Morbidity and Mortality Probability of COVID-19 in Diabetic Patients in Rural Areas of Himachal Pradesh and Its Management

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Abstract:

Background: Coronavirus-19 is caused by Severe Acute Respiratory Syndrome-Coronavirus-2, first identified in November 2019 in Wuhan, serious threat for health of older adults and diabetic patients as viral infections increase inflammation, internal swelling, and diabetes ketoacidosis. Respiratory problems, pyrexia, myalgia, sputum production and pain throat are common symptoms, spreads via contact droplets of sneezing and coughing. Exposure to onset of symptoms time is about between two days to two weeks.

Method and Material: Data collected on health institution level, villages and hamlets by visiting in rural areas by following government advisory for COVID-19. Test data of Fasting Blood Sugar, Post Prandial Blood Sugar, and Random Blood Sugar is collected and noted by digital glucometer. Fasting Blood Sugar, in morning about ≥8 hours of meal and Post Prandial Blood Sugar after one and half to two hours of taking 75gram glucose or equivalent after fasting test and Random Blood Sugar after 4-5 hours of meal. Diagnosis has been done on basis of ADA guideline 2018. Morbidity and mortality probability data is collected from different journals, articles and news.

Result: Number of person tested: 1794, Male: 917 (51.11%), Female: 877 (48.89%) Fasting Blood Sugar: 911 (50.78%), Post Prandial Blood Sugar :911 (50.78%), Random Blood Sugar: 883 (49.22%), Normal Persons: 1637 (91.25%). Diabetic Mellitus-II : 134 (7.47%), Diabetic Mellitus-I: 11 (0.61%), Gestational Diabetic Mellitus:12 (0.67%), Mortality Probability in DM : ≥ 75%, and in normal persons:≤ 25% Morbidity probability in DM patient ≥ 90%, Morbidity probability in normal persons ≤ 10%.

Conclusion: Coronavirus-19 affects diabetic patients, by increasing inflammation and diabetes ketoacidosis. The morbidity probability in diabetic patients is about 90% and in normal persons is about 10% and mortality probability in Diabetic Patients is about 75% and about25% in Normal persons in rural areas of Himachal Pradesh.

Keywords: Mortality, morbidity, diabetes, posts prandial, digital glucometer, probability.

Introduction:-

Severe acute respiratory syndrome coronavirus-2 causes the infectious disease Coronavirus-2019,[1] which is a serious health threat for older adults and diabetic patients. Inflammation is caused by COVID-19 virus in diabetic patients, with an increased risk of diabetes

ketoacidosis which more in DM-I as compare to the DM-II patients. Respiratory problems, pyrexia, myalgia, sputum production and pain throat are common symptoms.[2] But the majority of patients are asymptomatic[3] and some may suffer with severe and acute pneumonia and multi-organ failure and lead to mortality.[4,5] Coughing and sneezing help in spreading the infection via respiratory droplets.[6,7] It takes two to fourteen days from exposure to onset.[8,9] Reverse Transcription Polymerase Chain Reaction from a nasopharyngeal swab and chest computed tomography scan are the standard method of diagnosis.[10,11] Coronavirus outbreak is declared pandemic and Public Health Emergency of International Concern by World Health Organization for 2019-20.[12,13.] COVID-19 is transmitted from person to person and can survive within aerosols for about three hours, generated by infected person, can stay stable on hard surfaces as well and on plastic and stainless steel plastic and can last up to three days.[14] 77 million diabetes patients in India which are about 57%, who are unware about diabetes, may not take steps to monitor or control their condition. From diagnosed patients, about 20%, who do not take treatment and about 40%, who take treatment, do not managed to control it. Diabetic patients more than 75% are lost to care lost to care which are at higher risk of mortality with COVID-19, if contacted.[15]The mortality risk from COVID-19 is up to 50% higher diabetic patients as compare to the non- diabetic.[16]

Material and Method:
Data collected on health institution level, villages and hamlets by visiting in rural areas by following government advisory for COVID-19. Test data of Fasting Blood Sugar, Post Prandial Blood Sugar, and Random Blood Sugar is collected and noted by digital glucometer. Fasting Blood Sugar, in morning about ≥8 hours of meal and Post Prandial Blood Sugar after one and half to two hours of taking 75gram glucose or equivalent after fasting test and Random Blood Sugar after 4-5 hours of meal. Diagnosis has been done on basis of ADA guideline 2018. Morbidity and mortality probability data is collected from different journals, articles and news.

Results:
Number of person tested: 1794, Male: 917 (51.11%), Female: 877 (48.89%) Fasting Blood Sugar: 911 (50.78%), Post Prandial Blood Sugar :911 (50.78%), Random Blood Sugar: 883 (49.22%), Normal Persons: 1637 (91.25%). Diabetic Mellitus-II : 134 (7.47%), Diabetic Mellitus-I: 11 (0.61%), Gestational Diabetic Mellitus:12 (0.67%), Mortality Probability in DM : ≥ 75%, and in normal persons:≤ 25% Morbidity probability in DM patient ≥ 90%, Morbidity probability in normal persons ≤ 10%. (Table-1)

