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Research Article

Periodontitis for Dental Health

Visual Enhancement and Experiences with Magnification Devices among the undergraduate dental students and Interns around Makkah region– A Questionnaire based study.

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Abstract: The aim of this study was to evaluate the level of knowledge, awareness, attitude, and use of magnification devices by Dental students and Interns among various universities in Makkah region of Saudi Arabia. Objective of the study was to accentuate the importance of using magnification in Dental procedures performed by dental students and Interns. A cross-sectional, questionnaire based study was conducted in Ibn Sina National College for Medical studies, Jeddah, Saudi Arabia. The study population was selected using cluster random sampling. This questionnaire was sent online to 500 dental students and interns, out of which 300 of them responded. The data were tabulated and analyzed using (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 a p-value of less than 0.001 was considered strongly significant. Among the study population, 98.30% (n=295) were aware of utilization of magnification devices in prosthodontic procedures, only 35.70% (n=107) of them attended courses on the magnification devices in the dental field. 85.3% (n= 256) of them felt surgical loupes would be useful for endodontic procedures and 52.3% (n=157) of them felt surgical loupes would be useful during prosthodontic procedures, 224 (74.70%) of them felt surgical loupes enhanced precision and accuracy, 52.00% (n=156) of them felt surgical loupes reduced eye strain, and 58.00% (n=174) felt surgical loupes improved ergonomics. The present study revealed that majority of the dental students and interns were aware of magnification devices used in dentistry and only a few of them attended courses on the use of magnification devices and majority of them believed that the surgical loupes will be useful for endodontic and prosthodontic procedures. Most of them experienced reduced eye strain, enhanced precision and accuracy and improved working speed and ergonomics by using surgical loupes.

Keywords: Magnification devices, Fixed partial denture, Ergonomics, Prosthodontic procedures and Visual field

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1. INTRODUCTION

Modern dentistry is heading towards improved technology which helps dental practitioners to improve the skills and knowledge in their routine practice. Their upgraded skills and knowledge helps them to treat the patient proficiently. Nowadays patients expect painless treatment and are more concerned about esthetics. Superior vision helps the dentists in improving diagnostic accuracy and deliver quality treatment for the patient. The brain can perceive what the eyes can see; however, there are much more than what the normal eyes can see when it comes to dental treatment. By using magnification devices, quality of treatment improves by magnifying the object and bringing it as close to the eyes as possible, using finer instruments, smaller incisions, short period of healing time, less pain and trauma, great esthetic results, and patient accepts easily.[1-6] Magnification is a phenomenon of visually amplifying and availing an enlarged, exaggerated, intensified view of an object or an image or a model. Dental magnification loupes are the magnifying glasses that dentists wear to enlarge everything that they see in the mouth.[7] There are various advantages of using magnification devices such as, locating crown margins and exact fitting of crown and bridges, scaling procedures, placing precise incisions, locating root canal , removal of caries, repair of furcation and perforation, post and core procedures and removal of post, and bone and soft-tissue grafting procedures.[8] Use of magnification devices has increased the quality of clinical work of all field of dentistry such as restorative dentistry, oral surgery, implant prosthodontics, periodontics and also endodontics.[9] Nowadays, dentists experience a lot of health problems with dentistry such as back pain, neuro-muscular problems which makes it less efficient for them in their clinical work. They usually face these problems because of faulty ergonomics for several hours continuously. 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.[10] 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.[11] There are several shortcomings of using magnification devices, such as prolonged learning curves, discomfort and narrow visual field and difficulties with positioning while treating patients and infection control measures.[12-15] Dentists with good vision and relying on their skills and experiences usually do not depend upon magnification devices. They are yet to be convinced that these devices are a boon to dentistry and enhances the quality of outcome of the treatment.[16,17] Although there are scientific evidences supporting the benefit of magnification devices on the dentist's performance, only few studies are available regarding dental students and interns. Hence, this study was proposed to evaluate the level of knowledge, awareness and attitude in the use of magnification devices among Dental students and interns 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 and approved by the institutional ethical committee and Protocol identification number is 031DP27042020. A cross-sectional, questionnaire based study was conducted among the dental students and interns, covering various dental colleges in Makkah region, Saudi Arabia; using a self□structured, pre□tested, closed-ended questionnaire consisting of 15 questions designed on knowledge, awareness, attitude and use of magnification devices among dental students and interns. Questions were related to utilization of magnification devices in dental procedures. A specially designed questionnaire consisting of close ended questions was pilot tested for validation on a small group of ten dental students, 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 500 dental students and interns, who were randomly selected and the purpose of the study was explained to them; out of which 300 students responded. Link for the questionnaire: https://forms.gle/JRpMiM4jL9cRXNrm8. Their names were not recorded in the data entry to ensure anonymity. Dental students not willing to participate in this study were excluded. The study was completed in 2 months.

