A SURVEY-BASED COMPARATIVE STUDY ON DENTAL PHOTOGRAPHY; INSIGHTS FROM DENTAL STUDENTS & PROFESSIONALS

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ABSTRACT

Objective: Dental photography plays a crucial role in diagnosing and documenting dental cases. This study aimed to assess the knowledge, attitudes, and practices of dental interns and postgraduate students regarding clinical dental photography. Photography is widely used across health sciences, including dentistry, to aid in diagnosis, documentation, and record-keeping. However, its usage varies significantly among dental interns and postgraduate students. This study aimed to evaluate their familiarity, methods, and practices in this domain.

Methods: A total of 191 undergraduate dental students, general dentists & consultants participated in a survey based on convenience sampling technique; exploring their familiarity with, approach to, and practices related to dental photography. The data collected was analyzed to understand device preferences, adherence to patient consent, confidentiality protocols, and general attitudes towards dental photography.

Results: A total of 191 participants completed the questionnaire; 58% of the participants held a undergraduate dental status, 15% fell in general dentists' category, whereas 27% had a consultant status. The study revealed that only 31% of respondents used DSLR cameras for clinical photography, with mobile phones being the most common device due to the high cost of professional equipment. Most participants recognized the importance of documenting cases, particularly for treatment and planning purposes Regarding patient consent and confidentiality, the majority obtained informed consent before taking photographs. Some participants (35%) also covered patients' eyes in photographs to maintain confidentiality.

Conclusion: The study underscores the need for enhanced education and training in dental photography to improve documentation practices and ensure patient privacy. Introducing dental photography as an engaging subject could aid in efficient case recording, foster learning opportunities, and support patient recall visits. Educating dental interns and postgraduate students on the advantages and best practices of dental clinical photography is essential for optimizing its use in clinical practice.

Keywords: dental photography, comparison, undergraduates, dentists

INTRODUCTION

In recent years, the field of dental practice has progressed to a level where treatment outcomes can often be visualized even before the procedures commence, made possible by innovations in digital dentistry, with dental photography playing a critical role in this transformation. [1]

By capturing, assessing, and tracking each stage of treatment, dental photography has become essential for pre-operative planning and assessment. Within dentistry, specialized equipment and advanced technologies have refined dental photography, making it indispensable and feasible for use in routine clinical practice. [2]

Viewed as a diagnostic tool on par with radiographs and study casts, dental photography provides a comprehensive visual record of clinical findings. Before any images are taken, it is essential to obtain written patient consent to maintain ethical standards and confidentiality. The primary purpose of digital dental photography is to accurately document clinical features in the oral cavity, while also serving several secondary functions, such as providing legal documentation for cases, supporting diagnosis and treatment planning, and enhancing dental education.[3-5] This tool also facilitates patient motivation and understanding by visually demonstrating conditions and treatment progress. Dental

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images further aid communication with laboratories, insurance companies, and specialists, especially in cases involving potential pre-cancerous or malignant lesions. Additionally, digital images are useful for developing professional portfolios and for marketing purposes, as they allow practitioners to showcase their work visually.[6-8]

Dental photography has practical applications across multiple disciplines. In orthodontics, it assists in analyzing facial profiles and assessing tooth alignment, while in prosthodontics, it helps evaluate occlusal harmony and plan restorative treatments for tooth wear. To further support clinical analysis, photographs can be marked to highlight specific features, such as tooth shape, translucency, or unique characteristics like banding, calcifications, or prosthetics.[9]

For dental students, photography offers considerable benefits, facilitating the preparation of clinical case presentations and enhancing the materials available for those considering academic careers. Several types of photographic equipment are used in dental settings, including mobile phones with high-quality cameras, point-and-shoot digital cameras, DSLR cameras, and intraoral cameras. A 2016 study, proposed a quality-based categorization of these tools, ranking them from smartphone accessories that enhance dental images, to digital cameras with macro lenses and diffusers, to high-end DSLR cameras with macro lenses and flash systems.[10]