Discussion:
Total tests are done are 1794, males are 917 (51.11%), females are 877 (48.89%), fasting and post prandial test done are 911 (50.78%), random test done are 883 (49.22%). In which normal persons are 1637 (91.25%), DM-II are 134 (7.47%), DM-I are 11 (0.61%), GDM are12 (0.67%) (Figure 1). The mortality probability in DM cases is more than 75% from the diabetic patients of the rural areas which is from the 9% of DM cases and less than 25% in normal person which is from 91% (Figure 2). Containment and mitigation are the two basic strategies to control the outbreak of the COVID-19 in the rural areas and to control the

mortality rate in the diabetic patients.[17] These two basic strategies may help in managing the outbreak of COVID-19 and may increase the length of the time to develop the suitable treatment which may decrease the risk of mortality of DM patients.[18] Diabetic patients should strictly follow the current government guidelines as they are at increased risk of severe illness from coronavirus. Frequent hand wash, social distancing, avoid contacts with COVID-19 patients, sanitize hands regularly for 20 seconds, avoid non-essential use of public transport, large gatherings, and small gatherings in pubs, cinemas, restaurants theatres, bars, clubs with family and friends. Blood sugar should be routinely checked, should stay hydrated and eat little and often.[19] The morbidity probability is more than 90% in diabetic patients and less than 10% in normal patients.

Conclusions:
Coronavirus-19 affects diabetic patients, by increasing inflammation and diabetes ketoacidosis. The morbidity probability in diabetic patients is about 90% and in normal persons is about 10% and mortality probability in Diabetic Patients is about 75% and about25% in Normal persons in rural areas of Himachal Pradesh (Figure 2).

Acknowledgement:
Not-Applicable

Ethical Clearance: The study is ethically clear. It is not disturbing the ethics of any person as no experiment has been done on human beings or on any animal. The verbal consents have been taken during collecting the data.

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Table-1: Data of FBS, PPBS, RBS Test Done for diabetic patients :

Particulars of the Test Done		Total Persons/Patients	Percentage
1.Number of person Tested		1794	
a)	Males	917	51.11%
b)	Females	877	48.89%
2. Test Done a)	FBS	911	50.78%
b)	PPBS	911	50.78%
c)	RBS	883	49.22%
3. Normal Persons		1637	91.25%
4. Total DM patients		157	8.75% about 9%
4 a) Diabetic Mellitus Type-II Patients		134	7.47% about 7%
4 b).Diabetic Mellitus Type-I Patients		11	0.61% about 1%
4 c).Gestational Diabetic Mellitus		12	0.67% about 1%
5. MPDM Patients			75%
6. MPNP			25%
7. Morbidity Probability in DM Patients			90%
8. Morbidity Probability in Normal Persons			10%

FBS:Fasting Blood Sugar, PPBS: Post Prandial Blood Sugar, RBS: Random Blood Sugar
DM-II: Diabetic Mellitus Type 2, DM-I : Diabetic Mellitus Type 1, GDM: Gestational Diabetic Mellitus. MPDM= Mortality Probability in Diabetic mellitus patients, MPNP= Mortality probability in normal patients. Figure-1 & 2.

Figure-1: **Graphical Presentation of DM-II, DM-I and GDM:**
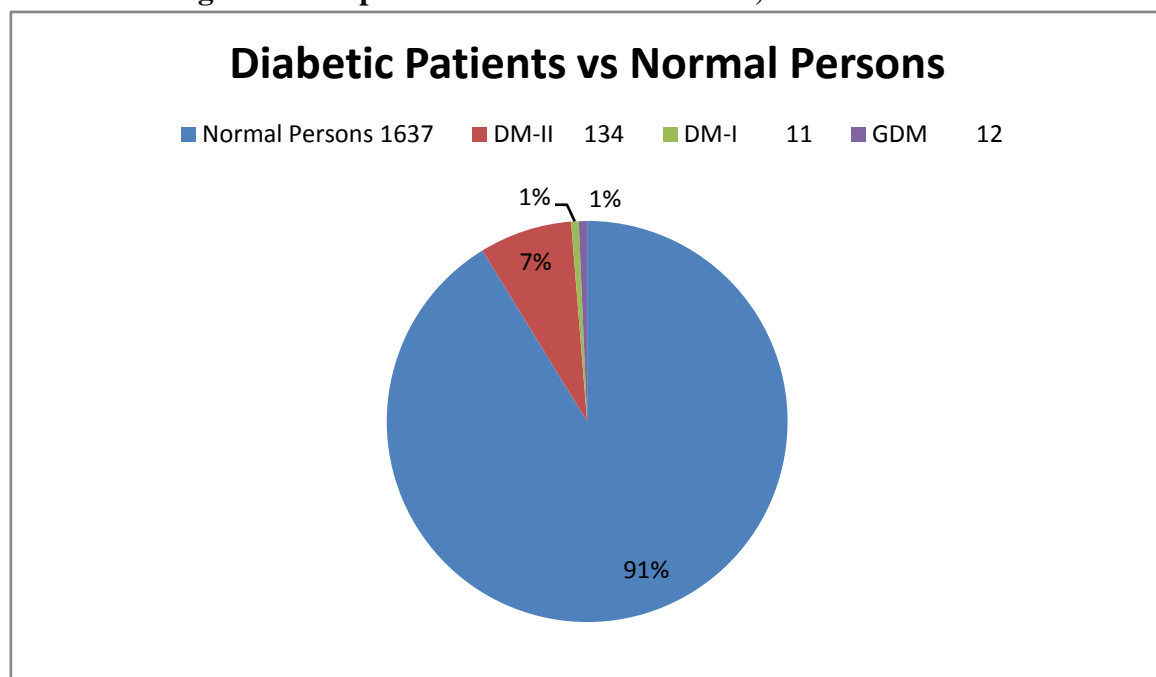
Figure-2: Graphical Presentation of Diabetic Patients & Normal Persons with Probability of Morbidity and Mortality: