= 287.6

I(t) = $(\delta L - (\gamma + \mu + \Psi)I)t$

At t =9

I(9) = $(0.25 \times 7 - (0.5 + 0.27 + 1.0)357)9$

= 0.25× 7 – (0.25+ 0.27 + 1.0)357)9

= 1.75 – 48.2 × 9

= -46.5×9

= -418.05

I(t) = $(\delta L - (\gamma + \mu + \Psi)I)t$

At t =10

I(10) = $(0.25 \times 34 - (0.5 + 0.27 + 1.0)220)10$

= 0.25× 34– (0.25+ 0.27 + 1.0)220)10

= 8.5 – 29.7 × 10

=-21.2×10

=-212

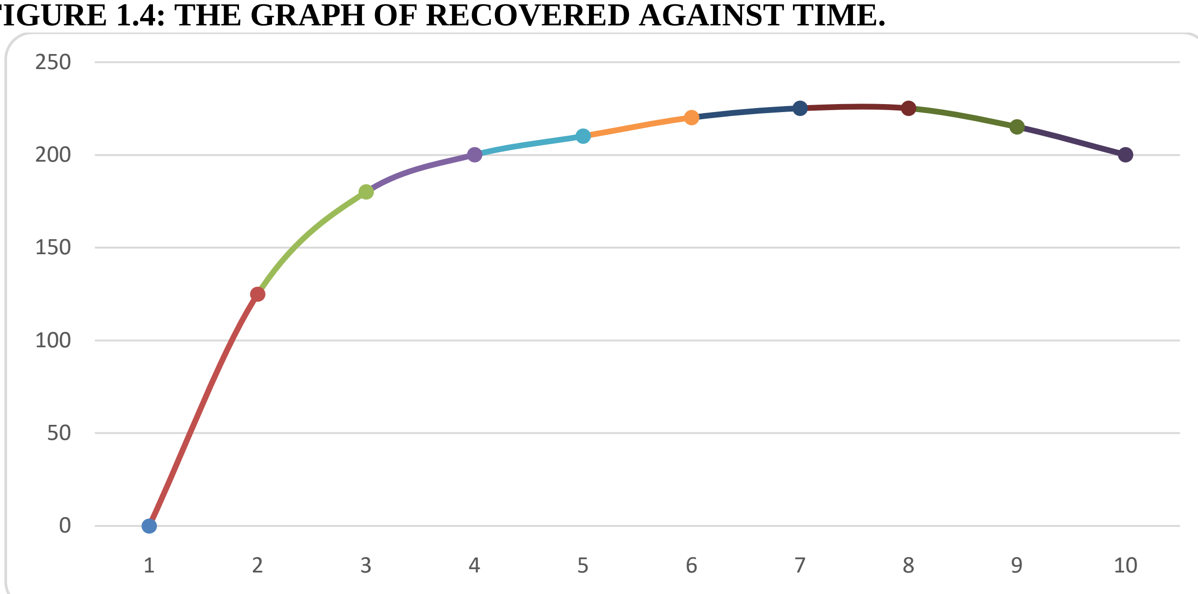
This shows that, ≈ 200 people will be infected with the virus, and they will show visible symptoms of the virus within the period of ten weeks.

From the above model we use the values we obtain to show the effect of varying treatment rate on the population infected individuals and their progression to recovered compartment. The infected individuals are isolated in a safer area (isolation centers) to prevent further transmission of the virus.

TABLE 1.5: SHOWS THE TABLE OF RECOVERED AGAINST TIME.

Time/week	1	2	3	4	5	6	7	8	9	10
Removed	0	0	6	23	30	25	70	166	166	385

FIGURE 1.4: THE GRAPH OF RECOVERED AGAINST TIME.



Time (weeks)

However, from table 1.5, based on Figure 1.4, graph of recovered individuals against time with infection rate, shows an increase in the population of recovered individuals after a while and then a decrease due to progression to the susceptible compartment. And also shows the effect of varying treatment rate on the population of infected individuals. The population of infected individuals increases for a while and then decrease after some time since the effective reproduction number is less than 1 and since individuals undergoing treatment progress later to susceptible class.
From the model 3.4, we now solve for the recovered individuals for the period of ten weeks to get the results.
From equation (3.4)

$\frac{dR}{dt} = \gamma I + \tau L - (e + \mu) R$

$dR = (\gamma I + \tau L - (e + \mu)R)dt$

Net, we integrate both sides

$$\int dR = \int (\gamma I + \tau L - (e + \mu)R)dt$$

$R(t) = (\gamma I + \tau L - (e + \mu)R)t$ (4.4)