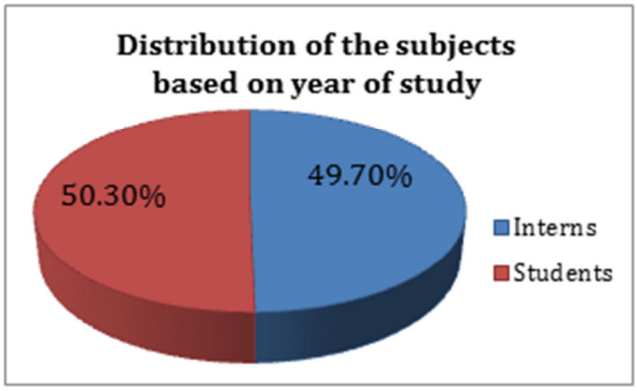
3. STATISTICAL ANALYSIS

The data were tabulated and analyzed using the Statistical Package for the Social Sciences (SPSS) version 21 (SPSS Inc., Chicago, IL). Chi-square test was used to compare knowledge, awareness, attitude and use of magnification devices among dental students and interns. 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: Distribution of the subjects based on year of study

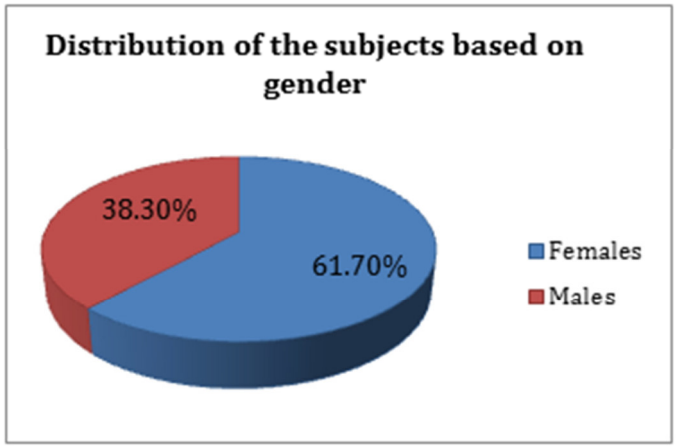
Year of study	Frequency	Percent
Interns	149	49.7
Students	151	50.3
Total	300	100.0



Graph 1: Shows distribution of the subjects

Table 2: Distribution of the subjects based on gender

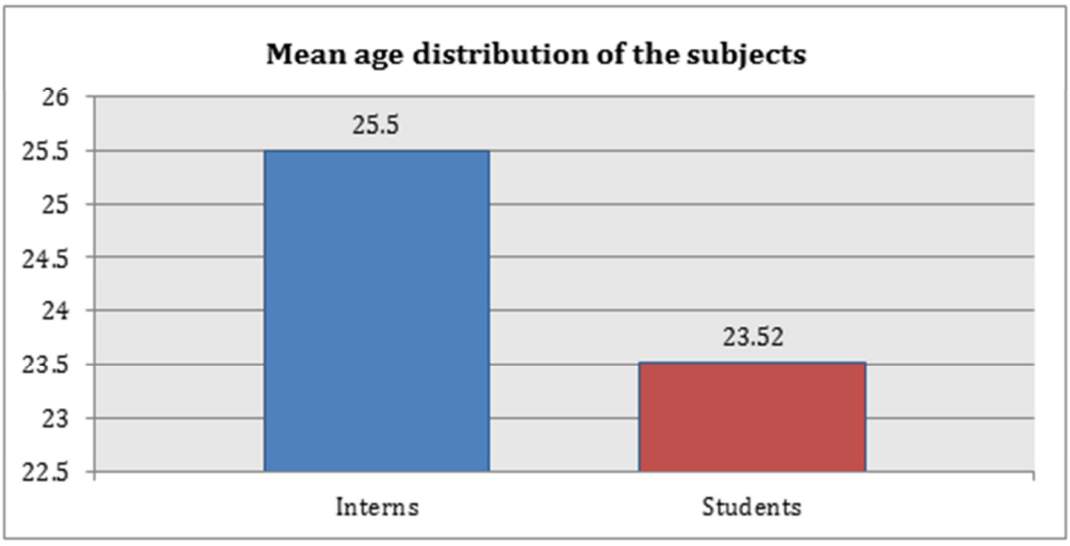
GENDER	Frequency	Percent
Female	185	61.7
Male	115	38.3
Total	300	100.0



