

# IMPACT OF CORONA VIRUS DISEASE PANDEMIC ON DENTAL PRACTICE IN PAKISTAN

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## ABSTRACT

**Objective:** *The objective of this article is to appreciate the effect of pandemic drawn on different clinical practices of all clinical specialties working in both the public/private academic institutes and private setups in Karachi, Pakistan.*

**Methodology:** *In this cross sectional study, comprising data set of 204 dentists who full filled the eligibility criteria. Data for this study were collected through an online questionnaire. The sample size was calculated using Open Epi version 3.01, two sided confidence interval was set at 5%. (95% confidence level) open source calculator—SS.*

**Result:** *The mean age ( $\pm$ SD) was 28.4 ( $\pm$ 5.760), sexual orientation: female 126 ( $\pm$ 66.1), male 78 ( $\pm$ 31.6). Individuals belonging to the Covid -19 risk group: yes responses were 130 ( $\pm$ 68.4), no 74 ( $\pm$ 31.6). Out of all 130 ( $\pm$ 69.0%) were practicing general dentistry as compare to others, doing specialized practice.*

**Conclusion:** *Most studies show deep deteriorating impacts on public/private dental sector during Covid. Everyone had to make necessary alterations in the daily routine to observe SOPs laid down by Government both at hospital and Outpatient settings. The pandemic directly influenced the work activities part and parceled with enormous financial destabilization for dental professionals.*

**Key words:** *Covid19, Dental professionals, Financial Destabilization, Global Covid catastrophe, Post Covid impact.*

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## INTRODUCTION

Corona virus - 2019-n CoV, a beta corona-virus belongs to group 2B, its genetically 70% identical to the sequence of SARS-CoV and a highly transmissible virus. The disease caused by this virus was announced as a global pandemic and emergency on 11 March 2020 by WHO. This disease affected over 200+ nations and above 600 million people were affected across globe over

the length of 2019 - 2023.<sup>1</sup> Countries such as Pakistan with lower health services and facilities have been on a greater risk.<sup>2</sup> Pakistan has recorded a total of 1,477,573 confirmed cases so far with 1,365,518 recoveries. Sindh reported 555,920 cases with 45,016 currently active and 502,946 recoveries.<sup>3</sup> Its spread was found most elevated in China followed by Iran in Asian region. The pandemic caused many challenges for healthcare providers and busted the economies worldwide.<sup>4</sup> Health care professionals who showed symptoms mimicking as that of SARS-CoV-2 were tested positive on PCR, this trend was observed irrespective of being a front line work force or back end.<sup>5</sup> Like other health care professionals field of dentistry is immensely affected, Dental surgeons, specifically the Periodontologist are most affected community that comes in contact with SARS-CoV-2 virus.<sup>6</sup> In dental settings considering the pursuits of dental treatment, there is a probability of spread of infection in dental setup.<sup>7</sup> As there lies a close interaction of dentists and patients, dealing with saliva, blood, air passage exchange because of the close proximity leading to the more favorable situation for the contagious pathogenicity.<sup>8</sup> Figure 1- explains

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the mode of Corona Virus spread in the dental clinic. Hence, knowledge about pathogenicity, modes of spread, protocol & policy for infection control must be of prime importance to the dental professional.<sup>9</sup>

The aim of this article is to appreciate that how this pandemic has drawn its deleterious impression on different clinical practice of registered dentist of all clinical specialties working in both the public/academic institutes and private setups in Karachi, Pakistan.

Thus rationale of this article is to explain the impact Covid on dental practice, economic crises, fear, inflation, shortage of gears and mental disharmony experienced by dentist. This article has dealt the above mentioned features in detail in Pakistan and expected that the outcome of these effects would not heal that easily. However, the impressions of these effects may impart a long lasting outcome which may or may not be repairable.<sup>10</sup>

## METHODOLOGY

In this cross sectional study, comprising data set of 204 dentists who full filled the eligibility criteria. Pakistan Medical Commission registered dentists, including (Oral Surgery, Operative Dentistry, Prosthodontist, Periodontology and Orthodontics), Those dentists who gave informed consent and House officers, general dentists and dental specialists belonging to Public/private academic, nonacademic institutes and private dental sector in Karachi, Pakistan, were included in the study while the exclusion criteria included failure to give informed consent, Unregistered dentists with Pakistan Medical Commission, Dental students and staff. A self-administered online google form was given to different major institutes and clinics across Pakistan. The IRB letter was obtained from parent institute - Bahria University with Ref. Letter No. ERC-46/2022 Data for this study were collected through an online questionnaire. The questionnaire was formulated as per a previous similar study and includes 4 domains such as Personal data, health conditions, working conditions and knowledge.<sup>11</sup> The topics included in the questionnaire to assess the impact of COVID-19 pandemic were established based on recommendations released by the Pakistan Medical Commission (PMC), World Health Organization (WHO) and American Dental Association (ADA). The link to the questionnaire was shared with target audience on social media (i.e. Whatsapp, Email and Facebook). Survey respondents were required to be dentists including house officers, PG- trainees, post graduates, general dentists and dental specialists working in departments such as Oral Surgery, Prosthodontics, Orthodontics, Operative Dentistry and Periodontology. Opportunity sampling will was done, the targeted sample was achieved with 5 months time period by clinicians who met eligibility criteria.

The sample size was calculated using Open Epi version 3.01, two sided confidence interval was set at 5%. (95% confidence level.) open source calculator—SS. The interest-dependent variables were perceived as impact of the COVID-19 pandemic on public/academic, non academic and private dental setup. Online questionnaire were distributed to almost all the universities of and major clinics in different provinces but responses received were majorly from Bahria University Of Health Sciences, Dow University Of Health Sciences (DIKI-OHS, DDC, DIDC), Jinnah Sindh Medical University, Sir Syed Medical University, Altamash Institute Of Dental Medicine, Combined Military Hospital, Baqai University, Multan Medical And Dental College, Fatima Jinnah Medical And Dental College, Agha Khan University Hospital, School Of Dentistry, Shaheed Zulfiqar Ali Bhutto Medical University, Avicenna Medical College, Pns Shifa, Pns Rahat, Watim Dental College, Ayub Medical College, Karachi Medical And Dental College, Qasim Welfare Hospital, Smile Arc, Iq Teams Of Professional, Teeth And Gums Dental Clinic, Ali Dental Care, Aesthetic Dental House, Moosani Dental Surgery, Waleed Dental Clinic, Zahid Dental Clinic, Cantonment General Hospital (Non Academic Public Service), Margalla Hospital, Rahman And Rahman Dental Surgeons, Dr. Tanveer Associates, Warsi Dental Clinic, Life Line Medical Center And Many Others. The duration of study was 12 months. The Logistic regression was implemented in SPSS 23 software to assess the probability of financial impacts on the practices between public/academic, nonacademic and private dental sectors in Pakistan. Logistic odds were assessed to gauge the impact of covid-19 era on dental practice, with a P - value of less than 0.05 and 95% confidence intervals.

## RESULTS

A total number of 204 subjects who showed positive agreement for the research inclusion in this study were taken; the participants belonging to various institutes and clinics around Pakistan were collected and analyzed. The frequencies of observed demographics are explained in the form of percentages in Table - 1. The mean age ( $\pm$ SD) was 28.4 ( $\pm$ 5.760), sexual orientation: female 126 ( $\pm$ 66.1), male 78 ( $\pm$ 31.6). Individuals who personally experienced Covid -19 symptoms only and were considered as Covid -19 risk group, there data was recorded as, yes/ No. The responses in 'YES' were 130 ( $\pm$ 68.4) and 'NO' were 74 ( $\pm$ 31.6). Out of all 130 ( $\pm$ 69.0%) were practicing general dentistry. Whereas, those who were practicing specialized dentistry were 74 in total. Periodontitis 25 (5.8%), Operative/restorative dentists 19(9.9%), Oral surgeons 24(12.3%) and Prosthodontist 6(2.9%). All the participants were currently active professionals with majority having minimum clinical experience of 1-2 years 85 (48.5%) followed by >2-5 years

60 (21.6%) and >5 years of clinical experience was owned by 59 (29.8%). Data collected from N= 204, showed 107 (51.5%) individuals with positive Covid history and 97 (48.5%) remained safe throughout Covid-19 era. Social isolation measures in their respective metropolis with no implementation of distancing protocol were 30 (16.4), dentists living in the suburbs practicing social distancing were 104 (48.0), besides those committed to smart lockdown 47 (24.0%) and complete lockdown followers were 23 (11.7%).

