

# Knowledge, Attitude and Behavior of Dental and Medical Postgraduates towards Photodynamic Therapy

Knowledge,  
Attitude and  
Behavior  
Towards  
Photodynamic  
Therapy

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## ABSTRACT

**Objective:** To evaluate and compare knowledge, attitude, and behaviors among medical postgraduates (MPG) and dental postgraduates (DPG) regarding Photodynamic therapy (PDT).

**Study Design:** Cross sectional Survey study

**Place and Duration of Study:** This study was conducted at the Department of Restorative and Prosthetic Dentistry, College of Dentistry, Dar Al Uloom University, Riyadh, Saudi Arabia from January 2021 to March 2021.

**Materials and Methods:** A questionnaire registered on [www.surveys.google](http://www.surveys.google) was used. The sample size was 433 participants. Total 387 health professionals responded with 89 % of response rate. Contact details of registered DPG and MPG were requested from the office of Saudi Commission for health Specialist. The questionnaire comprised of four sections. The first section is comprised of socio-demographics. The second domain inquired about knowledge i.e., invasiveness, mechanism of action, and photosensitizers. The third section investigated attitude in clinical practice. Whereas the fourth section of the questionnaire inquired about behavior and willingness to offer PDT as a treatment option. Statistical Package for the Social Sciences was used to analyse data. Descriptive analysis was performed and the result was presented in the form of mean, frequencies, and percentages.

**Results:** Most MPG displayed adequate knowledge, 80%, 82%, and 79% were aware of the invasiveness, mechanism of action, and role of photosensitizers in PDT respectively. Whereas, DPG displayed inadequate knowledge. Similarly, MPG demonstrated a better attitude towards PDT. A notable result signifies an extraordinary response of MPG for discussing PDT as a treatment alternative with their patients. When inquired about the recommendation of therapeutic benefits of PDT, 65% of MPG and 40% of DPG recommends PDT in their practice. Role to treat cancer and acne was well-known among MPG (90%) whereas dental trainees did not exhibit adequate behavior

**Conclusion:** DPG showed inadequate knowledge regarding PDT. However, their response presented keenness in acquiring knowledge through training and workshops. On the contrary, MPG exhibited satisfactory knowledge and behavior towards PDT.

**Key Words:** Photodynamic therapy, Dental postgraduates, medical postgraduates, Knowledge

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## INTRODUCTION

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Photodynamic Therapy (PDT) is defined as the light-induced inactivation of unwanted cells. It is also known as phototherapy or photo radiation therapy. It has been practiced in medicine for more than three decades.<sup>1</sup> It is a highly selective and minimally invasive technique to treat malignant and premalignant conditions. Its mechanism of action involves a photoactivatable agent (photosensitizer) activated upon irradiation with the light of a specific wavelength in the presence of oxygen to form reactive oxygen species (ROS).<sup>2</sup> These ROS are responsible for causing oxidation of cellular component i.e., plasma cell membrane and DNA resulting in cell death.<sup>3,4</sup>

In recent years PDT has emerged as a non – invasive therapeutic modality for the treatment of various diseases.<sup>5,6</sup> Currently the use of PDT has been expanded to several different medical fields i.e., dermatology, ophthalmology, and cosmetic surgery, and their outcomes are reasonably convincing.<sup>7</sup>

However, there are certain limitations associated with its use. As visible light can penetrate the tissues not deeper than 5-10 mm, which confines the application of PDT to mainly superficial lesions. In addition, use of PS leads to skin photosensitivity which lasts for weeks which restricts its use as a therapeutic regimen.<sup>8,9</sup>

In dentistry, PDT was initially adopted as a novel disinfection technique. It represents a suitable alternative for treating localized microbial infections. In addition, its role has been lengthened to overcome the antibiotic resistance produced by bacteria.<sup>10</sup> Today, PDT has been widely utilized among different domains of dentistry i.e., periodontology, endodontics, operative, oral medicine, and oral pathology.<sup>11</sup> It is also claimed that over the last few years the use of PDT has been advanced and moved beyond educational centers and specialist care units to general dental practice. Looking towards the future, it is anticipated that PDT will become a vital component of present-day dental practice.<sup>12</sup>

To our knowledge from available indexed literature, it was found that treatment through laser is common nowadays, whereas the application of PDT is limited. In addition, studies related to the assessment of knowledge, attitude, and practice related to PDT among medical and dental professionals are scarce. Therefore, the present study aimed to assess and compare knowledge, attitude, and behaviors among medical postgraduates (MPG) and dental postgraduates (DPG) related to PDT from the different medical and dental tertiary care centers.

