

## Appendix No (1): Simulation Data by MATLAB Program.

```
clc
Bo=input('Bo= ');
B1=input('B1= ');
Bo1=input('Bo1= ');
B11=input('B11= ');
Bo2=input('Bo2= ');
B12=input('B12= ');
segma=input('segma= ');
segma1=input('segma1= ');
segma2=input('segma2= ');

x=[6.3 10 3.5 12.5 20 17.2 18.3 5.8
9.3 13 11.7 8.9 22.3 10.4 23 4.3 7.5 8
19 5];
for i=1:1000
    ei=normrnd(0,segma,20,1);
    ei1=normrnd(0,segma1,20,1);
    ei2=normrnd(0,segma2,20,1);
    for j=1:20
        xx(i,j)=x(j);
        y(i,j)=Bo+B1*x(j)+ei(j);
        y1(i,j)=Bo1+B11*x(j)+ei1(j);
        y2(i,j)=Bo2+B12*x(j)+ei2(j);
    end
end
trypon=0;
trypze=0;
trygmse=0;
for ww=1:3
    switch ww
        case 1
            Y=y;
```

```

        case 2
        Y=y1;
        case 3
        Y=y2;
    end

X=xx;
for mm=1:3
    irect=0;
    Upper=0;
    Lower=0;
    BetH1=0;
    BetHo=0;
    MSE=0;
    XHP=0;
n=input('n= ');
nn(mm)=n;
t(mm)=input('t= ');
for i=1:1000
    posr=randi([1,1000],1,n);
    posc=randi([1,20],1,n);
    smpx=zeros(1,n);
    smpy=zeros(1,n);
    for iii=1:n
        smpx(1,iii) =
X(posr(iii),posc(iii));
        smpy(1,iii)=
Y(posr(iii),posc(iii));
    end
    xbar=mean(smpx');
    ybar=mean(smpy');
    up=0;
    down=0;
    for ii=1:n

```

```

        up=up+( smpx(ii) -
xbar)*( smpy(ii) -ybar );
        down=down+( smpx(ii) -xbar).^2;
    end
    BetH1(mm,i)=up/down;
    tBetH1(i)=up/down;
    BetHo(mm,i)=ybar -
(BetH1(mm,i)*xbar);
    for jj=1:n

YH(jj)=BetHo(mm,i)+(BetH1(mm,i)*smpx(j
j));
        XH(jj)=(YH(jj) -
BetHo(mm,i))/BetH1(mm,i);
        XHP(mm,i,jj)=XH(jj);
        YHP(mm,i,jj)=YH(jj);
    end
    mset=0;
    for jj=1:n
        mset=mset+ (smpx(jj)-XH(jj)).^2;
    end
    MSE(i)=mset/(n-2);
    ddown=0;
    for jj=1:n
        ddown=ddown+( smpx(jj) -xbar).^2;
    end
    for jj=1:n

VAR(jj)=((MSE(i)/(BetH1(mm,i)).^2))*(1
+(1/n)+(((XH(jj)-xbar).^2)/(ddown)));
        STD(jj)=sqrt(VAR(jj));

Upper(mm,i,jj)=XH(jj)+(t(mm)*STD(jj));

```

```

        Lower(mm,i,jj)=XH(jj)-
(t(mm)*STD(jj));
        upr=Upper(mm,i,jj);
        low=Lower(mm,i,jj);
            if (smpx(jj)>=low) &
(smpx(jj)<=upr)
                iresult(i,jj)=1;
                result(mm,i,jj)=1;
            else
                iresult(i,jj)=0;
                result(mm,i,jj)=0;
            end
        end

gmse(mm)=mean(MSE);
gtBetH1(mm)=mean(tBetH1);
trygmse(ww,mm)=mean(MSE);
end

numbers=prod(size(iresult))
numones=nnz(iresult)
numzeros=numbers-numones;
percones=(numones/numbers)*100
perczeros=(numzeros/numbers)*100
pon(mm)=percones;
pze(mm)=perczeros;
trypon(ww,mm)=percones;
trypze(ww,mm)=perczeros;
iresult=0;
end
gmse
figure(1)
subplot(2,3,ww);
plot(nn,pon,'-bx');

```

```
hold on;
plot(nn,pze, '-rx');
subplot(2,3,5);
plot(nn,pon, '-bx');
hold on;
plot(nn,pze, '-rx');
figure(2);
subplot(2,3,ww);
plot(nn,gmse, '-bo');
subplot(2,3,5);
hold on
plot(nn,gmse, '-bo');
trert=input('another try= ');
end
```

