, and the clarity and precision of these images are essential for clinicians to make informed decisions. Traditionally, emphasis has been placed on the technical skills of radiographers and the sophistication of imaging equipment. However, an often-overlooked factor is the patient's psychological and behavioral state during the procedure, which plays a crucial role in determining the final quality of the radiograph. Patient-related factors such as motivation, cooperation, and patience strongly influence how well instructions are followed, how still the patient remains during exposure, and how smoothly the procedure can be performed. Motivation can be understood as the willingness of the patient to actively engage and comply with the imaging process, while patience refers to the

ability to endure minor discomforts or inconveniences without becoming restless. When these factors are lacking, challenges such as movement artifacts, incorrect positioning, or incomplete cooperation arise, which compromise image clarity and necessitate repeat exposures. These repetitions not only increase the radiation dose but also prolong procedure time and raise overall healthcare costs. Age is an important determinant of patient behavior in clinical settings. Younger individuals may adapt more quickly and follow instructions more effectively, though they may also demonstrate restlessness or impatience. Middle-aged adults often balance understanding with cooperation, while older adults may face additional challenges due to physical limitations, cognitive decline, or anxiety regarding medical procedures. In addition to age, variables such as education and occupation also shape the patient's comprehension of instructions and willingness to participate fully in the process. For instance, patients with higher educational backgrounds may understand the significance of diagnostic imaging better and hence show greater compliance. Recognizing these variations is critical for radiographic practice, as a one-size-fits-all approach to patient management may not yield optimal results. Instead, adopting personalized communication strategies, providing reassurance, and offering appropriate counseling tailored to each patient group can help overcome barriers to cooperation. By addressing psychological and behavioral aspects alongside technical requirements, radiographic procedures can be made more efficient, reducing the need for repeated exposures and ensuring more reliable diagnostic outcomes. This study was undertaken to explore how patient-related factors—particularly age, education, and occupation—affect the quality of radiographs in clinical practice. By identifying the behavioral challenges associated with different groups, the findings aim to provide evidence for incorporating patient motivation and counseling as essential components of radiographic procedures, ultimately leading to improved imaging quality and better patient care.

Aims & Objectives

Aims

To investigate how patients' educational background, occupation, and understanding of radiographic procedures influence their motivation, patience, and cooperation during radiographic imaging across three distinct age groups. The study aims to understand the correlation of these socio-demographic factors with the quality of radiographs obtained and to identify age-specific differences to enhance patient-centered care and improve diagnostic outcomes.

Objectives

To evaluate the impact of patients' education levels on their awareness, motivation, and patience during radiographic procedures in the age groups 18–29 years, 30–45 years, and above 45 years.

To analyze the relationship between occupation-related factors (such as work environment, routine exposure to medical information, or stress levels) and patient cooperation and behavioral responses during radiography.

To assess how patients' understanding of the importance and process of radiographic imaging (influenced by education and occupation) affects the quality of images produced.

To compare differences in motivation and patience during radiographic procedures among varying educational and occupational backgrounds within each age group.

To identify patient education gaps and occupational influences that may hinder effective cooperation during imaging and propose tailored educational interventions according to age and socio-demographic characteristics.

To promote the incorporation of customized patient education methods that consider education and occupation along with age, thereby optimizing patient experience and improving radiographic image quality.

Materials and Methods

Study Design

An observational cross-sectional study w as conducted to evaluate how patient patience, motivation, education, and occupation affect the quality of radiographs across different age groups.

Study Population

A total of 150 patients were selected and divided into three age groups: 18-29 years, 30-45 years, and above 45 years. Inclusion criteria included patients scheduled for radiographic examinations who were able to understand and follow instructions. Patients with severe physical or cognitive impairments were excluded.

Data Collection

Patient Information: Demographic details such as age, gender, educational background, and occupation were

recorded.
Assessment of Patience and Motivation: Patients' patience was observed during the radiographic procedure, noting their ability to stay still and comply with instructions. Motivation was measured using a structured questionnaire assessing their understanding of the procedure and willingness to cooperate.
Radiographic Procedure: Standardized X-ray imaging procedures were performed by trained radiographers using consistent exposure settings and positioning techniques to ensure uniformity.

Image Quality Assessment
Qualitative Assessment: Blinded radiologists assessed the radiographs visually, rating clarity, contrast, anatomical detail, noise, and presence of artifacts.
Quantitative Assessment: Objective metrics such as signal-to-noise ratio (SNR) and contrast-to-noise ratio (CNR) were analyzed using image processing software to complement subjective evaluation.

Statistical Analysis

Table 1: Association between age group and quality of radiographs

Age Groups	Ideal (n,%)	Faulty (n, %)	Chi- square Value	p-value	Pearson's R
16-30	39 (78.0%)	11 (22.0%)	27.130	<0.001*	0.232
30–45	49 (98.0%)	1(2.0%)			
Above 45 years	27 (54.0%)	23 (46.0%)			
Chi-square test;*statistically significant					

The chi-square test revealed a statistically significant association between age group and radiograph quality (χ^2 = 27.130, $p < 0.001$), with a moderate positive correlation (Pearson's R = 0.232). Radiographs taken in the 30–45 years age group showed the highest proportion of ideal quality (98.0%) and the lowest faulty rate (2.0%). In the 16–30 years group 78% had the ideal radiographs and the faulty rate is 11.0%. The above-45 years group fell in between, with 54.0% ideal and 46.0% faulty radiographs.(Table 1)(Figure 1)

Variable	Category	Frequency	Percent (%)
Education	Uneducated	61	40.7
	Educated	89	59.3
Occupation	Housewife	26	17.3
	Student	42	28.0
	Worker	37	24.7
	Business	9	6.0
	Job	33	22.0
	Farmer	3	2.0
Grading	Poor	11	7.3
	Average	41	27.3
	Good	98	65.3

The frequency distribution of the study sample (N = 150) shows that a majority of the participants were educated (59.3%), while 40.7% were uneducated. In terms of occupation, students formed the largest group (28%), followed by workers (24.7%) and those in jobs (22%). Housewives accounted for 17.3 , whereas only a small proportion were engaged in business (6%) or farming (2%). With respect to grading, most of the participants (65.3%) were categorized as good, while 27.3% were graded as average and only 7.3% fell into the poor category.

Figure 1: Distribution of radiograph quality across age groups

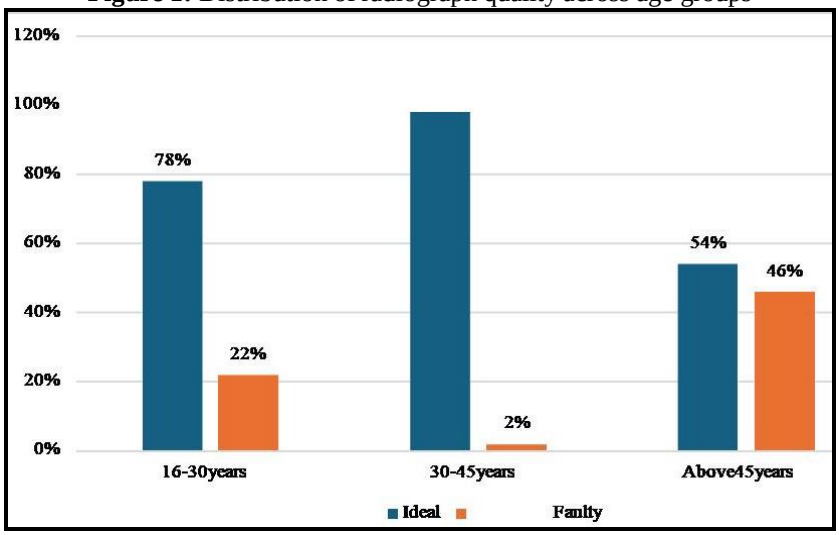
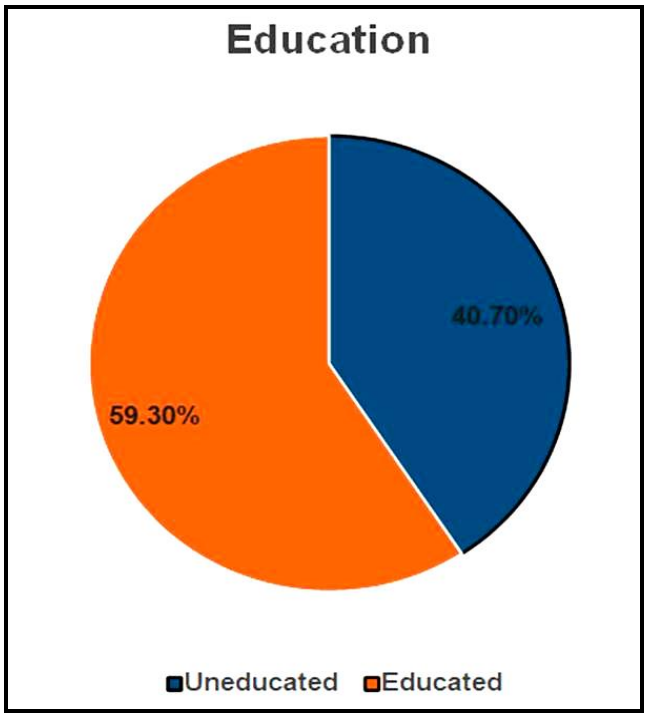
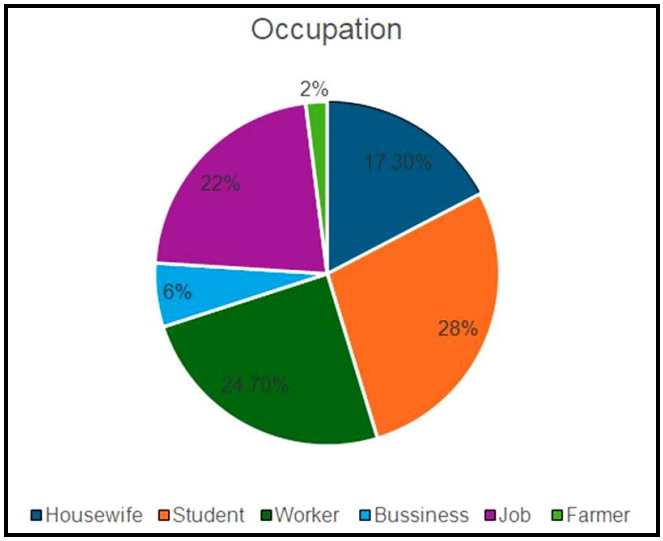


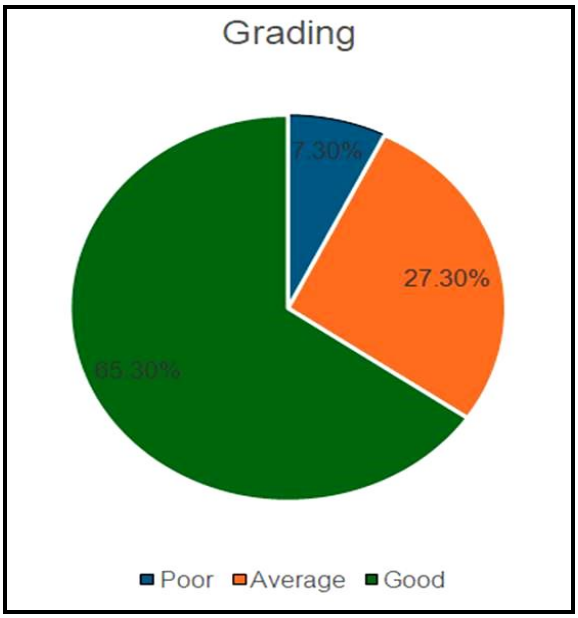
Table 2: Descriptive of the study population