## MATERIALS AND METHODS

**Study design:** A descriptive study was designed as a questionnaire-based, cross-sectional analysis to assess and compare the knowledge, attitude, and behaviour regarding PDT among DPG and MPG from different teaching hospitals. STROBES checklist was followed for reporting cross-sectional survey. The total period of the study was 3 months from January 2021 to March 2021

**Sample Size calculation:** A short-structured questionnaire was administered through online survey forms registered on [www.surveys.google](http://www.surveys.google). Using power calculation analysis, the sample size was calculated and estimated to be 433 participants with a confidence interval of 95%, 5% margin of error, and 80% power. Raosoft calculator was used in determining the sample size. Participants were approached by sending a link containing a questionnaire along with a consent form on their registered email addresses. Contact details of registered DPG and MPG were requested from the office of Saudi Commission for health Specialist. To improve the response rate reminder weekly emails were sent periodically. A total of 387 participants responded with a response rate of 89%.

**Structured questionnaire:** A questionnaire was comprised of four sections. The questionnaire was adopted after reviewing a questionnaire from a study by Vohra et al. The research team of statisticians along with authors reviewed the content of each question to make sure that the survey reflected appropriate phrasing and understanding (Cronbach's alpha 0.80). The four domains of the survey comprised of questions related to socio-demographics i.e., age, gender, institute, clinical experience, and year of post-graduation. The second section inquired about the level of knowledge among medical and dental postgraduates in the form of responses yes or no. The third section investigates their behaviour. Whereas the fourth section asked about their attitude and their willingness to learn more about PDT. Statistical Package for the Social Sciences (SPSS Inc., software version 21 Chicago, IL, USA) was used to analyse data. Descriptive analysis was performed and the result were presented in the form of mean, frequencies, and percentages.

## RESULTS

Total 433 postgraduates enrolled in medical and dental postgraduate training programs in Saudi Arabia were sent an email with a questionnaire attached but only 387 responded with a response rate of 89%. 200 were males and 187 were females.

The participant's ages ranged from 26 to 33 years, with mean  $\pm$  SD 29.50  $\pm$  1.21. By designation, 51% were dental postgraduate trainees whereas 49% were medical postgraduates. Based on their post-graduation year 49% were junior postgraduates (1-2 years of training) whereas 195 were senior postgraduates (3-4 years of training). Their demographic characteristics are listed in Table 1

Table 2 demonstrates knowledge items with the correct answers. It also represents the percentage of correct responses by medical and dental postgraduates regarding PDT. Most medical postgraduates displayed adequate knowledge related to PDT, and nearly 80%, 82%, and 79% were aware of the invasiveness, mechanism of action, and the role of photosensitizers in PDT respectively. Whereas among dental professional's knowledge seems to be inadequate. 64% of dental professionals were aware of the invasiveness of the procedure whereas their knowledge related to the mechanism of action and use of photosensitizer was insufficient

Table 3, investigated the behaviour of postgraduates towards PDT by inquiring about their behaviour in clinical practice. When asked about the therapeutic role of PDT i.e., treating ulcers both medical and dental trainees displayed inadequate knowledge. However, its role to treat cancer and acne was well-known by the medical trainees (90%) whereas dental trainees did not exhibit adequate behavior. When inquired about the recommendation of therapeutic benefits of PDT, around

65% of MPG and 40% of DPG recommend PDT in their practice.

**Table No.1: Sociodemographic characteristics of medical and dental postgraduates (n =387).**

Average age: 29.50±1.21 years	
Gender – n (%)	
Male	200 (52)
Female	187 (48)
Designation – n (%)	
Medical resident	192 (49)
Dental residents–	195 (51)
Post-graduation year n (%)	
1-2 years junior PG	192 (49)
3+ years senior PG	195 (51)

**Table No.2: Response summary of MPG and DPG regarding knowledge items (n=387).**

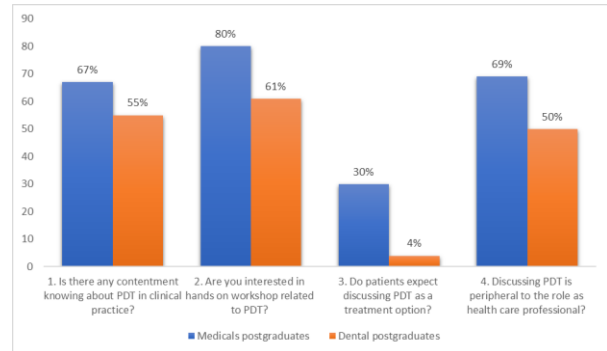
Item	Correct answer	Medical post-graduates %	Dental post-graduates %
Do u think Photodynamic therapy is invasive and painful?	False	80	64
Photodynamic therapy (PDT), also known as photo-radiation therapy, involves the use of a photoactive dye.	True	57	51
PDT is based on the principle that the target cells are destroyed using toxic reactive oxygen species generated upon the interaction of a photosensitizer, light and oxygen.	True	82	55
Photo sensitizers are activated with low level laser between 630 and 700 nm.	True	79	49
PDT affects both surrounding tissues and micro-organisms.	True	55	48