## Appendix No (2): Actual Data from Khartoum hospital

No.	Y	Age	Pcv	Mch
1	case	33.00	32.00	34.00
2	case	35.00	37.50	28.00
3	case	40.00	32.00	26.00
4	case	49.00	39.00	29.00
5	case	29.00	41.00	30.00
6	case	31.00	37.00	28.00
7	case	47.00	34.00	28.00
8	case	36.00	36.00	27.00
9	case	47.00	33.00	26.00
10	case	33.00	31.00	25.00
11	case	35.00	32.00	27.00
12	case	49.00	35.00	30.00
13	case	35.00	34.00	26.00
14	case	29.00	30.00	28.00
15	case	38.00	35.00	28.00
16	case	40.00	38.00	26.00
17	case	37.00	38.00	30.00
18	case	37.00	25.00	26.00
19	case	32.00	31.00	25.00
20	case	33.00	37.00	26.00
21	case	49.00	35.00	30.00
22	case	46.00	28.00	26.00
23	case	66.00	36.00	28.00
24	case	30.00	26.00	23.00
25	case	48.00	40.00	29.00
26	case	40.00	29.00	25.00
27	case	31.00	31.00	25.00
28	case	50.00	26.00	27.00
29	case	56.00	28.00	29.00
30	case	40.00	27.00	27.00
31	case	44.00	34.00	25.00
32	case	81.00	29.00	27.00
33	case	43.00	28.00	26.00
34	case	48.00	39.00	27.00
35	case	50.00	39.00	29.00
36	case	26.00	26.00	25.00
37	case	33.00	33.00	29.00
38	case	28.00	28.00	25.00
39	case	47.00	39.00	27.00
40	case	53.00	39.00	29.00
41	case	35.00	26.00	25.00
42	case	48.00	32.00	29.00
43	case	41.00	36.00	29.00
44	case	55.00	39.00	28.00
45	case	35.00	30.00	30.00
46	case	50.00	28.00	26.00

47	case	56.00	28.00	27.00
48	case	36.00	22.00	22.00
49	case	33.00	26.00	25.00
50	case	45.00	27.00	27.00
51	case	61.00	36.00	23.00
52	case	42.00	38.00	24.00
53	case	47.00	38.00	29.00
54	case	40.00	42.00	29.00
55	case	35.00	36.00	25.00
56	case	52.00	32.00	31.00
57	case	42.00	33.00	27.00
58	case	30.00	36.00	22.00
59	case	47.00	30.00	26.00
60	case	55.00	28.00	29.00
61	case	33.00	22.00	28.00
62	case	77.00	27.00	25.00
63	case	37.00	28.00	30.00
64	case	46.00	26.00	27.00
65	case	55.00	31.00	24.00
66	case	42.00	30.00	29.00
67	case	48.00	33.00	28.00
68	case	50.00	29.00	28.00
69	case	60.00	31.00	33.00
70	case	49.00	28.00	23.00
71	case	38.00	29.00	30.00
72	case	69.00	35.00	28.00
73	case	49.00	38.00	27.00
74	case	40.00	48.00	27.00
75	case	49.00	36.00	32.00
76	case	55.00	25.00	31.00
77	case	67.00	34.00	33.00
78	case	32.00	25.00	28.00
79	case	37.00	35.00	27.00
80	case	36.00	30.00	24.00
81	case	51.00	31.00	27.00
82	case	38.00	26.00	28.00
83	case	55.00	34.00	28.00
84	case	30.00	35.00	23.00
85	case	46.00	31.00	30.00
86	case	46.00	26.00	25.00
87	case	44.00	25.00	24.00
88	case	38.00	26.00	25.00
89	case	45.00	25.00	25.00
90	case	48.00	25.00	25.00
91	case	44.00	42.00	27.00
92	case	31.00	25.00	24.00
93	case	39.00	27.00	26.00
94	case	39.00	42.00	27.00
95	case	41.00	25.00	24.00
96	case	56.00	42.00	23.00

97	case	63.00	32.00	27.00
98	case	44.00	24.00	25.00
99	case	42.00	40.00	27.00
100	case	39.00	25.00	27.00
101	cotorol	33.00	40.00	28.00
102	cotorol	35.00	37.00	29.00
103	cotorol	40.00	37.00	26.00
104	cotorol	49.00	37.00	29.00
105	cotorol	29.00	40.00	29.00
106	cotorol	31.00	38.00	29.00
107	cotorol	47.00	41.00	26.00
108	cotorol	36.00	39.00	29.00
109	cotorol	47.00	37.00	29.00
110	cotorol	33.00	39.00	29.00
111	cotorol	35.00	33.00	30.00
112	cotorol	49.00	40.00	27.00
113	cotorol	35.00	38.00	28.00
114	cotorol	29.00	37.00	28.00
115	cotorol	38.00	37.00	29.00
116	cotorol	40.00	37.00	30.00
117	cotorol	37.00	40.00	31.00
118	cotorol	37.00	39.00	29.00
119	cotorol	32.00	38.00	28.00
120	cotorol	33.00	37.00	28.00