# Assessment of The Efficiency of Services for Pre-University Educational Institutes and Its Relationship to The Disease Map in Jazan City Using Geographic Information Systems (GIS)

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## ABSTRACT

The present is devoted to the Assessment of the efficiency of services for pre-university education institutes in the year 2023 (1445AH) Jazan city using Geographic Information Systems (GIS). The data assessment stemmed with many important results. The number education institutes in the year 2023 reached 139; 88 of them were for males. It is noted that the distribution of those educational institutes was compatible with urban blocks of Jazan city neighborhoods except for Alsafa which was in short of many of them (males or females). In future, it seems that compatibility might be broken, and clear variation happens. Concentration might appear in the central and the western parts of Jazan city.

## 1. INTRODUCTION

The present study is concentrated on the geography of the educational services distribution in Jazan city with special consideration to its relationship with neighborhood expansions, population concentrations and people's needs for each of educational level service. In response of population increase, and hence the increase and diversity of services presented, more and more researchers have been engaged with those affairs.

1. **The study problem:** The study problem is concentrated on the analysis of the efficiency of the educational services to satisfy the need of Jazan city neighborhood communities in a fair partitioning. The study has been motivated by the need for the reviewing the distribution of educational services, and make use of it in future plans within the development and the large population growth that the city witnessed recently.

**2. The study question and hypothesis:**

Q: Is the distribution of the pre-university education schools among Jazan neighborhoods fairly balanced? i.e. efficiently distributed?

**Hypothesis**. The distribution of the pre-university education schools among Jazan neighborhoods is fairly balanced i.e. they are efficiently distributed.

- **Alternative hypothesis.** The distribution of the pre-university education schools among Jazan neighborhoods is significantly unbalanced i.e. they are not efficiently distributed.

- **Aims of the study:**

The main aims of the study are as follows:

1. Assessment of the geographical distribution of the pre-university educational schools in Jazan.

2. Study of the relationships resulted from the up mentioned variables

3. Inspecting the harmony of the geographical distribution of the pre-university education schools with the population densities of Jazan neighborhoods.

4. Contribution to better planning for pre-university education in

Jazan city

- **Methodology of the study:**

The study depended mainly on the descriptive methodology in studying educational services and their geographical distribution in the study area. The study also followed the analytic methodology depending on the powerful Geographic Information Systems (GIS). The study collected data from several sources; most important are:

Books, articles, governmental reports, reports from Planning section of Education Administration in Jazan city, reports from Jazan Region Municipality.

- **Previous studies:**

The present study referred to many published books and articles in the geography of educational services. Of those studies are:

The study of Abd Al- Salam (2021

) is devoted to the spatial analysis of petrol stations in Al Khobar town using GIS. His study targeted to show the mutual spatial effect of the location of petrol stations, and to reveal the characteristics of their spatial distributions and the factors led to their existing structure

Amal Al Ahmadi (2019) published a study titled: "Geographic distribution of kindergarten schools in Al Madinah Al Munawara using GIS". The researcher was targeting to discover the degree of achieving locally required standards.

The study published by Al Majmae (2022) " Spatial analysis of educational services in Is-haaqi District 2020". The study was made to present the spatial structure of the educational services, and to assess its efficiency and its adequacy according to planning standards.

- **The study area:** Jazan area lies between latitudes 16˚ 20' and 18˚ 00' N, and between longitudes 41˚ 30' and 43˚ 30' E, in the south western corner of the Kingdom of Saudi Arabia (Fig. 1)



Source: Author's work on the National Urban Development Strategy for the Jazan Administrative Region map and Google Earth imagey.