Figure 1, inquired about the attitude of medical and dental postgraduates towards PDT. Medical postgraduates displayed a better attitude towards PDT than dental postgraduates. Around 67% of the medical postgraduates responded that their patient feels contented about knowing PDT as a treatment option whereas only 55% of dental postgraduates responded positively about the response of the patient. Similarly, a significant number of medical postgraduates and dental postgraduates 80% and 61% respectively were interested in gaining clinical expertise through hands-on practice. When questioned about patient’s expectations on discussing PDT as a treatment option, a low response rate was noted from both health care professionals. Similarly, a significant number of

medical postgraduates (69%) considered discussing PDT with patients as peripheral to medical care. Whereas, only 50% of dental trainees agreed that they discussed PDT with their patients.

**Table No.3: Behaviour response summary of dental and medical postgraduates**

Item	Correct answer	Medical post-graduates(%)	Dental post-graduates(%)
Do you think PDT has a role to treat oral ulcers?	yes	55	57
Do you think PDT has a role to treat cancer and acne?	yes	90	55
Do you recommend therapeutic choices of PDT to the patient?	yes	65	40
Do you recommend patients to consider PDT in your respective fields?	yes	75	35



**Figure No.1: Attitude towards PDT among medical and dental postgraduates**

## DISCUSSION

The existing cross-sectional design aims to evaluate and compare the knowledge, attitude, and behaviour among MPG and DPG towards PDT from different universities of Pakistan. To our understanding from available literature, this is a unique survey representing distinctive findings related to PDT among health care professionals. The response rate was calculated to be 89% which was considered to be satisfactory. This method of research design was adopted as cross-sectional surveys are efficient, easy, and rapid. In addition, it gives the researcher an insight into certain behaviour and attitude. It also helps in establishing hypothesis which can be further investigated through interventional study designs.<sup>13</sup>

A questionnaire was designed and generated through online google forms to collect the desired sample. In today's world online surveys or web-based surveys have been considered as an important tool for the collection of data. As the method is convenient, less biased compared to the manual survey. Moreover, it has the advantage of rapid response and less cost compared to the conventional survey.<sup>14</sup>

The present study displayed some interesting outcomes. It was found that medical trainees displayed superior knowledge, attitude, and behaviour than their fellow dentists. Most of the respondents from medical backgrounds showed better understanding and awareness towards the invasiveness of the procedure, mechanism of action, and role of photosensitizer used in PDT. Their familiarity with PDT was also reflected through their attitude and behaviour in clinical practice. Another notable result from the present study signifies an extraordinary response of MPG for discussing PDT as a treatment alternative with their patients. Furthermore, they consider informing patients about different treatment strategies as their peripheral role. Though medical professionals display an adequate amount of knowledge, their attitude towards learning and gaining more information about PDT through attending hands-on workshops was quite overwhelming. This can be explained by the fact that PDT has been practiced in the medical profession for the last 3 decades for treating different diseases.<sup>15</sup> It also reflects a well-designed medical curriculum at undergraduate and postgraduate levels.<sup>16</sup> The finding of the present study is in line with the study conducted by Al Moman *et al.*, among medical nurses in Riyadh city, Kingdom of Saudi Arabia. It was found that nurses displayed satisfactory knowledge and modest awareness towards PDT.<sup>17</sup>

In contrast knowledge, attitude, and behavior among dental PGs regarding PDT varies considerably from the medical professionals. Response to the questions exploring knowledge, attitude, and behavior was quite discouraging. Dental practitioners from the present study exhibited inadequate knowledge regarding PDT. The lack of knowledge was also reflected through their attitude and behavior in clinical practice. Most of the dentists did not confer PDT as a treatment option and gave less attention to PDT in their routine dental settings. They also didn't take into consideration their sole obligation to discuss this treatment with patients. Primarily, the reason for this outcome can be linked to PDT being an innovative concept in dentistry.<sup>18</sup> Secondly, high cost and limited expertise to handle the equipment can influence the low acceptability of PDT in their routine dental practice.<sup>16,19</sup> Moreover, in the author's opinion paucity in the dental curriculum can limit its generalizability among practicing dentists. A similar survey conducted by Vohra *et al.*, among

dentists of Karachi city displayed adequate amount knowledge as well as positive towards PDT.<sup>20</sup>

## CONCLUSION

DPG showed inadequate knowledge regarding PDT. However, their response presented keenness in acquiring knowledge through training and workshops. On the contrary, MPG exhibited satisfactory knowledge and behaviour towards PDT.

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**Conflict of Interest:** The study has no conflict of interest to declare by any author.

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