A significant rise in the safeguarding gadgets like polyvinyl gloves (93.5%), face protection equipments like respirators, masks, face shields (80.07%) and hand sanitizing liquids (89%) were observed in the study. On the other end the least likely used equipment for personal protection by dentists belonging to different specialty against corona-virus were lab coats (20%) and personal protective equipment's of the most ready to be used protective gear after start of the pandemic were gloves to protect against corona virus in the periodontal specialist and general dentist clinic (82.7 %) and Face shield (81.2%) while the least practiced were overall/ lab coats (12.2 %) and water proof jacket (26.3%). However, the professionals faced great deal of difficulty than usual for procuring personal protective equipment (90%). After substantial down fall in the social and economic activities due to corona outburst all the general and special dentist re-framed their works hours in their work schedules are described in the table - 2.

Table-2, showed that total of 92.4 % (158) dentists displayed adjustment of routine. As far as environment disinfection of work place / clinic is concerned 93.0% (159) practitioners were found proactive in this matter and PPE used was observed by (94.2%) 161 dentists in their daily routines, personalized hygiene was enhanced by (96.5) 165 dentists, to promote social distancing (59.6 %) 102 dentists incorporated remote patient screening and (38.6%) 66 dentists introduced a proper tele-dentistry system of proceeding in their practice. Specialized procedures mandatory to be performed were preferred to be done in least rush hours by (88.3) 151 dentists. For precautionary measures like, preliminary symptom assessment by (45.6%) 78, by (36.3%) 62 dentists, temperature check before coming to clinic by (71.9 %) 123 dentists and on spot assessment by (68.4%) 117 dentists, use of mouthwash/ antimicrobial at chair site by (24.6%) 42 dentists and disinfection protocol followed by patient before coming for dental visit by (34.5%) 59 dentists were reported as mentioned in table-2. Apart from this, Periodontal procedure in special were recorded separately, where pre and post operative mouth wash (38%), use of high speed hand piece (68.4%), performance of minimally invasive (74.9%) /conservative procedure (57.3%), extra oral

radio graph recording instead of intra - oral technique (29.8%), implementation of resorbable suture instead of non resorbable (46.8%) to eliminate additional visit and observations like remote assistance used during pandemic (59.1%) are described in table -2. Figure-1 displayed the highest impact of Covid on specialty of periodontology among four main specialties. Table - 3, show the logistic regression including all the variables in the final model. Dental professionals who were related to private sector, they reported less significant impact of the COVID-19 pandemic on their clinical routine as compared with those working in the public service sector or academic institutions, important point to mention here is that routines prevailed by the private sector clinicians were amended to maintain community health care and personal financial pursuit. Whereas, public sector organization is governed by government, where execution of daily health care service is time bound for public sector on the other hand private sector has flexible timing to practice. The impact of the pandemic on the finances of dental practices was significantly associated with a perceived impact of the pandemic (OR: 1.36; 95% CI: 1.16–1.61). In the nut shell, those professionals who were proactive in observing the hand hygiene, they mentioned a significant impact of SARS 2019-nCoV pandemic by 3.41 times (95% CI: 1.28–9.04) in comparison to others who have shown negligence to their hand hygiene routine in this manner. The ORs (odd ratios- ORs) for other variable like social alienation and clinical activity adaptation were not statistically associated with the perception of impact by SARS 2019-nCoV by the pandemic.

Modifications made in the daily clinical practice such as intensification of hand washing, social distance maintenance, remote screening and temperature checking at the clinic, these factors influenced the practice of Periodontology and general dentist with significant p-value ( $p < 0.005$ ). Those who followed the measures with strict protocol were able to manage financial outcomes, majority of these were posh practice owners. On the other hand those who failed to manage the purchase of logistics went through extreme financial catastrophe (Table-3). Another factor in relation to the perception of significant influence on dental practice during mandatory isolation of episodic waves SARS-CoV-2 virus.

