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Knowledge, Awareness and Attitudes on the use of Magnification Devices among General Dental Practitioners and Prosthodontists in Makkah Region, Saudi Arabia - A Questionnaire Based Study

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Abstracts

The precise dental treatment outcomes can be achieved by perfect visualization and magnification devices play an important role. The aim of this study was to evaluate the level of knowledge, awareness, attitude, and use of magnification devices among Dental practitioners (General practitioners and Prosthodontists) in Makkah region of Saudi Arabia. A cross-sectional, questionnaire based study was conducted in Ibn Sina National College for Medical studies, Jeddah; covering various dental clinics in Makkah region of Saudi Arabia. The study population was selected using cluster random sampling. This questionnaire was sent online to 300 private dental practitioners (General practitioners and Specialists (Prosthodontists), out of which 205 practitioners responded. The data were tabulated and analyzed using Statistical Package for the Social Sciences (SPSS) version 21. Chi-square test was used to analyze the data and a P-value of less than 0.05 was considered statistically significant, whereas p-value of less than 0.001 was considered strongly significant. Among the study population, 78.5% (n=161) were aware of utilization of magnification devices in prosthodontic procedures, 150 (73.2%) of them attended courses or classes on the magnification devices in the dental field, 140 (68.3%) were using surgical loupes during prosthodontic procedures, 130 (63.4%) felt surgical loupes enhances precision and accuracy, 132 (64.4%) felt surgical loupes reduces eye strain, 128 (62.4%) felt surgical loupes improve the speed of working and 137 (66.8%) felt surgical loupes improves ergonomics. The present study revealed that majority of the dental practitioners were aware of magnification devices used in dentistry and attended courses on the use of magnification devices in the field of dentistry and using surgical loupes for prosthetic procedures. Majority of the specialists (Prosthodontist) were using surgical loupes for fixed prosthesis and implant procedures. Most of them were using light mounted surgical loupes and were very comfortable using surgical loupes as it reduces eye strain enhances precision and accuracy and improves working speed and ergonomics.

Keywords: Fixed Prosthodontics, Magnification Devices, Surgical Loupes and Ergonomics

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1. Introduction

Innovation is part of dentistry and magnification is considered as one of the greatest revolutions in the field of modern dentistry. This new development initiated several studies throughout the world and expertise in this field. An operating microscope was introduced to dentistry in late 1970s and Dr. Garry Carr initiated the dental operating microscope and found that magnification could be useful in the endodontic apical surgeries[1].

Dr. Garry Carr also recommended the use of Dental operating microscope in various dental specialties, which included diagnosis and excavation of dental caries, to locate crown margins and post and core, periodontal and surgical endodontic procedures[2,3]. In spite of the high cost and special training required, many of the dental practitioners are using magnification devices for their dental practice. Significant advantages of using magnification devices in dentistry are: improved quality of treatment, posture, reducing eye strain and decreasing musculoskeletal injury. Dental practitioners are advocated to go for training to be able to take the advantage of using magnification devices[4-7].

In the field of endodontics, magnification devices play a vital role to detect hidden root canals, retreatment cases, and removal of broken instruments, perforation repairs and various steps of endodontic surgery[8]. Magnification devices are also very useful with prosthodontic procedures, especially in fixed prosthodontics like tooth preparation, to evaluate final impression, seating of crowns and bridges and to detect minute occlusal discrepancies[9-11]. For improving the quality of the clinical work, many Dental practitioners are using magnifying loupes and even undergraduate dental students have started using surgical loupes for endodontic and prosthodontic procedures[12]. The visual field enlarged by the lenses can be an important element and surgical loupes plays a very important role for improving ergonomic work posture in dental procedures. There are various incidences, due to bad posture where dental practitioners have developed neck and spinal torsion, hunched shoulders and musculoskeletal disorders[13].