Graph 2: Shows distribution of the subjects based on gender

Table 3: Mean age distribution of the subjects

	N	Minimum	Maximum	Mean	Std. Deviation
Interns	149	24	28	25.50	.811
Students	151	20	27	23.52	1.295



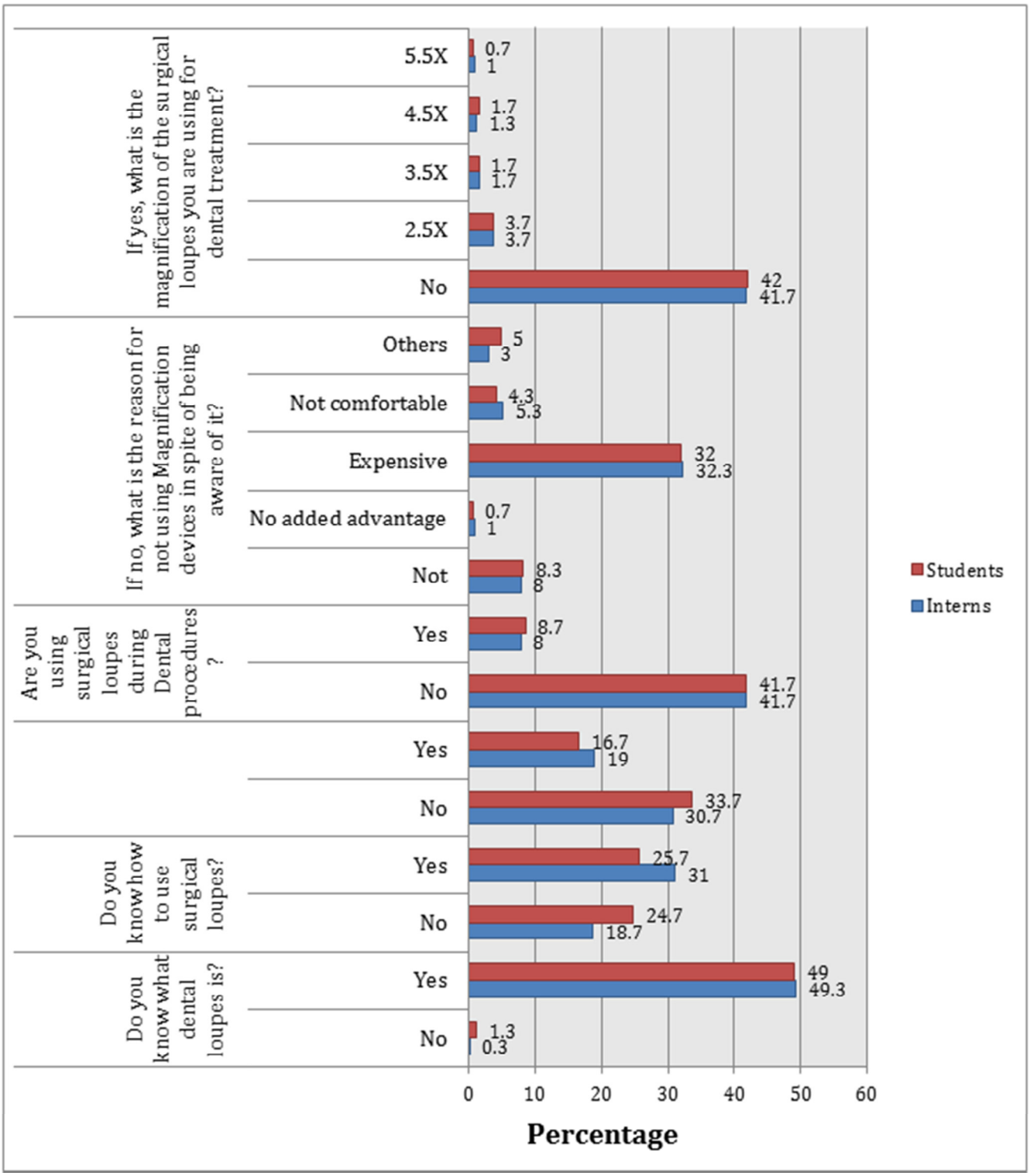
Graph 3. Shows age distribution of the subjects