The transition from traditional film to digital imaging has revolutionized dental photography, making it both practical and appealing. However, many dentists and students may still not fully utilize this technology due to a lack of formal training in dental photography, resulting in hesitation to integrate it into practice.[11] Concerns about workflow interruptions and equipment costs also contribute to its underutilization. With technology continuously advancing and equipment costs decreasing, digital photography is now more accessible to practitioners, with minimal disruption to patient flow.[12]

To gauge familiarity with dental photography among students and dentists at School of Dentistry & Bacha Khan Medical College, a study was conducted to assess their understanding of the ethical, practical, and technological aspects of dental photography. Based on the findings, recommendations were made to improve knowledge and proficiency in digital dental photography, empowering students to incorporate it into clinical practice with greater confidence. These steps aim to equip dental professionals with the skills needed to utilize dental photography as a multifaceted tool that supports patient care, professional development, and the ongoing evolution of modern dental practice.

MATERIALS & METHODS

Following ethical approval from listed institutions on 13-10-2024, this survey based study was conducted at School of Dentistry, Islamabad and dental section, Bacha Khan Medical College, Mardan. A survey was carried out among undergraduate dental students, general dentists and dental consultants via Google forms to evaluate their knowledge, viewpoints, and related practices concerning the use of dental photography in clinical scenarios. The study spanned from October to December 2024; selecting participants based on three categories: (A) Undergraduate students (B) General dentists & (C) Consultants. All participants joined the study after providing informed consent prior to its initiation. Exclusion criteria included (A) individuals not interested in participating. A convenient sampling method was applied; collecting data from easily accessible individuals.

The sample size of 200 was calculated using G*Power software, with the study designed to have 80% power, an alpha level of 0.05, an effect size of 0.5, and a Degree of Freedom of 5. A digital, self-administered, closed-ended questionnaire was adapted, featuring 26 pre-validated questions (Cronbach's alpha score 0.6[14]) organized into four sections: 1) Demographic data, 2) Knowledge-based questions, 3) Attitude-based questions, and 4) Practice-based questions. This questionnaire was distributed via digital platforms such as WhatsApp and Instagram.

The collected responses were compiled into Microsoft Excel 2016 spreadsheets and analyzed using descriptive statistics and Chi-Square test considering a p value of $\leq$ 0.05 to be significant. Statistical analysis was performed using SPSS software version 25.0.

RESULTS

In this study, an online pro forma was shared with 200 individuals who met the outlined inclusion and exclusion criteria. Among them, 191 participants, comprising undergraduates, graduates, and consultants, responded affirmatively (response rate of 95.5%). The

gender distribution showed that 26% were male and 74% were female (figure 1). Regarding academic qualifications, 58% (111) of the participants held a undergraduate dental status, 15% (27) fell in general dentists' category, whereas 27% (51) had a consultant status (figure 2). This diverse participant profile allowed for a well-rounded analysis across both educational and gender demographics.