Although, there are few scientific evidences supporting the benefit of magnification devices on the dentist's performance, only few studies are available comparing their use between general practitioners and prosthodontists. Hence, this study was proposed to evaluate the level of knowledge, awareness and attitude in the use of magnification devices among Dental practitioners (General practitioners and Prosthodontists) in Makkah region of Saudi Arabia.

2. Materials and Methods

This study was conducted in the dentistry program of Ibn Sina National College for Medical studies, Jeddah. Ethical clearance was obtained from the Institutional Ethical committee with approval number H-01-22122019. A cross-sectional, questionnaire based study was conducted among the dental practitioners, covering various dental clinics in Makkah region, Saudi Arabia, using a self-structured, pre-tested, closed-ended questionnaire consisting of 14 questions designed on knowledge, awareness, attitude and use of magnification devices among General Dental practitioners and prosthodontists. Questions were related to utilization of magnification devices in Prosthodontic procedures. A specially designed questionnaire consisting of close ended questions was pilot tested for validation on a small group of ten dental practitioners, who were requested to complete it and to indicate any question that they found unclear. The necessary modifications were made in the final questionnaire.

The study population was selected using cluster random sampling. This questionnaire was sent online to 300 private dental practitioners (General practitioners and Specialists (Prosthodontists), who were randomly selected and the purpose of the study was explained to them; out of which 205 practitioners responded [161 general practitioners and 44 of them were specialists (prosthodontists)]. Their names were not recorded in the data entry to ensure anonymity. Dental practitioners not willing to participate in this study were excluded. The study was completed in 2 months.

3. Statistical Analysis

The data were tabulated and analyzed using the SPSS version 21 (SPSS Inc., Chicago, IL). Chi-square test was used to compare knowledge, awareness, attitude and use of magnification devices among General Dental practitioners and prosthodontists. P-value of less than 0.05 was considered statistically significant, and a p-value of less than 0.001 was considered strongly significant.

4. Results

Table 1 shows the study population comprising of 205 participants of which, 131 were males and 74 were females. 62% (n=127) were general practitioners including 82 males (62.6%) and 45 females (60.8%). 38% (n=78) were specialists which included 49 males (37.4%) and 29 females (39.2%).

Table 1. Cross-tabulation of gender and type of dental practice

Type of dental practice		Gender		Total
		Males	Females	
General Practice	Count	82	45	127
	Percent	62.6%	60.8%	62.0%
Specialist	Count	49	29	78
	Percent	37.4%	39.2%	38.0%
Total	**Count**	**131**	**74**	**205**
	Percent	**100.0%**	**100.0%**	**100.0%**
Chi-square value- 0.064				
P value- 0.80				

Table 2 shows the awareness of study population regarding utilization of magnification devices in prosthodontic procedures, 78.5% (n=161), out of which 77.1% (n=101) male participants and 81.1% (n=60) and 21.5% (n=44) were unaware of magnification devices. Out of which 22.9% (n=30) were male participants and 18.9% (n=14) were female participants.

Table 3 shows the study population knows about surgical loupes, 127 (62%) out of which male participants were 59.5% (78) and female participants were 66.2% (n=49) and 34 (16.6%) of the participants were knew about surgical microscopes, out of which 19.1% (n=25) were male participants and 12.2% (n=9) and 44 (21.5%) were unaware of magnification devices, out of which 21.6% (n=16) were male participants and 21.4% (n=28) were female participants.

Table 2. Are you aware of utilization of magnification devices in prosthodontic procedures?

Are you aware of utilization of magnification devices in prosthodontic procedures?		Gender		Total
		Males	Females	
Yes	Count	101	60	161
	Percent	77.1%	81.1%	78.5%
No	Count	30	14	44
	Percent	22.9%	18.9%	21.5%
Total	**Count**	**131**	**74**	**205**
	Percent	**100.0%**	**100.0%**	**100.0%**
Chi-square value- 0.44				
P value- 0.505				

Table 3. If yes, which are the magnification devices that you know of?

