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Knowledge and Awareness about Biomarkers Pathogenesis, Diagnosis and Treatment of Covid19

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Abstract:-

- ***Introduction:***

Pandemics occur rarely, but shatters the world once it occurs. Covid19 a pandemic is a scientific, medical and social challenge. Covid19 effects are serious in patients with co -morbid conditions. Identifying the valuable biomarkers and pathogenesis of the virus may help in prompt treatment. Tremendous advances in In vitro Diagnostic assay(IVD) help in better diagnosis and treatment.

- ***Methodology*:**

Cross sectional questionnaire survey was conducted by circulating google forms through social media to interested dental students. 100 interested students participated in this survey and their details were protected.

- ***Conclusion:***

This survey helps to evaluate the knowledge of dental students about biomarkers ,virology, pathogenesis of corona virus. Better knowledge could help in better diagnosis and treatment.

I. INTRODUCTION

A novel coronavirus, designated the severe acute respiratory syndrome coronavirus 2 (SARS-COV -2) [1], which is emerged in late December 2019 in Wuhan, China from a cluster of pneumonia cases epidemiologically. The disease now commonly known as “COVID -19”, which has spread to all the countries of the world leading to the Worldwide ‘Pandemic’[1]. The pathogens were transferred from animals to humans, rapidly evolving into transmission from humans to humans.

Coronaviruses belong to the coronaviridae family ,with large , single, plus-stranded RNA as the genome. Coronaviruses are divided into four groups; Alpha-coronavirus , Beta-coronavirus , Gamma-coronavirus, and Delta-coronavirus. The alpha-coronavirus and beta-coronavirus primarily infect the respiratory ,gastrointestinal, central nervous system of humans and mammals, while other virus delta-coronavirus affect the birds.

Covid-19 has demonstrated a wide spectrum of clinical manifestation from mild to severe viral pneumonia with respiratory failure, multi organ and systemic dysfunction. The human receptor for covid-19 is angiotensin converting enzyme 2(ACE2)[2] .The clinical symptoms can be explained more confidently with the help of biological marker(biomarker), which helps in categorising patients into mild, moderate, severe, or critical allowing for earlier interventions .

This article gives a broad view about Biomarkers and pathogenesis of covid-19 among dental students.

II. METHODOLOGY

Cross sectional study was implemented with randomly selected dental students in India. Since this study was conducted during a COVID19 lock down period, was unable to collect live samples from the subjects. The questionnaires was then converted into the online filling format called Google forms. Then the link of the Google form was circulated among the young adults. This took

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around a month for collecting a complete data of all the participants. A total of 100 dental students were randomly participated according to their willingness .The link of the Google form have been shared to the participants through WhatsApp groups and other social media. The purpose of the questionnaire was clearly explained to the participants. A self-administered structured questionnaire of twenty questions written in English and designed to acknowledging the awareness and knowledge about COVID 19.These 20 questions are under the aspect of knowledge, awareness about biomarkers and pathogenesis of COVID 19.The questionnaire were sent to dental students to keep minimal bias. The study size was arrived by sending the link through WhatsApp and other social media. Participants were asked to complete and submit the responses to this online survey. Subsequently summary of the responses were analyzed through the Google forms itself. All the questions were marked as mandatory, so without answering the participants cannot submit the response and by this data missing was eliminated. It took about five to ten minutes to complete the questionnaire.

III. FREQUENCY

KNOWLEDGE & AWARENESS ABOUT VIROLOGY -	option	Frequency	percent
1.What is a subfamily of COVID19	A. Orthocoronaviridae	73	73.0
	B. Orthomyxoviridae	10	10.0
	C. Pneumovirinae	12	12.0
	D. None	5	5.0
2.How many different human coronavirus Stains are there	A. 5	24	24.0
	B. 3	43	43.0
	C. 8	26	26.0
	D. 7	7	7.0
3.Coronavirus belong to which type of genome	A. Double stranded DNA	14	14.0
	B. Single stranded DNA	13	13.0
	C. Double stranded RNA	16	16.0
	D. Single stranded RNA	57	57.0
4.Among the following which type of genus of Coronavirus primarily infect birds	A. Alphacoronavirus	24	24.0
	B. Betacoronavirus	33	33.0
	C. Gammacoronavirus	34	34.0
	D. None	9	9.0
5.Who named novel coronavirus	A. ICTV	19	19.0
	B. WHO	51	51.0
	C. ICMR	28	28.0
	D. None	2	2.0
6.Does HERD immunity protect against COVID19	Maybe	52	52.0
	No	22	22.0
	Yes	26	26.0