**Fig.1 An overlayed map on Google Earth imagery of Jazan (Studyarea) in south west of Saudi Arabia**

## 2. DISTRIBUTION OF EDUCATIONAL INSTITUTES IN JAZAN CITY

Geographical distribution of educational institutes is considered a basic component in the national strategies of both developing and advanced countries, as it forms one of the basic infrastructures for developing human resources that considered the essence of development in any community. It became clear, nowadays that education has become a crucial role in achieving security, stability and welfare for peoples, as when we contemplate geographical phenomena, we find that their distribution is the focal point for understanding their behavior and the way they develop. Education reflects the resultant group of spatial relationships that sign their effect on the phenomenon added to its relationships with the other geographical phenomena. The complicated mutual interaction between education and geography, confirms that education should play a major role in supporting sustainable development and in strengthening the ties that keep the society united.
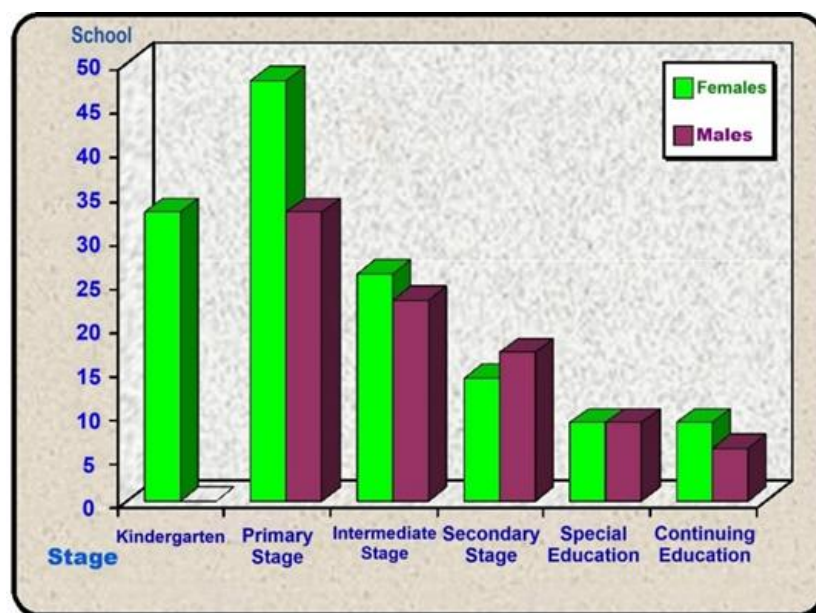
The study of the distribution of phenomena over the earth surface is considered of the basic functions of geography. In this section the study will concentrate on the geographical distribution of educational institutes for males and females in the neighborhoods of Jazan city; areas of concentration. The distribution will be looked at according to dependencies, neighborhood areas, population numbers and densities, building coverages, road networks, the institutes situations, teachers numbers, administrators, and the relative importance of the distribution of educational institutes in the city.

From Table (1) and Figure (2) we notice that the total number of educational institutes reached 227 in Jazan city; of it 61% were for female and 44.1% were for males, where primary level is listed top; 33 (35.7%) i.e. more than one third. The intermediate level ranked second (21.6%). Kinder level ranked third with 14.5 %, whereas secondary level ranked forth, with 13.7 % and lastly Special education ranked fifth with 7.9 % of the total number of educational institutes in the city.

## Table1. Educational Institutes numbers by level in Jazan city in the year 2023

| Educational level | Females | | Males | | Total | |
|---|---|---|---|---|---|---|
| | No | % | No | % | No | % |
| Kinder | 33 | 23.7 | - | - | 33 | 14.5 |
| Primary | 48 | 34.5 | 33 | 37.5 | 81 | 35.7 |
| Intermediate | 26 | 18.7 | 23 | 26.1 | 49 | 21.6 |
| Secondary | 14 | 10.1 | 17 | 19.3 | 31 | 13.7 |
| Special education | 9 | 6.5 | 9 | 10.2 | 18 | 7.9 |
| Continuing educa. | 9 | 6.5 | 6 | 6.8 | 15 | 6.6 |
| Total | 139 | 61.2 | 88 | 44.1 | 227 | 100 |

Source of data: Planning Section, Education Department, Jazan Administration Region,2023



Source: data from Table 1

*Fig.2 Numbers of educational institutes according levels in Jazan city in the year 2023*

In relation to female – male distribution we find that the pre- intermediate female schools came as follows:  Primary schools numbered 48 (34.5%) of the total number of the educational institutes of the city, followed kindergartens with a total of 33 schools (18.7%). The remaining number is shared by the rest of the education level schools, with the least share represented by the special education and the continuing education institutes. This grading came in accordance with the hierarchical population distribution. The male primary level got the highest percentage (37.5%) amongst all male educational institutes in the city. The intermediate level school came next by scoring 26.1%; in third rank came the secondary level (19.3%), and in the lowest rank came the special education (10.2%) and the continuing education (6.8%).

Fig.2 shows the distribution of 138 female educational institute in all education levels all over Jazan city, with high concentration in the city center especially the western side. The institutes decrease in the far north and the far south of the city. Fg.2 also shows the distribution of 88 male educational institutes in all education levels all over Jazan city with similar concentration in the center and the west towards the sea coast, and decrease towards the north and towards the south. This is noted in the case of both primary and intermediate levels those include 56 institutes (63.7). The numbers rest of the institutes continue to decline till they disappear from existence in some neighborhoods such as in Alsafa

## 2.1 Female educational institution distribution

Variation in female educational institutes distribution in Jazan city neighborhoods is noted from looking to Table (2) and Figure (3). The reason for that goes back the history of the city development that started from the center and extended to the north accompanied with the establishment of the other services in the city. It is noted that the institutes are highly concentrated, especially the Investment Area neighborhood which includes Plans 5, 6, 7, and 8. This concentration is noted also in Rawdah north and Rawdah south as they include 30% (42) of the total institutes in the study area. The concentration decreases in Safa, Mohamadiyah and Thuraya

The present study categorized female educational institutes in the neighborhoods of Jazan city as follows:

Neighborhoods with more than 15 % educational institutes. Those are represented by the Investment Area (plans 5 – 6 – 7 – 8), and Rawdah neighborhoods. The reason for this distinction is that Investment Area neighborhood is old, added to it existing nearby the sea coast and the area is rich with gardens, parks and different services, and the adjacency of the plans to each other's; all attracted so many people to live there. Rawdah-south and north-is characterized by having many educational institutes; as it is one of the old neighborhoods of Jazan city