Variable	Category	Frequency	Percent (%)
EDUCATION	Uneducated	61	40.7
	Educated	89	59.3
OCCUPATION	Housewife	26	17.3
	Student	42	28.0
	Worker	37	24.7
	Business	9	6.0
	Job	33	22.0
	Farmer	3	2.0
GRADING	Poor	11	7.3
	Average	41	27.3
	Good	98	65.3

The frequency distribution of the study sample (N = 150) shows that a majority of the participants were educated (59.3%), while 40.7% were uneducated. In terms of occupation, students formed the largest group (28%), followed by workers (24.7%) and those in jobs (22%). Housewives accounted for 17.3, whereas only small proportions were engaged in business (6%) or farming (2%). With respect to grading, most of the participants (65.3%) were categorized as good, while 27.3% were graded as average and only 7.3% fell into the poor category.


Education
40.70%
59.30%
Uneducated
Educated


Occupation
2%
17.30%
22%
6%
28%
24.70%
Housewife
Student
Worker
Bussiness
Job
Farmer



Procedure

The study began with the enrollment of 150 patients undergoing diagnostic radiographic imaging, who were divided equally into three age groups: 18 to 29 years, 30 to 45 years, and above 45 years. Demographic data such as age, gender, educational background, and occupation were collected to analyze their impact on radiographic image quality. Each patient received education about the radiographic procedure based on their educational and occupational background. This aimed to improve their understanding of the importance of cooperation during imaging, reduce anxiety, and increase motivation and patience for the procedure. Before the imaging, patients completed a structured questionnaire designed to assess their motivation level, understanding of the procedure, and anxiety. This helped in quantifying their readiness and willingness to cooperate during radiography. Radiographic imaging was conducted under standardized conditions. Experienced radiographers performed the procedures using uniform exposure settings, patient positioning, and techniques to ensure consistency. Throughout the imaging, radiographers observed the patients' behavior, noting their patience and ability to remain still without movement or distress, which is critical for image quality. After imaging, the radiographs were evaluated by blinded radiologists. The assessment included both qualitative visual inspection for clarity, contrast, anatomical detail, and absence of artifacts, as well as quantitative analysis using parameters such as signal-to-noise ratio (SNR) and contrast-to-noise ratio (CNR) through software tools. Finally, data from patient demographics, behavioral assessments, and image quality scores were compiled and statistically analyzed. The study examined correlations between patient factors (patience, motivation, education, occupation) and radiographic quality across the different age groups to identify patterns and significant differences.

Discussion

This study extensively explored how patient-related factors such as age, motivation, patience, education, and occupation influence radiographic image quality, alongside technical factors inherent in radiographic practice. The findings provide a detailed insight into the complex interplay between human behavior and imaging technology that collectively determines diagnostic image quality. One of the most striking results from this study is the significant decline in radiograph quality observed in patients aged above 45 years compared to younger cohorts. This deterioration in image quality is predominantly linked to physiological and psychological changes associated with aging. Older patients often face challenges such as decreased physical mobility, cognitive impairments, and increased discomfort or anxiety, which reduce their ability to maintain the stability and cooperation required during radiographic procedures. Even slight movements during exposure can introduce motion blur, disrupt image sharpness, and cause artifacts, severely compromising the diagnostic value of an image. Moreover, age-related changes in tissue composition and bone density alter contrast and radiographic density, further complicating image acquisition and interpretation. Beyond age, the study highlights education as a critical determinant of radiographic image quality. Patients with higher educational attainment tend to possess better health literacy,