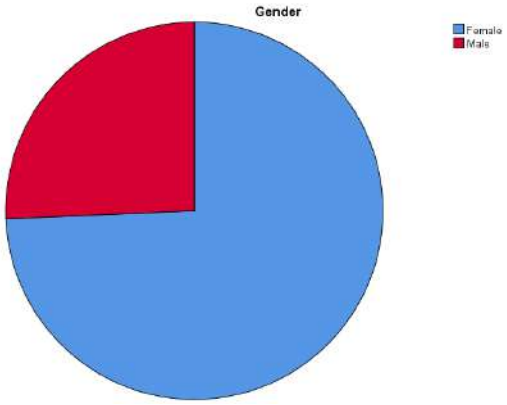

Figure 1: Gender distribution amongst participants

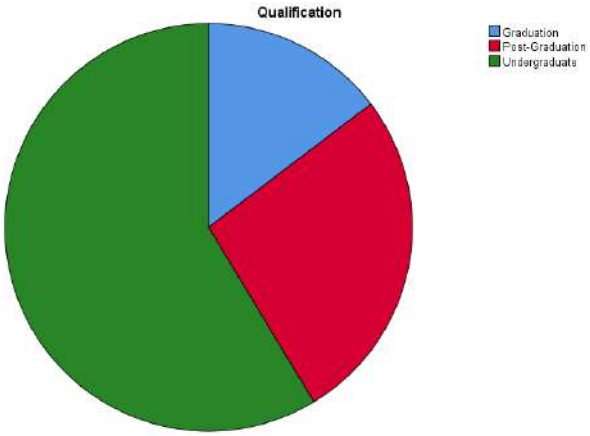

Figure 2: Qualification distribution of participants

This study revealed that 63% of participants considered dental photography the most effective method for reporting and documenting clinical cases. Despite this, only 31% of the participants utilized DSLR cameras for dental photography, highlighting a significant gap in the adoption of advanced equipment. Mobile cameras, on the other hand, were the most widely used device, with 55% of participants preferring them as a practical and accessible alternative. Additionally, 68% of the respondents underscored the importance of documenting cases, particularly for outlining and planning treatment.

Table 1: Knowledge regarding dental photography

Knowledge regarding dental photography	Qualification						P value
	Undergraduate		General Dentist		Consultant		
	N	%	N	%	N	%	
Attendance of Integrated Dental Photography course	51	46	12	44	10	31	0.08*
Dental photography as best method of recording cases	62	56	20	74	37	73	0.15
Case paper as adopted method of case documentation	49	44	8	30	17	33	0.01*
Use of mobile camera in dental photography	51	46	17	63	36	71	0.005*
Importance of treatment planning to record cases	69	62	21	78	40	78	0.000*

Use of occlusal-buccal mirrors in case recording	44	40	9	33	20	39	0.923
Patients' objection as a main hindrance in dental photography	50	45	10	38	15	29	0.000*
Use of cheek & lip retractors in photography	48	43	23	85	46	90	0.000*
Use of macro-lens in dentistry	16	14	13	48	19	37	0.002*
Covering the eyes of patient to maintain privacy	25	23	11	41	28	55	0.001*
Appropriate shutter speed	47	42	12	44	24	47	0.765

Chi- square test; *statistically significant

Patient reluctance to have their photographs taken emerged as a major deterrent, as cited by 40% of the cohort, which impacted their ability to document and store case details effectively. Nonetheless, a majority of participants demonstrated sufficient knowledge regarding the use of specific tools in dental photography. For instance, 39% of respondents correctly identified the occlusal-buccal mirror as essential for capturing quadrant or arch occlusal photographs, while 62% emphasized the necessity of cheek and lip retractors for obtaining detailed intraoral images. (Table 1)

Conversely, a lack of awareness was noted among 75% of the study population regarding the type of lens commonly used in clinical photography, indicating a need for further training and education in this area. Despite these limitations, 62% of participants stressed the imperative nature of case documentation for clinical practice (Table 2)

Table 2: Attitude regarding dental photography

Attitude regarding dental photography	**Qualification**						**P value**
	Undergraduate		Graduation		Consultant		
	No.	%	No.	%	No.	%	
Importance of recording cases	56	51	21	78	39	77	0.024*
Benefits of dental photography in clinical scenario	44	40	13	48	31	61	0.587
Role of case documentation in research	46	41	18	67	38	75	0.008*
Importance of DSLR	27	24	8	30	22	43	0.227
Cost of accessories causing hindrance in case documentation	27	24	9	33	16	31	0.805
Lack of interest as a cause of hindrance in documentation	19	17	2	7	7	14	0.053
Lack of time as a cause of hindrance in documentation	21	19	6	22	12	24	0.207
Use of macro-lens is mandatory in dental photography	21	19	4	15	5	10	0.737

Chi- square test; *statistically significant

In terms of patient consent and confidentiality, the study highlighted that 90% of participants obtained informed verbal consent before photographing patients, ensuring ethical compliance. However, only 12% took additional measures to protect patient confidentiality by covering their eyes during photography, suggesting a potential area for improvement in safeguarding patient privacy. Furthermore, only 22% of surveyed participants attended the dental photography course before suggesting a possible gap in this area.

General dentists demonstrated a significantly higher tendency to obtain written consent from patients compared to undergraduates and consultants ($p = 0.002$). Meanwhile, consultants exhibited a superior

level of knowledge about the types of lenses used in dental photography (p = 0.002) and showed greater efforts in maintaining patient confidentiality (p = 0.001) (Table 3).