Table 4: Cross-tabulation of the responses with year of study

Questions			Interns	Students	Total	Chi-square value	p value
Do you know what dental loupes is?	No	Count	1	4	5	1.79	0.18
		Percent	0.30%	1.30%	1.70%		
	Yes	Count	148	147	295		
		Percent	49.30%	49.00%	98.30%		
Do you know how to use surgical loupes?	No	Count	56	74	130	3.98	0.046*
		Percent	18.70%	24.70%	43.30%		
	Yes	Count	93	77	170		
		Percent	31.00%	25.70%	56.70%		
Have you ever attended courses or classes on the use of magnification Devices in the Dental field?	No	Count	92	101	193	0.86	0.35
		Percent	30.70%	33.70%	64.30%		
	Yes	Count	57	50	107		
		Percent	19.00%	16.70%	35.70%		
Are you using surgical loupes during Dental procedures?	No	Count	125	125	250	0.067	0.79
		Percent	41.70%	41.70%	83.30%		
	Yes	Count	24	26	50		
		Percent	8.00%	8.70%	16.70%		
If no, what is the reason for not using Magnification devices in spite of being aware of it?	Not	Count	24	25	49	2.02	0.73
		Percent	8.00%	8.30%	16.30%		
	No added advantage	Count	3	2	5		
		Percent	1.00%	0.70%	1.70%		
	Expensive	Count	97	96	193		
		Percent	32.30%	32.00%	64.30%		
	Not comfortable	Count	16	13	29		
		Percent	5.30%	4.30%	9.70%		
	other	Count	9	15	24		
		Percent	3.00%	5.00%	8.00%		
If yes, what is the magnification of the surgical loupes you are using for dental treatment?	No	Count	125	126	251	2.89	0.71
		Percent	41.70%	42.00%	83.70%		
	2.5x	Count	12	12	24		
		Percent	3.70	3.70%	7.40%		
	3.5x	Count	5	5	10		
		Percent	1.70	1.70%	3.40%		
	4.5x	Count	4	5	9		
		Percent	1.30%	1.70%	3.00%		
	5.5x	Count	3	2	5		
		Percent	1.00%	0.70%	1.70%		
Which type of surgical loupes do you use?	No	Count	125	126	251	2.05	0.56
		Percent	41.70%	42.00%	83.70%		
	A. Light mounted.	Count	7	4	11		
		Percent	2.30%	1.30%	3.70%		
	B. Ordinary.	Count	17	21	38		
		Percent	5.70%	7%	12.60%		
Do you think magnification would be useful for which of the following step?- DIAGNOSIS	No	Count	118	124	242	0.41	0.52
		Percent	39.3%	41.3%	80.7%		
	Yes	Count	31	27	58		
		Percent	10.3%	9.0%	19.3%		
Do you think magnification would be useful for which Of the following step?- ENDODONTICS	No	Count	17	27	44	2.51	0.11
		Percent	5.7%	9.0%	14.7%		
	Yes	Count	132	124	256		
		Percent	44.0%	41.3%	85.3%		
Do you think magnification would be useful for which Of the following step?- PROSTHODONTICS	No	Count	65	78	143	1.93	0.16
		Percent	21.7%	26.0%	47.7%		
	Yes	Count	84	73	157		
		Percent	28.0%	24.3%	52.3%		
Do you think magnification would	No	Count	116	129	245	2.87	0.09