If yes, which are the magnification devices that you know of?		Gender		Total
		Males	Females	
Surgical loupes	Count	78	49	127
	Percent	59.5%	66.2%	62.0%
Surgical microscopes	Count	25	9	34
	Percent	19.1%	12.2%	16.6%
NA	Count	28	16	44
	Percent	21.4%	21.6%	21.5%
Total	**Count**	**131**	**74**	**205**
	Percent	**100.0%**	**100.0%**	**100.0%**
Chi-square value- 1.70				
P value- 0.426				

Table 4 shows that 150 (73.2%) attended courses or classes on the magnification devices in the dental field, out of which 74% (n=97) male participants and 71.6% (53) were female participants and 55 (26.8%) did not attend courses or classes on the magnification devices in the dental field, out of which 26% (n=34) were male participants and 28.4% (n=21). Table 5 shows that 140 (68.3%) were using surgical loupes during prosthodontic procedures, out of which male participants were 65.6% (n=86) and 73% (n=54) female participants. 65 (31.7%) were not using surgical loupes during prosthodontic procedures, out of which 34.4% (n=45) male participants and 27% (20) were female participants.

Table 4. Have you ever attended courses or classes on the use of magnification in the dental field?

Have you ever attended courses or classes on the use of magnification in the dental field?		Gender		Total
		Males	Females	
Yes	Count	97	53	150
	Percent	74.0%	71.6%	73.2%
No	Count	34	21	55
	Percent	26.0%	28.4%	26.8%
Total	**Count**	**131**	**74**	**205**
	Percent	**100.0%**	**100.0%**	**100.0%**
Chi-square value- 0.14				
P value- 0.70				

Table 6 shows that 72 (35.1%) participants were using the loupes for more than one year, out of which 35.1% (n=46) were male participants, 35.1% (n=26), 59 (28.8%) were using the loupes more than 5 years, 27.5% (n=36) of them were male participants, 31.1% (n=23) of them were female participants, 50 (24.4%) of the participants were using the loupes for more than 10 year, out of which 25.2% (n=33).

Table 7 shows that 102 (49.8%) they feel no added advantage, out of which 48.1% (n=63) weremale participants

Table 5. Are you using surgical loupes during prosthodontic procedures?

Are you using surgical loupes during prosthodontic procedures?		Gender		Total
		Males	Females	
Yes	Count	86	54	140
	Percent	65.6%	73.0%	68.3%
No	Count	45	20	65
	Percent	34.4%	27.0%	31.7%
Total	**Count**	**131**	**74**	**205**
	Percent	**100.0%**	**100.0%**	**100.0%**
Chi-square value- 1.17				
P value- 0.27				

Table 6. Since how many years you are using magnification device in your practice?

Since how many years you are using magnification device in your practice?		Gender		Total
		Males	Females	
More than 1 yr.	Count	46	26	72
	Percent	35.1%	35.1%	35.1%
More than 5 yrs.	Count	36	23	59
	Percent	27.5%	31.1%	28.8%
More than 10 yrs.	Count	33	17	50
	Percent	25.2%	23.0%	24.4%
More than 15 yrs.	Count	16	8	24
	Percent	12.2%	10.8%	11.7%
Total	**Count**	**131**	**74**	**205**
	Percent	**100.0%**	**100.0%**	**100.0%**
Chi-square value- 0.38				
p value- 0.94				

and 52.7% (n=39), 56 (27.3%) felt not comfortable using magnification devices, out of which 27.5% (n=36) were male participants and 27% (n=20) were female participants.

Table 8 shows that 97 (47.3%) were using surgical loupes with magnification of 2.5X, out of which 47.3% (n=62) were male participants and 47.3% (n=35) were female participants, 73 (35.6%) were using surgical loupes with magnification of 3.5X, out of which 34.4% (n=45) were male participants and 37.8 (n=28) were female participants, 26 12.7% participants were using surgical loupes with magnification of 4.5X, out of which 14.5% (n=19) were male participants and 9.5% (n=7) were female participants and 6 (2.9%) participants were using surgical loupes with magnification of 5.5X, out of which 3.1% (n=4) (n=19) were male participants and 2.7% (n=2) were female participants.