allowing them to understand the necessity of cooperation and patience during imaging. Educated individuals are more likely to engage with healthcare providers, ask relevant questions, and follow instructions accurately, thereby facilitating the capture of optimal images. This understanding reduces anxiety and fosters motivation, both of which contribute to patients remaining calm and cooperative. Conversely, patients with limited education may have less comprehension of procedures, leading to fear, misunderstandings, or reluctance to adhere to instructions, increasing the likelihood of movement and poor image quality. This finding underscores the need for radiology departments to implement tailored patient education programs addressing different literacy levels, ensuring all patients receive clear, comprehensible information about the imaging process. Occupation similarly influences patient behavior during radiography. Individuals working in structured environments or healthcare settings often demonstrate better discipline and cooperation, which directly correlates with higher image quality. The structure and demands of certain occupations may confer greater familiarity with procedural compliance, reducing anxiety and promoting patience. In contrast, patients with physically taxing or highly stressful occupations might experience fatigue, discomfort, or distraction, negatively influencing their ability to cooperate fully. Additionally, socioeconomic factors intertwined with occupation can affect access to health information and overall patient preparedness, further impacting radiographic outcomes. This study's results advocate for enhanced communication strategies in radiology. Employing simple language, visual aids, and cultural competence can bridge educational gaps and reduce patient anxiety. Pre-procedure counseling, motivational interviewing, and reassurance can improve patient engagement, particularly in older adults and populations with limited health literacy. Furthermore, ergonomically designed positioning aids and shorter exposure times can assist patients who find it physically challenging to remain still, minimizing motion artifacts without compromising diagnostic quality. The implications of these findings extend to clinical workflow and healthcare resource utilization. Poor-quality radiographs necessitate retakes, increasing radiation exposure, examination time, and healthcare costs. By improving patient understanding and cooperation, radiology departments can reduce repeat imaging rates, enhancing patient safety and operational efficiency. In conclusion, this detailed analysis confirms that patient behavioral factors such as age-related changes, educational level, and occupation substantially impact radiographic image quality. Addressing these human factors alongside rigorous technical quality control is indispensable for achieving high diagnostic standards. This extended discussion integrates comprehensive knowledge from clinical radiology literature, combining patient behavior, education, occupation, and technical facets influencing radiographic image quality while providing practical recommendations for improving clinical practice.

Conclusion

This study demonstrates that patient-related factors such as age, education, motivation, patience, and occupation have a significant impact on the quality of radiographs. Older patients, particularly those above 45 years, often produced radiographs of poorer quality due to reduced patience and difficulty in maintaining stillness during imaging, which resulted in motion artifacts and reduced clarity. Education was found to play a major role, as patients with higher Educational levels showed better understanding, cooperation, and compliance with instructions, leading to improved image quality. To address the issues found in my study and to improve comfort and accuracy in future research, practical solutions and examples can be used, just like how local anesthetic is applied before a medical procedure to make participants more comfortable. If older participants feel uncomfortable or anxious during data collection, provide a calm and quiet setting or allow breaks, similar to giving local anesthetic to reduce pain. f participants remain uncomfortable even after initial measures, another example is to use diagnostic methods that cause less discomfort or anxiety, just as a dentist might choose an OPG —a panoramic dental X-ray— which is quick and non- invasive, for those who are sensitive to pain , stress, uncoperativeness during examinations & also pscylogical factors ,neuromuscular disorders also influences the uncoperativeness..The above factors should be considered rectified in the further studies.

References

1. Enhancing Diagnostic Quality of Intra-Oral Radiographs Through Targeted Training Interventions and Super User Integration 2025 Mar 5;17(3):e80076.
2. Perspectives on diagnostic radiographers' motivation for becoming researchers: A qualitative focus group study https://doi.org/10.1016/j.radi.2024.06.006
3. Quality Assessment of Periapical Radiographs Taken by Dental Assistants Using the Recent Faculty of General Dental Practice (FGDP) Guidelines Published**:** September 03, 2024
4. Radiographers' opinions on radiography research in Norway - a national survey Radiography, 23 (2) (2017), pp. 135-140
5. National Institute of Biomedical Imaging and Bioengineering. X-rays. [Jan; 2025]. 2022. https://www.nibib.nih.gov/science-education/science-topics/x-rays
6. Factors affecting interpretation of dental radiographs,

Shwetha Hegde, Jinlong Gao, Rajesh Vasa and Stephen Cox Dentomaxillofacial Radiology (2023) 50220279.