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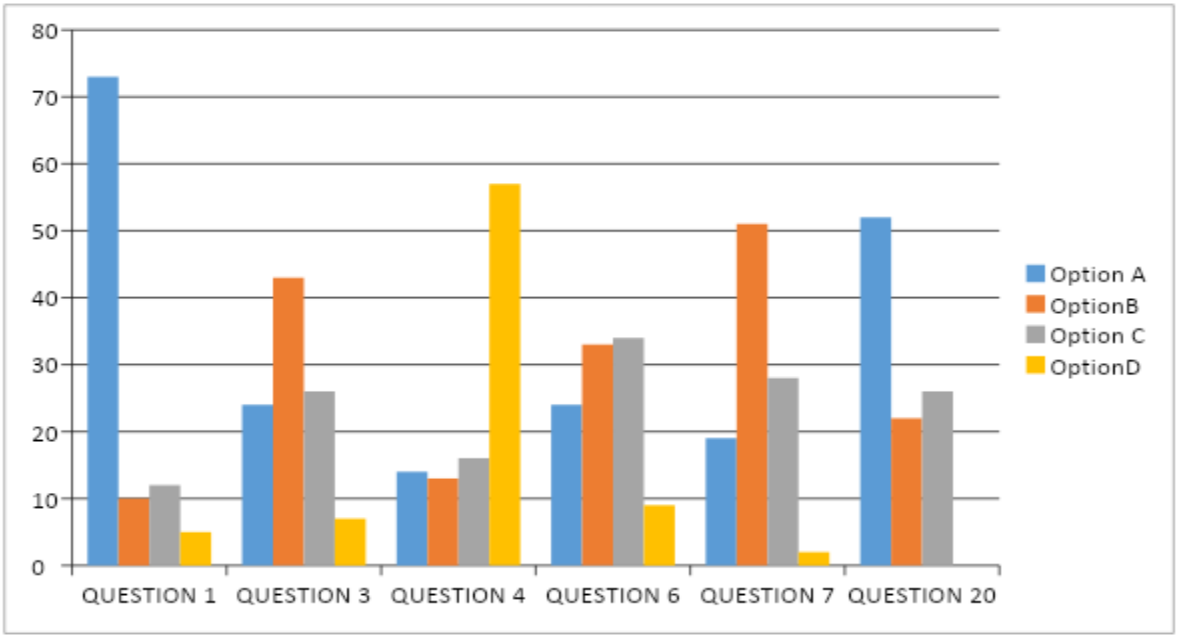

Fig 1:- Knowledge & awareness about virology –COVID19

KNOWLEDGE & AWARENESS ABOUT BIOMARKERS -	**Options**	**Frequency**	**percent**
1.Which enzyme receptor is common form CoV-virus and SARS-CoV	ACE receptor	60	60.0
	Alpha receptor	14	14.0
	Beta receptor	22	22.0
	Muscarinic receptor	4	4.0
2.Higher the level of Angiotensin2 enzyme greater will be the	Blood sugar level	11	11.0
	Increased metabolic activity	23	23.0
	None of the above	3	3.0
	Viral load & lung injury	63	63.0
3.Which biomarker are positively correlated with MURRAYs Score	ALB & LYM	22	22.0
	CD4 & CD8	21	21.0
	CRE & NEU	28	28.0
	CRP & LDH	29	29.0
4.What does MURRAYs Score indicate	Albumin defeciency	6	6.0
	Lung injury	53	53.0
	Viral injury	16	16.0
	Viral replication	25	25.0
5.How many biomarkers are there to indicate COVID19	6	37	37.0
	8	24	24.0
	10	13	13.0
	13	26	26.0
6.Which appearance is seen in the chest –X ray of COVID19 patient	Both of the above	42	42.0
	Ground glass capacities	36	36.0
	Homogenous radiopaque	22	22.0
7.What are the four low pathogenicity counter parts of novel corona virus	A. 229E	5	5.0
	B. OC43	8	8.0
	C. NL63	12	12.0
	D.HKUI	4	4.0
	E. All the above	65	65.0
	F. None of the above	6	6.0