Table 7. If no, what is the reason for not using magnification devices in spite of being aware of it?

If no, what is the reason for not using magnification devices in spite of being aware of it?		Gender		Total
		Males	Females	
No added advantage	Count	0	1	1
	Percent	0.0%	1.4%	0.5%
Expensive	Count	63	39	102
	Percent	48.1%	52.7%	49.8%
Not comfortable	Count	36	20	56
	Percent	27.5%	27.0%	27.3%
Others	Count	1	1	2
	Percent	0.8%	1.4%	1.0%
Not replied	Count	31	13	44
	Percent	23.7%	17.6%	21.5%
Total	**Count**	**131**	**74**	**205**
	Percent	**100.0%**	**100.0%**	**100.0%**
Chi-square value- 2.96				
p value- 0.56				

Table 9 shows that 133 (64.9%) were using light mounted surgical loupes, out of which 66.4% (n=87) were male participants and 62.2% (n=46) and 72 (35.1) were using ordinary surgical loupes, out of which 33.6% (n=44) were male participants and 37.8% (n=28).

Table 8. If yes, what is the magnification of the surgical loupes you are using for prosthodontic procedures?

If yes, what is the magnification of the surgical loupes you are using for Prosthodontic procedures?		Gender		Total
		Males	Females	
2.5X	Count	62	35	97
	Percent	47.3%	47.3%	47.3%
3.5X	Count	45	28	73
	Percent	34.4%	37.8%	35.6%
4.5X	Count	19	7	26
	Percent	14.5%	9.5%	12.7%
5.5X	Count	4	2	6
	Percent	3.1%	2.7%	2.9%
Not replied	Count	1	2	3
	Percent	0.8%	2.7%	1.5%
Total	**Count**	**131**	**74**	**205**
	Percent	**100.0%**	**100.0%**	**100.0%**
Chi-square value- 2.34				
p value- 0.67				

Table 10 shows that 99 (48.3%) were using surgical loupes for fixed partial denture, out of which 50.4% (n=66) were male participants and 44.6% (n=33) and 36 (17.6%) were using surgical loupes for removable partial denture procedures, out of which 19.1% (n=25) were male participants and 14.9% (n=11) were female participants. 45 (22%) were using surgical loupes for implant supported prosthesis, out of which 16.8% (n=22) were male participants and 31.1% (n=23).

Table 11 shows that 113 (55.1%) were using surgical loupes for tooth preparation, out of which 51.9% (n=68) were male participants and 60.8% (n=45) were female participants and 36 (17.6%) were using surgical loupes for gingival retraction procedures, out of which 19.8% (n=26) were male participants and 13.5% (n=10) were female participants. 22 (10.7%) were using surgical loupes for evaluating impression, out of which, 12.2%

Table 9. Which type of surgical loupes do you use?

Which type of surgical loupes do you use?		Gender		Total
		Males	Females	
Light mounted	Count	87	46	133
	Percent	66.4%	62.2%	64.9%
Ordinary	Count	44	28	72
	Percent	33.6%	37.8%	35.1%
Total	**Count**	**131**	**74**	**205**
	Percent	**100.0%**	**100.0%**	**100.0%**
Chi-square value- 0.37				
P value- 0.54				

Table 10. In which prosthodontic procedures magnification loupes devices are helpful?

In which prosthodontic procedures magnification loupes devices are helpful?		Gender		Total
		Males	Females	
FPD	Count	66	33	99
	Percent	50.4%	44.6%	48.3%
RPD	Count	25	11	36
	Percent	19.1%	14.9%	17.6%
Implant supported prosthesis	Count	22	23	45
	Percent	16.8%	31.1%	22.0%
All of the above	Count	18	7	25
	Percent	13.7%	9.5%	12.2%
Total	**Count**	**131**	**74**	**205**
	Percent	**100.0%**	**100.0%**	**100.0%**
Chi-square value- 5.91				
p value- 0.11				

(n=16) were male participants and 8.1% (n=6) female participants and 34 (16.6%) were using surgical loupes for all prosthodontic procedures, out of which, 16% (n=21) were male participants and 17.6% (n=13) female participants.