**Table 2 Distribution of female educational institutes by neighborhood in Jazan city**
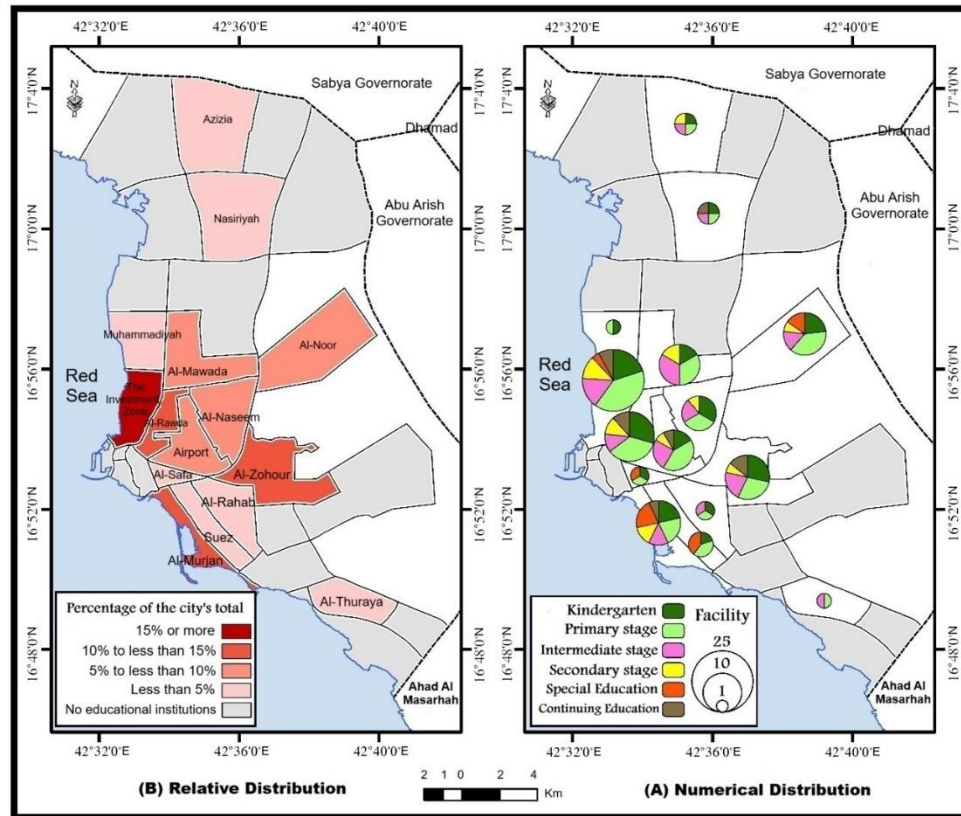
| Neighborhood | Kinder | | Primary | | Intermedi-ate | | Secondary | | Private | | Continuing | | total | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No | % | No | % | No | % | No | % | No | % | No | % | No | % |
| Airport | 2 | 6.1 | 5 | 10.4 | 3 | 11.5 | 1 | 7.1 | - | - | 1 | 11.1 | 12 | 8.63 |
| Rawdah | 5 | 15.2 | 6 | 12.5 | 2 | 7.7 | 2 | 14.3 | - | - | 2 | 22.2 | 17 | 12.23 |
| Safa | 1 | 3 | 1 | 2.1 | - | - | - | - | 1 | 11.1 | - | - | 3 | 2.16 |
| Invest. A | 5 | 15.2 | 10 | 20.8 | 4 | 15.4 | 3 | 21.4 | 1 | 11.1 | 2 | 22.2 | 25 | 18.00 |
| Mawaddah | 2 | 6.1 | 4 | 8.3 | 4 | 15.4 | 2 | 14.3 | - | - | - | - | 12 | 8.63 |
| Nasirya | 1 | 3 | 1 | 2.1 | 1 | 3.8 | - | - | - | - | 1 | 11.1 | 4 | 2.88 |
| Alnur | 3 | 9.1 | 5 | 10.4 | 2 | 7.7 | 1 | 7.1 | 2 | 22.2 | - | - | 13 | 9.35 |
| Azizya | 1 | 3 | 1 | 2.1 | 1 | 3.8 | 1 | 7.1 | - | - | - | - | 4 | 2.88 |
| Mohamadiya | 1 | 3 | 1 | 2.1 | - | - | - | - | - | - | - | - | 2 | 1.44 |
| Naseem | 3 | 9.1 | 3 | 6.25 | 2 | 7.7 | 1 | 7.1 | - | - | - | - | 9 | 6.47 |
| Alzuhur | 4 | 12.1 | 4 | 8.3 | 3 | 11.5 | 1 | 7.1 | - | - | 2 | 22.2 | 14 | 10.07 |
| Suez | 1 | 3 | 2 | 4.16 | - | - | - | - | 2 | 22.2 | - | - | 5 | 3.60 |
| Marajan | 3 | 9.1 | 3 | 6.25 | 2 | 7.7 | 2 | 14.3 | 3 | 33.3 | 1 | 11.1 | 14 | 10.07 |
| Thuraya | - | - | 1 | 2.1 | 1 | 3.8 | - | - | - | - | - | - | 2 | 1.44 |
| Rehab | 1 | 3 | 1 | 2.1 | 1 | 3.8 | - | - | - | - | - | - | 3 | 2.16 |
| Total | 33 | 23.7 | 48 | 34.5 | 26 | 18.7 | 14 | 10.7 | 9 | 6.5 | 9 | 6.5 | 139 | 100 |

Source of data: Municipality of Jazan Distric

- Neighborhoods with 10% to less than 15 % of the educational institutes. This category includes 5 of the neighborhoods of Jazan city: Alzuhur, and Almarjan that have 21% (28) educational institutes in Jazan city. In this category, Alnur, although is a new neighborhood, it soon became densely populated, and hence witnessed the establishment of many of private educational institutes; 9% (13) of the total of Jazan city. What is worth noting is that both Airport and Mawaddah neighborhoods, though they are old and have high population density and in need especially of intermediate and secondary schools, they include only 8.6% of educational institutes each.