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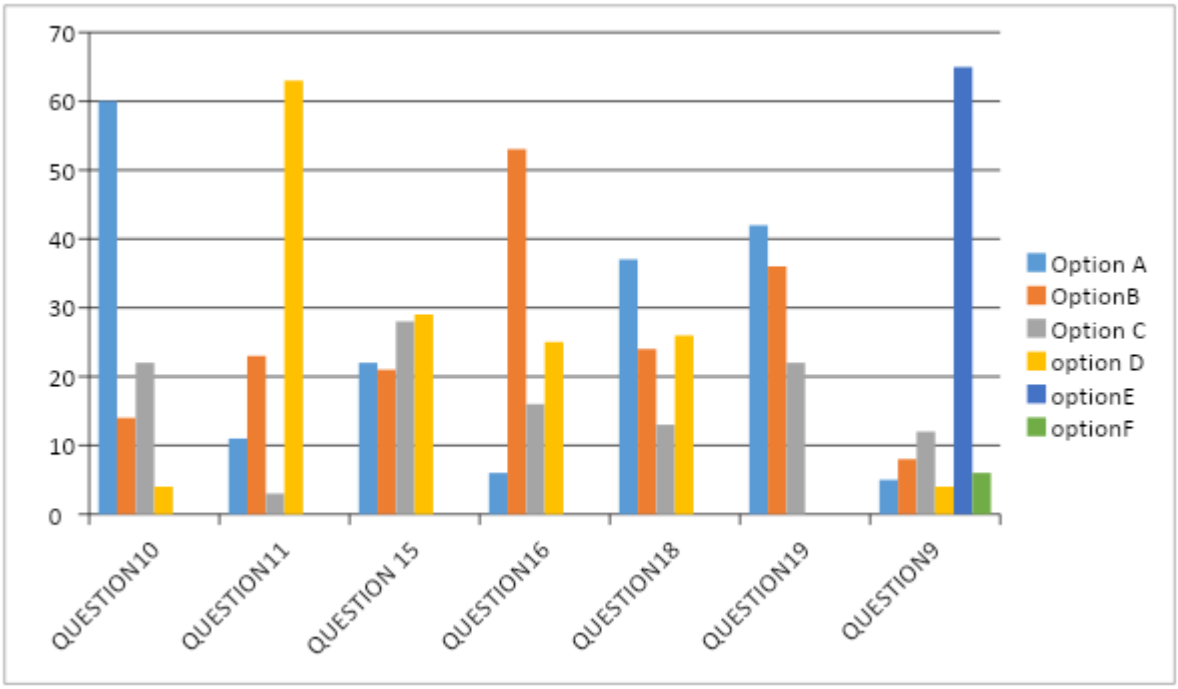

Fig 2:- knowledge & awareness about biomarkers -COVID 19

KNOWLEDGE & AWARENESS ABOUT PATHOGENESIS,&DIAGNOSIS-COVID-19	options	frequency	percent
1.Coronavirus bind to human epithelial cells by which type of enzyme	A. ACE -1	11	11.0
	B.ACE- 2	43	43.0
	C. Both A and B	44	44.0
	D. None	2	2.0
2.What are the diagnostic test recommended by WHO	A. NAAT	9	9.0
	B.rt-PCR	22	22.0
	C.Serological test	13	13.0
	D. All of the above	56	56.0
3.In electron micrographs coronavirus look like	A. Solarcorona	10	10.0
	B.Stellar corona	27	27.0
	C. Both A & B	61	61.0
	D. None	2	2.0
4.Do you agree that Transplacental transmission of coronavirus occurs	Agree	32	32.0
	Disagree	13	13.0
	Neutral	37	37.0
	Strongly agree	12	12.0
	Strongly disagree	6	6.0
5.Mechanism of action of SARS CoV -2 infection is	Both 1 & 2	43	43.0
	Both 1 & 3	17	17.0
	Endocytosis by enzyme bound virus	4	4.0
	None of the above	2	2.0
	Phagocytosis	18	18.0
	Transmembrane proteases serine 2	16	16.0
6.Which co-morbid condition is highly associated with COVID19	Cardio vascular disease	27	27.0
	Hyperglycemia	32	32.0
	Hypertension	28	28.0
	Liver injury	13	13.0
	All the above	51	51.0
	Lopinavir	8	8.0