Table 11. In which step magnification devices are more helpful for prosthodontic procedures?

In which step magnification devices are more helpful for prosthodontic procedures?		Gender		Total
		Males	Females	
Tooth preparation	Count	68	45	113
	Percent	51.9%	60.8%	55.1%
Gingival retraction	Count	26	10	36
	Percent	19.8%	13.5%	17.6%
Evaluation of impression	Count	16	6	22
	Percent	12.2%	8.1%	10.7%
All of the above	Count	21	13	34
	Percent	16.0%	17.6%	16.6%
Total	**Count**	**131**	**74**	**205**
	Percent	**100.0%**	**100.0%**	**100.0%**
Chi-square value- 2.57				
p value- 0.46				

Table 12 shows that 113 (55.1%) were using surgical loupes for surgical placement procedures, out of which 51.9% (n=68) were male participants and 60.8% (n=45) were female participants and 36 (17.6%) were using surgical loupes for making impression procedures, out of which 19.8% (n=26) were male participants and 13.5% (n=10) were female participants. 22 (10.7%) were using surgical loupes for evaluating impression, out of which, 12.2% (n=16) were male participants and 8.1% (n=6) female participants and 34 (16.6%) were using surgical loupes for all prosthodontic procedures, out of which, 16% (n=21) were male participants and 17.6% (n=13) female participants.

Table 12. In which step magnification devices are more helpful with implant supported prosthesis?

In which step magnification devices are more helpful with Implant supported prosthesis?		Gender		Total
		Males	Females	
Surgical placement	Count	68	45	113
	Percent	51.9%	60.8%	55.1%
Impression making and evaluation	Count	26	10	36
	Percent	19.8%	13.5%	17.6%
Evaluation of Implant restoration	Count	16	6	22
	Percent	12.2%	8.1%	10.7%
All of the above	Count	21	13	34
	Percent	16.0%	17.6%	16.6%
Total	**Count**	**131**	**74**	**205**
	Percent	**100.0%**	**100.0%**	**100.0%**
Chi-square value- 2.50				
p value- 0.96				

Table 13. In which step magnification devices are more helpful for removable prosthodontics?

In which step magnification devices are more helpful for removable prosthodontics?		Gender		Total
		Males	Females	
Diagnosis and evaluation	Count	45	20	65
	Percent	34.4%	27.0%	31.7%
In mouth preparation(hard and soft tissue)	Count	36	27	63
	Percent	27.5%	36.5%	30.7%
Evaluation of frame work	Count	22	11	33
	Percent	16.8%	14.9%	16.1%
All of the above	Count	28	16	44
	Percent	21.4%	21.6%	21.5%
Total	**Count**	**131**	**74**	**205**
	Percent	**100.0%**	**100.0%**	**100.0%**
Chi-square value- 2.15				
p value- 0.54				

Table 13 shows that 65 (31.7%) were using surgical loupes for diagnosis and evaluation of RPD, out of which 34.4% (n=45) were male participants and 27% (n=20) were female participants and 63 (30.7%) were using surgical loupes for mouth preparation for RPD procedures, out of which 27.5% (n=36) were male participants and 36.5% (n=27) were female participants. 33 (16.1%) were using surgical loupes for evaluation of frame work, out of which, 16.8%(n=22) were male participants and 14.9% (n=11) female participants and 44 (21.5%) were using surgical loupes for all rpd procedures, out of which, 21.4% (n=28) were male participants and 21.6% (n=16) female participants.