- Neighborhoods with 5 % to less than 10 % of the educational institutes. This category includes 2 neighborhoods: Naseem (6.46%), and Suez (3.6%) of the total number of the educational institutes in Jazan city. These neighborhoods, until recent, were sparsely populated with few numbers of educational institutes. People began later to move to them deserting other old neighborhoods that would be removed.

- Neighborhoods with less than 5 % of the educational institutes: This category includes 2 of the neighborhoods: Safa (3%), Rehab (3%), Mohamadiyah (2%), Nasiriyah (4%), Aziziyah (4%), Althuriya (2%). The need is real for providing this category with some educational institutes in future.



Source: made by the author depending on data obtained from the Municipality of Jazan Districts

**Fig. 3 Geographical distribution of educational institutes according to males and females in Jazan city neighborhoods, 2023**

The distribution of educational institutes varies from neighborhood to another for different reasons. The gain of the largest numbers on educational institutes by the central and the western parts of the city is due to them being the oldest neighborhoods added to being existed nearby the sea coast and the area is rich with gardens, parks and different services and the relative larger numbers of educational institutes and the attractive northern corniche. this pulling movement has been accelerated by push of shifting some educational institutes from some areas originally are agricultural lands at the city outskirt; such as Alnur and Alzuhur. The neighborhoods that lack educational services are because they are newly established. Those are Nasiriyah, Aziziyah, Rehab, and Althuriya.

## 2.2 Male educational institution distribution

The total number of all the different levels of education reached 88 schools, varies from a neighborhood to another. From Table 3 and Fig. 4 Male educational institutes are categorized according to neighborhoods of Jazan city as follows:

- Neighborhoods with more than 10 % educational institutes in the study area. Those are represented by the Investment Area (plans 5 – 6 – 7 – 8), and Rawdah neighborhoods. They all reached 28.2% (25) from the total number of them in Jazan city.

- Neighborhoods with 5 % to less than 10 % of the educational institutes. This category includes 7 of the neighborhoods: Suez, Mawaddah, Shamiya, Rawabi, Airport Alnur, Alzuhur, where they include 47% (41) of the total number of the educational institutes in Jazan city
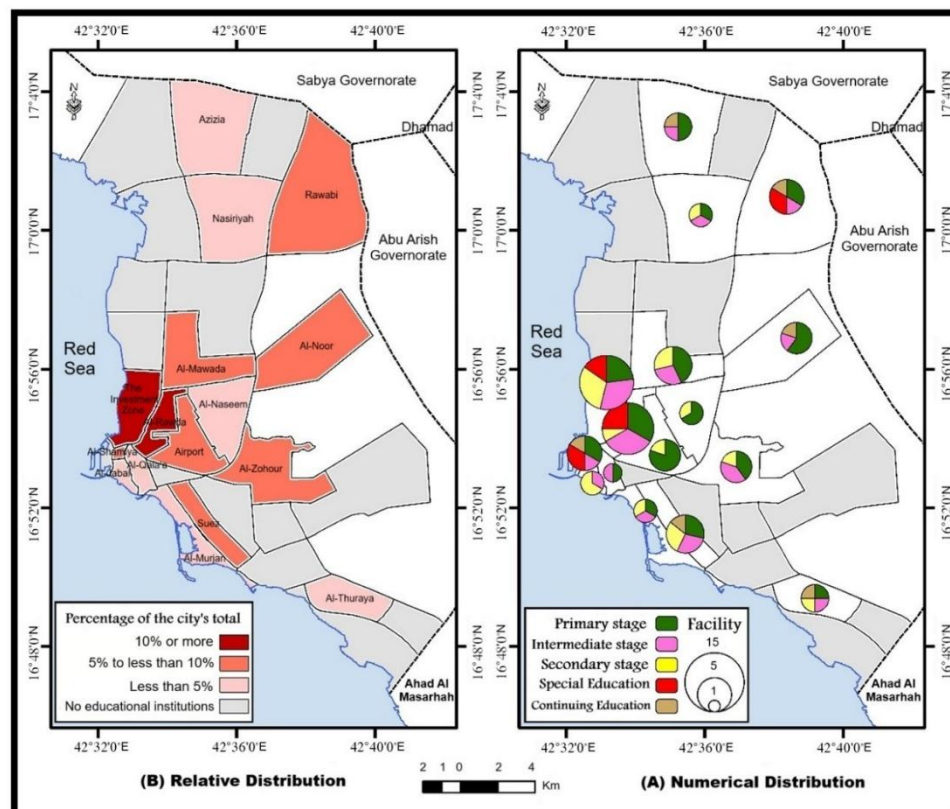
- Neighborhoods with less than 5 % of the educational institutes: This category includes 7 neighborhoods: Aziziyah,