## DISCUSSION

Covid is classified as 6th public health emergency of international concern, which made it necessary to probe the impact of Covid on dental specialties because the outbreak has severely affected many countries around the globe and inflicted severe financial crisis across the geographic map of globe and drew negative impact on different spheres of life. Therefore, the current study explored the deleterious impact of outbreak on

TABLE-1: DEMOGRAPHIC DATA OF THE DENTISTS INCLUDED IN THE STUDY.

Characteristic	Variables (N %)
Age mean ( $\pm$ SD)	28.4( $\pm$ 5.760)
Gender	
Female	126 (66.1)
Male	78(33.9)
Belonging to Covid Risk group	
Yes	130 (68.4)
NO	74 (31.6)
Level of specialization	
Graduate	139 (73.7)
Post Graduate	63 (25.7)
PHD	2 (.6)
Field of specialization	
General Dentist	130 (69.0)
Periodontology	25 (5.8)
Operative	19 (9.9)
Oral surgery	24 (12.3)
Prosthodontics	6 (2.9)
Length of Clinical Experience	
1-2 years	85 (48.5)
>2-5years	60 (21.6)
>5years	59 (29.8)
Covid Disease status	
Yes	107 (51.5)
No	97(48.5)
Social measure practice within the vicinity of measures	
None	30 (16.4)
Social distancing	104 (48.0)
Smart lockdown	47 (24.0)
Complete lockdown	23 (11.7)

TABLE - 2: RESTRUCTURING OF DAILY WORK SCHEDULE IN THEIR CLINICAL ROUTINE DURING THE COVID PANDEMIC.

Characteristic	Variables (N %)
Change in clinical routine	
Adjustments of the working environment	158 (92.4)
Disinfection of the working environment	159 (93.0)
Increased use of PPE	161 (94.2)

Incorporation of preliminary remote patient screening	102 (59.6)
Enhanced personal hygiene	165 (96.5)
Adjustments of clinical procedures	151 (88.3)
Reduction of working hours	72 (42.1)
Incorporation of tele dentistry	66 (38.6)
Precautionary measures in sorting	
Use of a specific questionnaire for COVID-19 to screen patients in person	78(45.6)
Use of a specific questionnaire for COVID-19 for remote patient screening	62(36.3)
Request for patients to check their temperature before going to the dental clinic	123 (71.9)
Temperature measurement at the dental clinic	117 (68.4)
Mouthwash with antimicrobial use in the dental clinic	42 (24.6)
Mouthwash with antimicrobial use before arriving at the dental clinic	59 (34.5)
Change in periodontal procedures	
Pre- and postoperative mouthwash	65(38.0)
Use of high-volume suction	128 (74.9)
Performance of minimally invasive and conservative procedures	98(57.3)
Use of hand pieces or other devices connected to the air/water lines only when indispensable	117(68.4)
Replacement of intra-oral radiographic techniques by extra-oral techniques	51(29.8)
Implementation of sutures with re-sorbable threads	80(46.8)
Remote assistance used during pandemic(calls, texts, whatsapp, zoom, facebook, other)	101 (59.1)

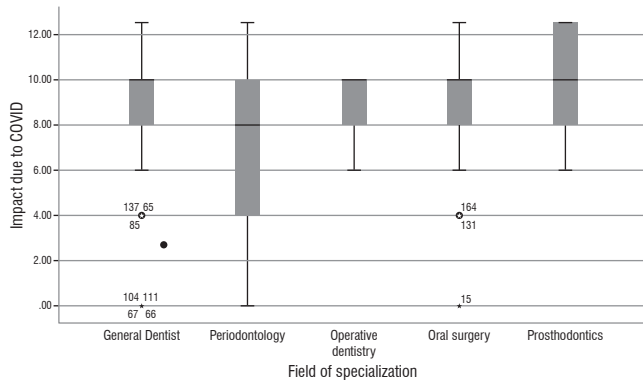


Fig1: Field of specialization versus impact due to Covid

TABLE-3: UNI VARIATE ANALYSIS OF FACTORS RELATED TO PERIODONTIST PERCEPTIONS OF THE IMPACT OF THE COVID-19 PANDEMIC ON PROFESSIONAL PRACTICE (N = 204).