Table 14 shows that 94 (45.9%) were using surgical loupes occasionally, out of which 45.8% (n=60) were male participants and 45.9% (n=34) were female participants and 60 (29.3%) were using surgical loupes frequently, out of which 30.5% (n=40) were male participants and 27% (n=20) were female participants. 20 (9.8%) were using surgical loupes only during demonstration, out of which, 9.2% (n=12) were male participants and 10.8% (n=8) female participants and 31 (15.1%) were using surgical loupes every time, out of which, 14.5% (n=19) were male participants and 16.2% (n=12) female participants.

Table 15 shows that 130 (63.4%) felt surgical loupes enhances precision and accuracy, out of which 62.2% (n=82) were male participants and 48% (n=64.9) were female participants and 44(21.5%) felt surgical loupes does not enhance precision and accuracy, out of which 20.6% (n=27) were male participants and 23% (n=17) were female participants. 31(15.1%) felt using surgical loupes may or may not have effect, out of which, 16.8% (n=22) were male participants and 12.2% (n=9) female participants.

Table 14. How often do you use magnification devices during prosthodontic procedures?

How often do you use magnification devices during prosthodontic procedures?		Gender		Total
		Males	Females	
Occasionally	Count	60	34	94
	Percent	45.8%	45.9%	45.9%
Frequently	Count	40	20	60
	Percent	30.5%	27.0%	29.3%
Only during demonstration	Count	12	8	20
	Percent	9.2%	10.8%	9.8%
All of the above	Count	19	12	31
	Percent	14.5%	16.2%	15.1%
Total	**Count**	**131**	**74**	**205**
	Percent	**100.0%**	**100.0%**	**100.0%**
Chi-square value- 0.42				
p value- 0.93				

Table 15. Do you believe dental magnification enhances precision and accuracy?

Do you believe dental magnification enhances precision and accuracy?		Gender		Total
		Males	Females	
Yes	Count	82	48	130
	Percent	62.6%	64.9%	63.4%
No	Count	27	17	44
	Percent	20.6%	23.0%	21.5%
Can't say	Count	22	9	31
	Percent	16.8%	12.2%	15.1%
Total	**Count**	**131**	**74**	**205**
	Percent	**100.0%**	**100.0%**	**100.0%**
Chi-square value- 0.83				
p value- 0.66				

Table 16 shows that 132 (64.4%) felt surgical loupes reduces eye strain, out of which 61.1% (n=80) were male participants and 70.3% (n=52) were female participants and 32(15.6%) felt surgical loupes does not eye strain, out of which 18.3% (n=24) were male participants and 10.8% (n=8) were female participants. 41(20%) felt using surgical loupes may or may not have effect, out of which, 20.6% (n=27) were male participants and 18.9% (n=14) female participants.

Table 16. Do you believe that treatment under magnification reduces eye strain?

Do you believe that treatment under magnification reduces eye strain?		Gender		Total
		Males	Females	
Yes	Count	80	52	132
	Percent	61.1%	70.3%	64.4%
No	Count	24	8	32
	Percent	18.3%	10.8%	15.6%
Can't say	Count	27	14	41
	Percent	20.6%	18.9%	20.0%
Total	**Count**	**131**	**74**	**205**
	Percent	**100.0%**	**100.0%**	**100.0%**
Chi-square value- 2.39				
p value- 0.30				

Table 17 shows that 128 (62.4%) felt surgical loupes improve the speed of working, out of which 60.3% (n=79) were male participants and 66.2% (n=49) were female participants and 31(15.5%) felt surgical loupes does not improve the speed of working, out of which 16% (n=21) were male participants and 13.5% (n=10) were female participants. 46(22.4%) felt using surgical loupes may or may not have effect on speed of working, out of which, 23.7% (n=31) were male participants and 20.3% (n=15) female participants.

Table 18 shows that 137(66.8%) felt surgical loupes improves ergonomics, out of which 63.4% (n=83) were male participants and 73% (n=54) were female participants and 30 (14.6%) felt surgical loupes does

Table 17. Do you believe magnification devices can improve the speed of working?