be useful for which of the following step?- SURGERY		Percent	38.7%	43.0%	81.7%		
	Yes	Count	33	22	55		
		Percent	11.0%	7.3%	18.3%		
Do you think magnification would be useful for which of the following step?- PERIO	No	Count	125	138	263	3.9	0.048*
		Percent	41.7%	46.0%	87.7%		
	Yes	Count	24	13	37		
		Percent	8.0%	4.3%	12.3%		
Do you believe Dental Magnification enhances precision and accuracy?	can't say	Count	26	33	59	1.36	0.5
		Percent	8.70%	11.00%	19.70%		
	No	Count	10	7	17		
		Percent	3.30%	2.30%	5.70%		
	Yes	Count	113	111	224		
		Percent	37.70%	37.00%	74.70%		
Do you believe that treatment under magnification reduces eye strain?	can't say	Count	53	55	108	0.57	0.75
		Percent	17.70%	18.30%	36.00%		
	No	Count	16	20	36		
		Percent	5.30%	6.70%	12.00%		
	Yes	Count	80	76	156		
		Percent	26.70%	25.30%	52.00%		
Did you believe or experience magnification tools Improve ergonomics (Dental posture) during practice?	can't say	Count	50	45	95	1.83	0.4
		Percent	16.70%	15.00%	31.70%		
	No	Count	12	19	31		
		Percent	4.00%	6.30%	10.30%		
	Yes	Count	87	87	174		
		Percent	29.00%	29.00%	58.00%		
Do you believe Magnification devices can improve the speed of working?	can't say	Count	9	18	27	4.06	0.13
		Percent	3.00%	6.00%	9.00%		
	No	Count	5	8	13		
		Percent	1.70%	2.70%	4.30%		
	Yes	Count	135	125	260		
		Percent	45.00%	41.70%	86.70%		
Are you currently using surgical loupes in your dental practice?	No	Count	128	131	259	0.046	0.83
		Percent	42.70%	43.70%	86.30%		
	Yes	Count	21	20	41		
		Percent	7.00%	6.70%	13.70%		
If your previous answer was yes, please indicate:	No	Count	128	131	259	0.84	0.83
		Percent	42.70%	43.70%	86.40%		
	A. Every patients	Count	3	4	7		
		Percent	1.00%	1.30%	2.30%		
	B. Most Patients	Count	14	14	28		
		Percent	4.60%	4.70%	9.30%		
	C. Patient who needs Extensive dental treatment.	Count	4	2	6		
		Percent	1.30%	0.70%	2.00%		
If your previous answer was no , please indicate:		Count	145	146	291	2.3	0.67
		Percent	48.30%	48.70%	97.00%		
	A. Comfort	Count	2	2	4		
		Percent	0.70%	0.70%	1.30%		
	B. Field of vision	Count	0	1	1		
		Percent	0.00%	0.30%	0.30%		
	C. See better without	Count	0	1	1		
		Percent	0.00%	0.30%	0.30%		
	D. Difficult to use	Count	2	1	3		
		Percent	0.70%	0.30%	1.00%		

significant



Graph 4. Shows cross tabulation of the response with year of study which is significant

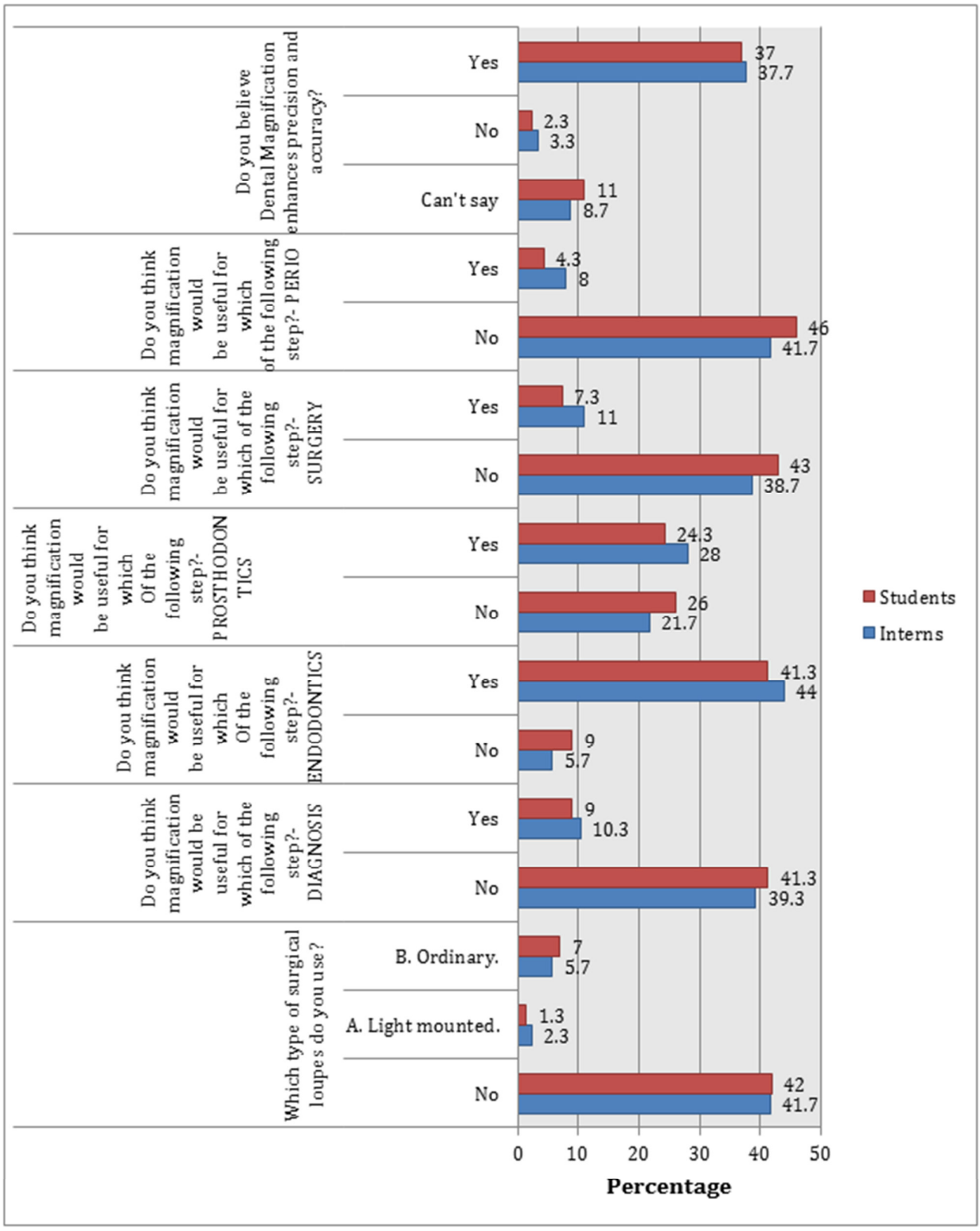
Table 5: Cross-Tabulation of the Responses with Gender