Variables	No impact	Impact (Low/Moderate/High)	P value
<b>Gender</b>			
Female	9(8.0%)	104 (92%)	.499
Male	3(5.2%)	55 (94.8%)	
Odds ratio :	1	1.587 (.413 - 6.101)	
<b>Age group</b>			
21-40 years	11(6.6%)	155(93.4%)	.249
41-65 years	1 (20.0%)	4(80%)	
Odds ratio:	1	.284 (.029 - 2.762)	
<b>Confirmed Covid Cases</b>			
Yes	6(6.8)	82(93.2%)	.916
No	6(7.2)	77(92.8%)	
Odds ratio:	1	.939(.290 – 3.036)	
<b>Social Isolation Measure</b>			
None	0	28(100%)	.213
Social distancing	9(11.0%)	73(89%)	
Smart lockdown	2(4.9%)	39(95.1%)	
Complete lockdown	1(5.0%)	19(95%)	
Odds ratio:	Not Significant		
<b>Field of specialization</b>			

General Dentist	10(83.3%)	108(67.9%)	.673
Periodontology	1(8.3%)	9(5.7%)	
Operative	0	17(10.7%)	
Oral surgery	1(8.3%)	20(12.6%)	
Prosthodontics	0	5(3.1%)	
<b>Odds ratio:</b>			
Periodontology	1	3.71(1.178-11.6)	.921
Operative	1	.364(.121-1.09)	
Oral surgery	1	.873(.240-3.17)	
Prosthodontics	1	1.31(.211-8.12)	
<b>Changes in clinical routine</b>			
<b>Adjustment made in working environment</b>			
Yes	11(7.0%)	147(93.0%)	.921
No	1(7.7%)	12(92.3%)	
Odds ratio:	1	898(.107 – 7.55)	
<b>Disinfection of the working environment</b>			
Yes	12(7.5%)	149(92.5%)	.371
No	0	10(100%)	
Odds ratio:	1		
<b>Increase use of PPE</b>			
Yes	12(7.5%)	149(92.5%)	.371
No	0	10(100%)	
Odds ratio:	1	6.5	
<b>Incorporation of preliminary remote patient screening using (calls, texts, whatsapp, zoom, facebook, other)</b>			
Yes	7(6.9%)	95(93.1%)	.923
No	5(7.2%)	64(92.8%)	
Odds ratio:	1	.943(.287 – 3.10)	
<b>Enhanced personal hygiene*</b>			
Yes	12(7.3%)	153(92.7%)	.493
No	0	6 (100%)	
Odds ratio:	1	9.2	
<b>Adjustments of clinical procedures*</b>			
Yes	12(7.9%)	139(92.1%)	.191
No	0	20(100%)	
Odds ratio:	1	4.1	

Reduction of working hours*		
Yes	4(5.6%)	68(94.4%)
No	8(8.1%)	91(91.9%)
Odds ratio:	1	.669(.194-2.31)

different types of dental practices may it be private or public. Around the world dentists have developed several adjustments needful to stop the outspread of virus and protection in post covid era at patient as well as at clinician's end. Furthermore, to avoid all possible contamination at workplace as discussed in a study conducted in Italy,<sup>12</sup> found similar finding as observed in this study. Besides, contribution of many good practicing attitudes, it is important to highlight that no country to date has been successful in attaining efficient measures of control over the spread of Sars-nCov-2 which is also a finding in this study too. On the other hand, prolonged shut down of services has led to noticeable economic crises.<sup>13</sup> Moreover, chasing the obtainment of quality services and simultaneously following the standard operating procedures (SOPs) for social distancing has resulted in poor disease control with worsening of signs and symptoms in some dental practice in this study and to surprise this is experienced not only in Pakistan but also in the other parts of world too like Greece.<sup>14</sup> A systematic review has reported worsening clinical features of gums due to Covid impact, while in many cases Covid was presenting symptoms like Necrotizing ulcerative gingivitis, adding more to uncontrolled spread of disease, other researches from different parts of Canada has highlighted the same features.<sup>15</sup>

Unlike dental professional, presumably the dental treatment seekers showed reduced demand for dental care owing to the high confirmed rate of Covid cases, mal-practice of social distancing and distress and infection spread to elders specially. Studies from Bangladesh (Hossain MR et al, PLOS March 2023) and Iran, has also deduced that the attendance was decreased by multiple fold especially in first phase of pandemic.<sup>16</sup> Few clinics shut their practice down on the account of insufficient personal protective equipment, analogous conditions are found in the study done in Iran<sup>17</sup> other parts of Pakistan.<sup>18</sup> These circumstances shifted the paradigm to online health care provision, e-health and tele-dentistry are the emerging new ways which came into being after global Covid catastrophe.<sup>19</sup> Moreover, many of dental practitioners registered themselves with online sources of health provision.