Do you believe magnification devices can improve the speed of working?		Gender		Total
		Males	Females	
Yes	Count	79	49	128
	Percent	60.3%	66.2%	62.4%
No	Count	21	10	31
	Percent	16.0%	13.5%	15.1%
Can't say	Count	31	15	46
	Percent	23.7%	20.3%	22.4%
Total	**Count**	**131**	**74**	**205**
	Percent	**100.0%**	**100.0%**	**100.0%**
Chi-square value- 0.705				
p value- 0.703				

not improve ergonomics, out of which 17.6% (n=23) were male participants and 9.5% (n=7) were female participants. 38 (18.5%) felt using surgical loupes may or may not have effect, out of which, 19.1% (n=25) were male participants and 17.6% (n=13) female participants. Chi-square tests show that these values are not significant (P<0.05) and 17.6% (n=13) female participants.

Chi-square tests carried out on all the data above showed that the values were not significant (P<0.05).

5. Discussion

In dentistry, manual dexterity and skill are of extreme importance to achieve accurate results. Along with manual dexterity and skill, vision also plays a very important role. As the work is done on teeth and soft tissues which need good visual acuity; this can be enhanced using magnification devices. Magnification devices are indeed an evolution from the conventional method of macro dentistry to a high precision micro dentistry. Modern-day dentist has numerous magnification systems to choose from, which range from simple to compound prismatic telescopic loupes and a vast variety of surgical microscopes. The use of magnification devices can lead to improved surgical outcomes, thereby resulting in a higher quality of care[13,14].

Table 18. Did you believe or experience magnification tools improve ergonomics (dental posture) during practice?

Did you believe or experience magnification tools improve ergonomics (dental posture) during practice?		Gender		Total
		Males	Females	
Yes	Count	83	54	137
	Percent	63.4%	73.0%	66.8%
No	Count	23	7	30
	Percent	17.6%	9.5%	14.6%
Can't say	Count	25	13	38
	Percent	19.1%	17.6%	18.5%
Total	**Count**	**131**	**74**	**205**
	Percent	**100.0%**	**100.0%**	**100.0%**
Chi-square value- 2.83				
p value- 0.24				

Our survey findings revealed that 62% of them were general practitioners, 38% of them were specialists. 78.5% of the participants were aware of utilization of magnification devices in prosthodontic procedures and 21.5% of them not aware, out of which 62% of them knew about surgical loupes and 16.6% of them knew about surgical microscopes. This is in accordance with other study where 91.1% of the respondents were aware of the usage of magnification devices in dentistry as well as they were well-informed about the different types of magnifying devices that are used in various dental procedures[15].

It is important to identify and assess the factors influencing the selection criteria of the dental professionals in using magnifying loupes. In our study, 49.8% of them felt that no added advantage and 27.3% felt not comfortable using magnification devices. 47.3% of them were using surgical loupes with magnification of 2.5X, and 35.6% of them with magnification of 3.5X and 12.7% with magnification of 4.5X. This is in accordance with other study where most of the participants felt magnification was the key factor to be considered[16] and on other hand stated that price was the key factor before purchasing loupes[17].

Regarding the source of knowledge about magnification in dentistry, majority of the participants 73.2% gained their knowledge by attending courses on the use of magnification devices in dental procedures and others 26.8% did not attend any courses, which is in contrast to other studies, where most of them gained knowledge during pursuing their professional degree, followed by suggestions from colleagues and friends[18]. Majority of the participants 63.4% of this study felt that using the magnification device improved the quality and accuracy of the work which is an added advantage in clinical practice and was in accordance with other studies[19-21].