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7.Anti viral drugs that can be given for COVID19 patients are	None of the above	8	8.0
	Remedesvir	25	25.0
	Ritonavir	8	8.0

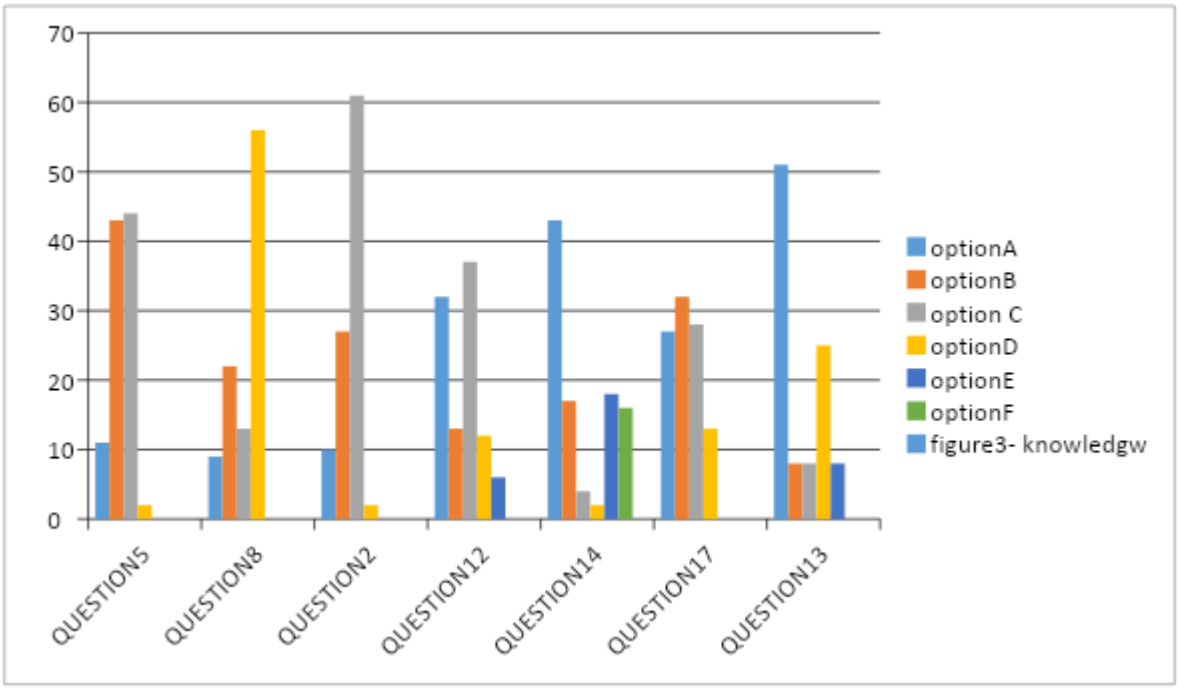

Fig 3:- Knowledge & awareness about pathogenesis and diagnosis of covid19

IV. RESULTS

A total of 100 undergraduate dental students from different colleges in India participated in the study. Out of 100 participants (n=70)70% were females and (n=30)30% were Males. The study questionnaire recorded 6 items of knowledge and awareness about virology, 7 items of Biomarkers and 7 items of pathogenesis and diagnosis. Overall 20 questions assessing the Virology, Biomarkers, Pathogenesis and diagnosis of COVID_19.

The vast majority 73.0% of the undergraduate dental student had the knowledge about the subfamily of COVID 19 is Orthocoronaviridae. About 57% were aware about the genome of coronavirus is single stranded RNA. These Questions reveals that students have good knowledge in virology of COVID _19.

Further 60% of participants answered ACE receptor is a common enzyme for nCOV-virus and SARS COV.61% of participants had recognized the view of coronavirus in electron micrograph is solar corona and stellar corona .Regarding viral load and lung injury 63%responded it is due to the higher level of angiotensin 2 enzyme. Higher percentage of 65% of participants had a better knowledge about the low pathogenicity counter parts of novel COV is 229E,OC43,NL63,HKUI.

About 56% were aware about the diagnostic tests recommended by WHO is NAAT, rt.PCR, serological test. Then in question about transplacental transmission of coronavirus 32% agreed,13% disagreed, strongly agreed 12%,strongly disagreed 6% and majority of the participants responded neutral 37%.Reports of increasing number of pregnant women with COVID-19 shows that most newborns are uninfected by coronavirus. However, a small number of neonates have tested positive for COVID-19.

