**Indexes**

i : index of demand nodes(State Hospitals)

j : index of potential sites for facilities

**Sets**

I : Set of demand nodes

J : Set of potential sites for facilities

**Parameters**

K: number of facilities to be located

S : Maximum service distance

ai: demand volume at demand node i

Cj : The workload capacity for a facility at site j

dij : Shortest distance from point i to point j

Ni : Set of potential sites for facilities that can reach demand node i

Ni = {j ϵ J | dij ≤ S}

Mj : Set of demand nodes that reachable from facility j

Mj = {i ϵ I | dij ≤ S}

**Decision Variables**

zij =

(1)

Subject to

(2)

(3)

(4)

(5)

(5)

{0, 1}

(6)

{0, 1}

(7)

{0, 1} ,

In objective function (1) it is aimed to maximize the demand points covered by the facilities. First constraint (2) states that node i cannot be covered unless at least one facility is located at one of the nodes i which cover node j. In the constraint (3), the number of facilities to be located j restricted to smaller or equal to k in constraint. Constraint (4) limits the service capacity of all facilities and also necessitates that service can be supplied from a point, provided that a facility is located at that point. Constraints (6) and (7) restrict the binary of variables, that is, only 0 or 1.