Table 3: Practices regarding dental photography

Practices regarding dental photography	Qualification						P value
	Undergraduate		Graduation		Consultant		
	No.	%	No.	%	No.	%	
Use of photography in clinical practice	59	53	26	96	40	78	0.000*
Awareness regarding dental photography course	46	41	20	74	30	59	0.011*
Attendance of course in dental photography	23	21	4	15	15	29	0.374
Importance of photography in service' quality improvement	88	79	23	85	48	94	0.102
Verbal consent appraisal from patient	93	84	27	100	57	100	0.002*
Written consent appraisal from patient	64	58	14	52	13	26	0.002*
Practice of covering eye before photography	93	84	26	96	48	94	0.043*

Chi- square test; *statistically significant

DISCUSSION

Our study demonstrated an unequal distribution of participants across genders and education levels, with a significant response from dental undergraduates and a marked female predominance (74%). The majority of respondents (58%) were dental students, followed by 14% general dentists and 27% consultants. These findings align with those of previous study by Ahmed et al. where students comprised of high percentage (78.4%) as compared to qualified dentists (21.6%), reflecting a potential imbalance in representation due to a larger pool of undergraduates compared to qualified dentists.[14]

The study highlighted a limited emphasis on using case records for marketing purposes, with only 8% of participants acknowledging its importance. This contrasts with findings by Harikrishnan et al., where marketing played a more significant role[12] which might be due to the nature of clinical practice carried out (public vs private). In contrast, a substantial 68% of participants underscored the importance of dental records for treatment purposes, consistent with other studies where authors reported that pre- and post-operative patient photographs were primarily used for treatment planning.[15-16,18]

Regarding the preferred methods of case documentation, 39% of participants identified case papers as the most effective medium. This finding contrasts with a study by Abouzeid et al.[1], which emphasized pictorial documentation as the most effective approach; this shows the possible resource restraint in current setup. Interestingly, 56% of participants in our study used mobile cameras (in agreement to another research[16]) to document cases, compared to only 31% who utilized DSLR cameras. These results conflict with observations by Sharland MR et al., who reported widespread use of dental photography among general practitioners in Great Britain; this might be attributed to regional differences.[20] Concerns over patient confidentiality emerged as a significant barrier, with 40% of respondents indicating that this was the primary reason for not documenting cases. This finding is consistent with research by Khaled et al., but it diverges from Albugami et al.'s work, which emphasized the role of patient consent and confidentiality management in clinical documentation.[13]

As far as the training in dental photography was concerned, only 22% of respondents had attended any formal training in the field which is in agreement to study conducted by Morse et al. A positive observation from our study was that 88% of participants reported obtaining patient permission before taking photographs, and 34% ensured confidentiality by concealing

the patients' eyes in images. This indicates a growing awareness and prioritization of patient privacy among dental professionals, representing an improvement over previous studies by Abouzeid et al. and aligning with similar findings from Albugami et al.[1,13] Almost 95% of participants appraised verbal consent from patients prior to photography which shows participants' awareness regarding patient consent.

Lastly, it was noted that 75% of the participants lacked knowledge of the standard lenses used in clinical photography. This gap could be attributed to the infrequent use of DSLR cameras for documenting cases, as most participants appeared to rely on more accessible options like mobile cameras.[17-19] This finding highlights a potential area for further training and awareness in clinical documentation techniques.

Conclusion:

This study highlighted that while participants were aware of dental photography, they lacked comprehensive knowledge of proper photographic techniques and the ethical principles surrounding patient confidentiality and consent. Addressing these gaps will significantly improve case documentation and patient treatment outcomes. Incorporating dental photography into core training and professional practice in dentistry can empower dental professionals to document cases systematically, enhancing teaching methodologies & better engage patients, ultimately boosting recall visit efficiency. Furthermore, implementing a short-term pre-clinical course on dental photography in dental institutions is a pressing need to foster these skills effectively.

Conflicts of interest: None to declare

Authors' Contributions

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