V. DISCUSSION

The study was conducted to assess the knowledge, awareness, perception level about "COVID19 ,pathogenesis and its biomarkers "among the dental students. It was conducted randomly among 200 dental students in India during july2020-august 2020 through google forms and data which was statistically analysed.

Regarding the subfamily of COVID19 ,73% participants responded as orthocoronaviridae, which was the expected results too. Remaining 12% participants responded as pneumoviridae,10% participants responded as orthomyxoviridae, only 5% participants had no idea about it, in comparative to study[3] the knowledge about it was similar, which shows that participants were highly aware and having knowledge about it.

Regarding the genome of coronavirus belongs to,57%participants responded as of single strandedRNA, which was expected result, Remaining were chosen between single and double stranded DNA [4].Regarding the stains of human coronavirus only 7% has responded as seven strains which was the expected results, but whereas 46% responded as three,24% responded as five,26% responded as eight [4]

which shows that knowledge about human strains of COVID19 was very low.

Biomarkers are the biological molecules which were usually found in body fluids like blood, urine, stool. In this survey we evaluated the knowledge of upcoming dentist about biomarkers related to Covid19. About 8 blood biomarkers were identified[1]. Regarding this when questioned 24% participants only responded correctly.

Murray's score is the scoring system for lung injury. Viral load and lung injury increments are greatly identified by Murray system.[1].

Renin angiotensin system is the important one which helps to regulate the body's haemostasis. Angiotensin converting enzyme (ACE) converts angiotensin1 to angiotensin2. Angiotensin2 is widely expressed in cells of principal organs like lungs, liver and kidneys[5].About 63% participants correctly answered that higher level of angiotensin2 is associated with lung injury caused by Covid19.

Angiotensin converting enzyme 2 (ACE2), the receptor which was exhibited in both human airway epithelia as well as lung parenchyma. It is the receptor for SARS-COV as well as NL63.[6] .SARS-CoV preferably infects well-differentiated ciliated epithelial cells exhibiting ACE2.The enzyme which bind coronavirus to human epithelial cells is ACE2, 43.0%of positive responses shows that participants have a moderate knowledge regarding it. Recently, angiotensin converting enzyme 2 (ACE2) was identified as a receptor for both SARS-CoV [7]and NL63 [8]

There are some rare published cases of COVID-19 occurring during pregnancyand there is an probability of transplacental transmission, It is a concern that the fetuses may be in jeopardy of congenital COVID-19[9] . COVID-19 virus is still spreading and there is a higher chances of infections in pregnant women. Whether COVID-19 increases the risk of miscarriage, preterm delivery, fetal tachycardia and fetal distress is unknown Regarding this transplacental transmission of coronavirus 37% of participants responded as neutral.

Radiographs are the best supporting source for diagnosis. Lei et al introduced CT findings of covid patients which demonstrated Ground Glass Opacities(GGO) [10]. Regarding this when questioned 36% of people answered correctly. Excessive production of cytokines leads to damage of endothelial cells and alveolar cells.

After the diagnosis of SARS-Cov2, the prevention and quarantine are considered as the most way to stopthe fast spreading of the virus, because there is no effective vaccine, drugs, or antiviral to prevent and treat this disease inspite of the enormous efforts made by the scientists and researchers around the world to develop vaccines and treatments ofcoronavirus. Additionally, various measures are carried out to help patients with COVID-2019 as oxygen therapy, antivirals (Lopinavir, Ritonavir, Ribavirin,Favipiravir (T-705), remdesivir, oseltamivir, Chloroquine, andInterferon)[11].

Regarding antiviral drugs given for coronavirus, 51%participants responded all the above (Remdesivir, Lopinavir, Ritonavir) knowledge is comparatively higher than the study[12] which is 31.1%

VI. CONCLUSION

This survey indicates that the dental undergraduates have fair knowledge about the biomarkers and diagnostic methods of COVID19. Good knowledge is at the field of pathogenesis of COVID19. It is indispensable for the dentists to be well informed and knowledgeable about this disease. Adoption of various drugs for treatment is still an ongoing process. So it is ideal to ameliorate our knowledge thereby protecting ourselves and the society.

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