Patients showing up in periodontology OPD and other departments were screened strictly for initial sign n symptoms of flu and fever, those with positive symptoms were deferred until recovery which is seems similar to

the findings of studies conducted at Lahore, Pakistan.<sup>20</sup>

Majority of Dentists in this study reported that provision of PPE (personal protective measures) were also short of stock in the market with exorbitant financial burden as noticed in the studies performed in Spain<sup>21</sup> and Iran.<sup>22</sup> Pakistani studies by Aslam H et al, 2021 and others<sup>23</sup> expressed similar situation as observed in this study which negatively impacted the clinical practice during and after the SARS CoV-outbreak, in Pakistan

In accordance to the results of our study, substantial alterations executed by periodontists in their clinical schedules once after the outbreak began, exactly similar patterns of daily clinical hour flexibility were reported in studies by Ather et al, 2020, Farooq and Ali et al, 2020 keeping the abidance of guidelines proposed by health organizations.

The strength of this study includes data from all the major institutes and clinical practises across Pakistan, giving a generalized review of the situation through which the dental fraternity has been during and after the COVID pandemic. It is observed that Pakistan being an under-developing country has faced more than a lot during this time and a substantial proportion of population, who were living a life above poverty line is now living below the poverty line. Many dental practitioners who were minimally bearing the expenditure to run their practices had completely shut down them. During the active Covid phase a large number of patients were unable to report to dentist for obvious isolation SOPs but now due to un-affordability due to inflation the situation is prevailing in the similar manner. Limitations of the study include its sample size and study design. In future, a multistage stage study with large sample size covering data from each province in detail shall be carried out to follow-up weather has any change took place in life style, socioeconomic conditions and psycho-social factors of life among dental practitioners of Pakistan.

## CONCLUSION

Most studies show deep deteriorating impacts on public/private dental sector during covid. Previous literature and present study showed harmony on the fact that dental practices were not good overall. The advent of Covid had serious repercussions on the personal and professional axis of Periodontologist. In addition, PPE shortage was observed everywhere. Everyone had to make necessary alterations in the daily routine to observe SOPs lay down by Government both at hospital and Outpatient settings. The pandemic directly influenced the work activities part and parceled with enormous financial destabilization for dental professionals. Similarly, observing different types of lock down system in different phases of pandemic brought

about salient social changes with a slow paced return to maximized bio-safety guidelines. It culminated in the increasing of trends of home visiting mobile dentists.

### FUTURE IMPLICATION:

The study highlighted major practicing changes in dentistry. Due to lack of reporting to dental office because of inflation is a major factor behind how the dental problems are going unreported and untreated; oral and periodontal disease burden is expected to increase by many folds. Hence, future studies on assessment of oral and periodontal disease prevalence, incidence are recommended. This study spotlighted that this pandemic has brought new modalities of treatment and diagnosis into practice like tele-dentistry, use of artificial intelligence in more meaningful manner and digital-communications methods. Further investigations must be performed to testify the efficacy and limitation of these techniques to make use of technology in the best benefit of mankind.

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- 1 Prof. Dr. Farzeen Tanwir:** Conceptualization, proof read of the write-up, supervision of entire execution, final critical proof reading before submission.
- 2 Dr. Tauqeer Bibi:** Data collection, write-up of manuscript, proof reading, Formatting and editing.
- 3 Dr. Bushra Ijaz:** Data collection and transfer to SPSS software.
- 4 Dr. Fatima Israr:** Devised form, Worked for IRB letter.
- 5 Dr. Ahmed Bin Khalid Khan**Data collection
- 6 Lt.Cdr. Dr.Nabeel Hafeez:** Data collection, Proof reading and formatting,
- 7 Dr. Chander Kumar:** Data collection, proof reading and editing in the final article.
- 8 Mr. Faisal Fahim:** Performed Statistics.