Many of the participants 47.3% have experienced 2.5X magnification loupes for routine dental procedures and (35.6%) of them used 3.5X loupes for the surgical procedures which is in accordance with other studies[22,23] and 2.5X was considered to be the most common magnification system and it was less cumbersome and easier to use initially when compared to surgical microscopes. When the use of surgical microscope was taken into consideration magnification levels up to ×20 has been shown as a significant aid in improving the quality of treatment. Usage of headlight was more comfortable (64.9%) compared to light emitted by the dental chair as stated by most of the participants 35.1%. This is in accordance with study where most of the participants used light mounted surgical loupes[24]. The magnification devices can also be used in tooth preparation and final restoration of the tooth in fixed prosthodontics. Most of the participants of our study 55.1% were using surgical loupes for tooth preparation, 17.6% were using surgical loupes for gingival retraction procedures. 10.7% were using surgical loupes for evaluating impression and 16.6% were using surgical loupes for all prosthodontic procedures. This is in accordance with other studies where surgical loupes could be useful in tooth preparation evaluate final impression and seating of crowns and bridges in fixed prosthodontics[25-28]. In this study, most of the participants (55.1%) were using surgical loupes for implant placement procedures and 17.6% were using surgical loupes for making impression procedures, 10.7% were using surgical loupes for evaluating impression, and 16.6% were using surgical loupes for all prosthodontic procedures. This is in accordance with study by Penmesta[15].

Majority of the participants 64.4% have also felt comfortable with the use of magnification devices as they have shown improvement in quality of treatment, thereby saving the time of the procedure. It goes without saying that improving the quality of treatment occurs by the use of surgical loupes as an aid in decreasing the tissue trauma, thereby hastening the healing process. Even though musculoskeletal diseases are an occupational hazard to the dentists, majority of the participants (66.8%) in our study stated that they did not suffer from those diseases as stated in the literature by Valachi and Valachi[29], that static forced posture adopted for prolonged time by dental students caused physical alterations and musculoskeletal disorders generating neck, back, hand, wrist, and shoulder pains. As ergonomics is one of the most important principles that need to be implicated in dental practice, the use of magnification devices definitely surpasses the limitations encountered in performing the procedures in a conventional way. Apart from the various advantages elicited in the literature regarding the use of magnification devices, ergonomics also plays a very important role in the day-to-day clinical practice, and therefore, magnification devices should definitely be advocated[20,30].

Some believe that magnification devices might affect the eye vision. According to Dr. Christensen[5] this is a misconception and using surgical loupes does not weaken or affect the eye. Our study reveals that 64.4% felt surgical loupes reduces eye strain, and 15.6% felt surgical loupes does not eye strain, 20% felt using surgical loupes may or may not have effect on the eye.

62.4% felt surgical loupes improve the speed of working, 15.5% felt surgical loupes does not improve the speed of working, 22.4% felt using surgical loupes may or may not have effect on speed of working and 66.8% felt surgical loupes improves ergonomics, and 14.6% felt surgical loupes does not improve ergonomics, 18.5% felt using surgical loupes may or may not have effect. This is accordance with study by Gopinadh[31] wearing magnifying loupes tends to have both negative and positive outcomes in terms of physical wellbeing. A study was conducted to determine the opinions of dental hygienists regarding wearing magnifying loupes by Maillet[7]. According to it, 71% of the respondents illustrated that wearing magnifying loupes enhances the quality of their work whereas, 50% of the respondents felt that magnifying loupes are not easily adjustable with limited vision, and result in vertigo and headache. The study further revealed that magnifying loupes were beneficial, but there are certain limitations as well. Hayes[32] revealed that the main limitation of using magnifying loupes is their heavyweight, restricted field of view and positional difficulties.

6. Conclusion

Overall, the results of our survey revealed that majority of the dental practitioners were aware of magnification devices and attended courses on the use of magnification devices and using surgical loupes for prosthetics procedures. Majority of the specialists (Prosthodontist) were using surgical loupes for fixed prosthesis and implant procedures. Most of them were using light mounted surgical loupes and were very comfortable using them and experienced reduced eye strain enhanced precision and accuracy and improved working speed and ergonomics. A larger survey population would probably have enhanced our response percentages, however, based on the results of our survey, use of magnification may be highly recommended in dental practice.

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8. Conflicts of Interest

The authors and planners have disclosed no potential conflicts of interest, financial or otherwise.

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