When t = 1

$R(1) = R(t) = (\gamma I + \tau L - (e + \mu)R)t\ 1$

= (0.5+5.13 – (0.1665)0)1

= 5.61

$R(t) = (\gamma I + \tau L - (e + \mu)R)t$

When t= 2

$R(2) = (0.5 \times 23 + 0.27 \times 2 - (0.580 + 0.27)0)2$

= (11.5+0.54 – 0)2

= (11.54)2

=23.08

$R(t) = (\gamma I + \tau L - (e + \mu)R)t$

When t= 3

$R(3) = (0.5 \times 46 + 0.27 \times 5 - (0.580 + 0.27)46)3$

=(23+1.35-39.1)3

=(24.35-39.1)3

= (-14.75)3

= -44.25

$R(t) = (\gamma I + \tau L - (e + \mu)R)t$

When t= 4

$R(4) = (0.5 \times 25 + 0.27 \times 24 - (0.580 + 0.27)23)5$

=(12.5+6.48-19.55)4

=(-0.57)4

=-2.28

$R(t) = (\gamma I + \tau L - (e + \mu)R)t$

When t= 5

$R(5) = (0.5 \times 93 + 0.27 \times 7 - (0.580 + 0.27)3)5$

= (46.5+1.89-2.55)5

= (48.39-2.55)5

= (45.84)5
=229.2
R (t) = $\left(\gamma I + \tau L - (e + \mu)R\right)t$
When t= 6
R (6) = $(0.5 \times 185 + 0.27 \times 5 - (0.580 + 0.27)25)6$
=(92.5+1.35-21.25)6
= (93.85-21.25)6
= (72.6)6
=435.6
R (t) = $\left(\gamma I + \tau L - (e + \mu)R\right)t$
When t= 7
R (7) = $(0.5 \times 318 + 0.27 \times 13 - (0.580 + 0.27)70)7$
=(159+3.51-59.5)7
= (162.51-21.25)7
= (141.26)7
= 988.8
R (t) = $\left(\gamma I + \tau L - (e + \mu)R\right)t$
When t= 8
R (8) = $(0.5 \times 357 + 0.27 \times 49 - (0.580 + 0.27)166)8$
=(178.5+13.23-141.1)8
= (191.73-141.1)8
= (50.6)8
= 505.04
R (t) = $\left(\gamma I + \tau L - (e + \mu)R\right)t$
When t= 9
R (9) = $(0.5 \times 357 + 0.27 \times 7 - (0.580 + 0.27)166)9$
=(92.5+1.89-21.25)9
= (94.39-21.25)9
= (73.14)9
= 658.26
R (t) = $\left(\gamma I + \tau L - (e + \mu)R\right)t$
When t= 10
R (10) = $(0.5 \times 220 + 0.27 \times 34 - (0.580 + 0.27)385)10$
=(110+9.18-327.25)10
= (119.18-327.25)10
= (-208.07)10
= -2080.7

This shows that, ≈ 2080 people will recover from the virus if undergone treatment while adhering to all the non-pharmaceutical measures for the period of 10 weeks.

According to the values obtained in this model we can see that the population of infected individuals increases for almost ten weeks under consideration. This is due the high contraction of the virus and lack of approved vaccine.

SUMMARY, CONCLUSION AND RECOMMENDATION

SUMMARY

In this study, we modeled the effect of varying infection rate and treatment on the transmission dynamics of coronavirus disease (covid19). The disease free equilibrium state and the endemic equilibrium state of the model were obtained, the basic reproduction number, (R_0) was derived and the analysis showed that covid19 can effectively be curtailed or even be contained if effort is made to ensure that latently infected individuals are detected, and ensuring proper isolation of infected individuals appropriately. In the absence of vaccine following the non-pharmaceutical measure is of tremendous important in curtailing the virus. This includes hand washing regularly, wearing of face mask, observing social and physical distancing among others.

CONCLUSION

The existence of the disease free equilibrium state implies that there is possibility of complete total eradication of coronavirus (covid19) from Nigeria. The negativity of all the eigenvalues arising from the stability analysis carried out in chapter three shows that there will be no return of the coronavirus 9covid190 pandemic after eradication from Nigeria. The existence of the endemic equilibrium state in chapter three signifies the possibility of Nigeria to continue recording cases of the virus and if vaccine is not approved, it will be an epicenter in the region or an endemic nation.

RECOMMENDATION

The incidence of coronavirus in 2020 and beyond, can greatly be minimized or possibly be eradicated in Nigeria or any population if effort is made to ensure that the endemic equilibrium of this model is never stable. That is if $R_0<1$, this can be achieved if the following recommendations are considered.

1. There should be more enlightenment campaign on the dangers of coronavirus and on its symptoms to the public.
2. More effort should be made to encourage people to voluntarily go for civid19 tests by discouraging stigmatization of people infected by the virus.
3. Covid19 tests and treatment should continue to be free of charge to enable poor people assess them and in all public and private health centers.
4. People should be educated on the mode of transmission of the virus, and on home care strategies for people infected by the virus before going to hospital.
5. The conditions that promote rapid spread of covid19 should be discouraged. Such conditions include: overcrowded accommodation, high level of illiteracy, lack or inadequate medical facilities, vanning of traveling to the highly infected countries.
6. There should be provision of more trained personnel and more covid19 test centers in the country.
7. Non-pharmaceutical measures (hand washing regularly with soap and water, using alcohol based sanitizers, observing social and physical distancing etc.) Should also be practice and ensure adequate compliance to them.

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