Questions			Females	Males	Total	Chi-square value	p value
Do you know what dental loupes is?	No	Count	3	2	5	0.006	0.93
		Percent	1.0%	.7%	1.7%		
	Yes	Count	182	113	295		
		Percent	60.7%	37.7%	98.3%		
Do you know how to use surgical loupes?	No	Count	80	50	130	0.002	0.96
		Percent	26.7%	16.7%	43.3%		
	Yes	Count	105	65	170		
		Percent	35.0%	21.7%	56.7%		

Have you ever attended courses or Classes on the use of magnification devices in the Dental field?	No	Count	124	69	193	1.52	0.21
		Percent	41.3%	23.0%	64.3%		
	Yes	Count	61	46	107		
		Percent	20.3%	15.3%	35.7%		
Are you using surgical loupes during Dental procedures?	No	Count	154	96	250	0.003	0.95
		Percent	51.3%	32.0%	83.3%		
	Yes	Count	31	19	50		
		Percent	10.3%	6.3%	16.7%		
If no, what is the reason for not using Magnification devices in spite of being aware of it?	Yes	Count	31	18	49	3.49	0.47
		Percent	10.3%	6.0%	16.3%		
	A. No added advantage	Count	2	3	5		
		Percent	.7%	1.0%	1.7%		
	B. Expansive	Count	124	69	193		
		Percent	41.3%	23.0%	64.3%		
	C. Not comfortable	Count	16	13	29		
		Percent	5.3%	4.3%	9.7%		
	D. other	Count	12	12	24		
		Percent	4.0%	4.0%	8.0%		
If yes, what is the magnification of the surgical loupes you are using for dental treatment?	No	Count	154	97	251	6.46	0.26
		Percent	51.3%	32.3%	83.7%		
	2.5x	Count	4	3	7		
		Percent	1.3%	1.0%	2.3%		
	3.5x	Count	14	12	26		
		Percent	4.7%	4.0%	8.7%		
	4.5x	Count	6	3	9		
		Percent	2.0%	1.0%	3.0%		
	5.5x	Count	7	0	7		
		Percent	2.3%	0.0%	2.3%		
Which type of surgical loupes do you use?	No	Count	154	97	251	2.89	0.4
		Percent	51.3%	32.3%	83.7%		
	A. Light mounted.	Count	9	2	11		
		Percent	3.0%	.7%	3.7%		
	B. Ordinary.	Count	22	16	38		
		Percent	7.3%	5.3%	12.6%		
Do you think magnification would be useful for which of the following step?- DIAGNOSIS	No	Count	149	93	242	0.005	0.94
		Percent	49.7%	31.0%	80.7%		
	Yes	Count	36	22	58		
		Percent	12.0%	7.3%	19.3%		
Do you think magnification would be useful for which of the following step?- ENDODONTICS	No	Count	23	21	44	1.92	0.16
		Percent	7.7%	7.0%	14.7%		
	Yes	Count	162	94	256		
		Percent	54.0%	31.3%	85.3%		
Do you think magnification would be useful for which of the following step?- PROSTHODONTICS	No	Count	95	48	143	2.62	0.1
		Percent	31.7%	16.0%	47.7%		
	Yes	Count	90	67	157		
		Percent	30.0%	22.3%	52.3%		
Do you think magnification would be useful for which of the following step?- SURGERY	No	Count	156	89	245	2.27	0.13
		Percent	52.0%	29.7%	81.7%		
	Yes	Count	29	26	55		
		Percent	9.7%	8.7%	18.3%		
Do you think magnification would be useful for which of the following step?- PERIO	No	Count	160	103	263	0.62	0.43
		Percent	53.3%	34.3%	87.7%		
	Yes	Count	25	12	37		
		Percent	8.3%	4.0%	12.3%		
Do you believe Dental Magnification enhances precision and accuracy?	can't say	Count	35	24	59	1.73	0.41
		Percent	11.7%	8.0%	19.7%		
	No	Count	13	4	17		

		Percent	4.3%	1.3%	5.7%		
	Yes	Count	137	87	224		
		Percent	45.7%	29.0%	74.7%		
Do you believe that treatment under Magnification reduces eye strain?	can't say	Count	67	41	108	0.51	0.77
		Percent	22.3%	13.7%	36.0%		
	No	Count	24	12	36		
		Percent	8.0%	4.0%	12.0%		
	Yes	Count	94	62	156		
		Percent	31.3%	20.7%	52.0%		
Did you believe or experience Magnification tools improve ergonomics (Dental posture) during practice?	can't say	Count	63	32	95	2.31	0.31
		Percent	21.0%	10.7%	31.7%		
	No	Count	21	10	31		
		Percent	7.0%	3.3%	10.3%		
	Yes	Count	101	73	174		
		Percent	33.7%	24.3%	58.0%		
Do you believe Magnification devices can improve the speed of working?	can't say	Count	12	15	27	3.74	0.15
		Percent	4.0%	5.0%	9.0%		
	No	Count	8	5	13		
		Percent	2.7%	1.7%	4.3%		
	Yes	Count	165	95	260		
		Percent	55.0%	31.7%	86.7%		
Are you currently using surgical loupes in your dental practice?	No	Count	157	102	259	0.88	0.34
		Percent	52.3%	34.0%	86.3%		
	Yes	Count	28	13	41		
		Percent	9.3%	4.3%	13.7%		
If your previous answer was yes, please indicate:	No	Count	157	102	259	1.58	0.66
		Percent	52.4%	34.0%	86.4%		
	A. Every patients	Count	5	2	7		
		Percent	1.7%	.7%	2.3%		
	B. Most Patients	Count	20	8	28		
		Percent	6.6%	2.7%	9.30%		
	C. Patient who needs extensive dental treatment.	Count	3	3	6		
		Percent	1.0%	1.0%	2.0%		
If your previous answer was no, please indicate:		Count	181	110	291	4.57	0.33
		Percent	60.3%	36.7%	97.0%		
	A. Comfort	Count	1	3	4		
		Percent	.3%	1.0%	1.3%		
	B. Field of vision	Count	0	1	1		
		Percent	0.0%	.3%	.3%		
	C. See better without	Count	1	0	1		
		Percent	.3%	0.0%	.3%		
	D. difficult to use	Count	2	1	3		
		Percent	.7%	.3%	1.0%		

significant



Graph 5. Shows cross-tabulation of the responses with gender which is highly significant.

5. DISCUSSION

Magnification devices are useful in dentistry for the quality and precise clinical work. Modern dentistry has various magnification systems to choose from, which range from simple surgical loupes to surgical microscopes.[18]Three advantages of using magnification devices in dentistry are as follows: enhanced visualization, improved working posture, and increased referral.[19]Limited number of studies have been published on the use of dental magnification among dental students and interns especially in the Kingdom of Saudi Arabia. The present study was proposed to examine the knowledge and experiences of use of dental loupes among undergraduate students. The current survey findings revealed that 98.30% of the participants of this study knew about surgical loupes and 1.70% of them did not knew. 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.[20, 21]Among the participants, 56.70% of them knew how to use surgical loupes and 43.30%

of them did not know. This is contrast with study where 91% of them knew how to use surgical loupes.[22] Regarding the source of knowledge about magnification in dentistry, majority of the participants 64.30% did not attend any courses and 35.70% of them gained their knowledge by attending courses on the use of magnification devices in dental procedures, which is in accordance with other study, where most of the participants gained knowledge during pursuing their professional degree, followed by suggestions from the colleagues and friends.[23] 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.[24-26]16.70% of them were using surgical loupes and 83.30% of them were not using. This is in contrast to the study by Forgie AH, found significant difference between undergraduate and postgraduate students using magnification 19.7% vs 68.8 %.[27]Among the participants, 64.3% of them felt surgical loupes were very expansive, 16.3% of them felt not required for dental procedures, 9.70 of them felt not comfortable and 1.70% of them felt no added advantage of using surgical loupes**.** This is in accordance with study by Farooq.[14] Many of the participants (7.40%) were using 2.5X, 3.40% were using 3.5X, 3.00% of them using 4.5X and 1.70 of them were using 5.5X. This is in contrast with other study, whereas 47.3% of them used 2.5X loupes and 35.6% of them used 3.5X loupes [28, 29] and most of the participants of this study 12.60% of them were using ordinary surgical loupes 3.70% and of them were using light mounted surgical loupes. This is in contrast with other study where most of the participants used light mounted surgical loupes.[30] Magnification devices can also be used in tooth preparation and final restoration of the tooth in fixed prosthodontics. Maximum participants of this study 52.3% of them felt surgical loupes would be useful for prosthodontic procedures and 47.7% of them felt not useful. This is accordance with other studies where surgical loupes were used for tooth preparation, gingival retraction evaluating impression and to check the seating of crown and bridges.[31-34]Majority of the participants 85.3% felt surgical loupes would be useful for endodontic treatment and 14.7% of them felt not useful. This is accordance with study by Gary B Carr.[8] 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. Some believe that magnification devices might affect the eye vision. According to Dr. Christensen[31] this is a misconception and using surgical loupes does not weaken or affect the eye. According to Eichenberger[30] using magnification tools can significantly enhance the vision acuity independent of age or natural vision. Majority of the participants felt comfortable with the use of surgical loupes and showed improvement in quality of treatment, thereby saving time of the procedures, improving quality of treatment. Among the participants, 86.70% of them believed magnification could improve speed of working, 4.30% of them believed it does not improve speed of the work. This is accordance with study by Gopinadh.[32] Even though musculoskeletal diseases are an occupational hazard to the dentists, majority of the participants 58% in our study believed that treatment with magnification improves ergonomics and 10.30% of them believed that treatment with magnification does not improves ergonomics as stated in the literature by Valachi and Valachi[33], 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.[34] According to a study by Gopinadh[32] 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.[35] 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 MJ[36] revealed that the main limitation of using magnifying loupes is their heavyweight, restricted field of view and positional difficulties. James and Gilmour reviewed the well-documented medical literature for assessing the use of loupes in dentistry. They recommended dental practitioners to wear magnifying loupes for presenting better clinical outcomes, reduce eyestrain and musculoskeletal comfort. Moreover, they demanded more controlled studies to provide the profession with more evidence on which base these recommendations.[23]

6. LIMITATIONS OF THE STUDY

This study was performed only in three dental colleges in Makkah region. It is recommended that other dental colleges in Saudi Arabia should be included to have better comparative results.

7. CONCLUSION

Overall, the results of our survey revealed that the majority of the dental students and interns were aware of magnification devices and only few of them attended courses on the use of magnification devices and using surgical loupes for dental procedures. Majority of the students and interns were using surgical loupes for most of the dental 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 for dental students and interns and advocated to introduce to them from the 3rd year of BDS course.

8. AUTHORS CONTRIBUTION STATEMENT

Dr. Karunakar Shetty conceptualized the study, formulated the study design with regard to this work and was also the principal investigator and primary author of the manuscript. He also analyzed the collected data and coordinated with the statistician for the analysis of the data. Dr. Nouf Mubarak Almehmadi, Dr. Saad Ali Alghamdi, Dr. Mohammed Sameer Redhwan, Dr. Turki Abdul Rasheed Turkistani and Dr. Abdulrhman Hadi Abdulghani gathered the data, helped in

analysis of these data and necessary inputs were given towards the designing of manuscript. All authors discussed the methodology and results and contributed to the final manuscript.

9. CONFLICTS OF INTEREST

Conflict of interest declared none.

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