Althuriya, Al Jabal, Nasiriya, Naseem, Marjan, Qalaa. They all together reached 25% (22) of the total number of them in Jazan city. Only one neighborhood is void of any educational institutes despite it is

densely populated.

**Table 3 Distribution of Male educational institutes by neighborhood of Jazan city in the year 2023**

| Neighborhood | Primary | | Intermedi-ate | | Secondary | | Private Education | | Continuing Education | | total | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No | % | No | % | No | % | No | % | No | % | No | % |
| Airport | 4 | 12.12 | - | - | 1 | 5.88 | - | - | - | - | 5 | 5.68 |
| Rawdah | 4 | 12.12 | 4 | 17.39 | 1 | 5.88 | 3 | 33.33 | - | - | 12 | 13.46 |
| Safa | - | - | - | - | - | - | - | - | - | - | - | - |
| Qalaa | 1 | 3.03 | 1 | 4.35 | - | - | - | - | - | - | 2 | 2.27 |
| Jabal | - | - | 1 | 4.35 | 2 | 11.76 | - | - | - | - | 3 | 3.41 |
| Shamiyah | 2 | 6.06 | 1 | 4.35 | - | - | 2 | 22.22 | 1 | 16.67 | 6 | 6.82 |
| Invest. Area | 3 | 9.09 | 4 | 17.39 | 4 | 23.53 | 2 | 22.22 | - | - | 13 | 14.77 |
| Mawaddah | 3 | 9.09 | 2 | 8.70 | 2 | 11.76 | - | - | - | - | 7 | 7.95 |
| Nasiryah | 1 | 3.03 | 1 | 4.35 | 1 | 5.88 | - | - | - | - | 3 | 3.41 |
| Alnur | 3 | 9.09 | 1 | 4.35 | - | - | - | - | 1 | 16.67 | 5 | 5.68 |
| Aziziyah | 2 | 6.06 | 1 | 4.35 | - | - | - | - | 1 | 16.67 | 4 | 4.55 |
| Rawabi | 2 | 6.06 | 1 | 4.35 | - | - | 2 | 22.22 | 1 | 16.67 | 6 | 6.82 |
| Naseem | 2 | 6.06 | - | - | 1 | 5.88 | - | - | - | - | 3 | 3.41 |
| Alzuhur | 2 | 6.06 | 2 | 8.70 | 1 | 5.88 | - | - | - | - | 5 | 5.68 |
| Suez | 2 | 6.06 | 2 | 8.70 | 2 | 11.76 | - | - | 1 | 16.67 | 7 | 7.95 |
| Marajan | 1 | 3.03 | 1 | 4.35 | 1 | 5.88 | - | - | - | - | 3 | 3.41 |
| Thuraya | 1 | 3.03 | 1 | 4.35 | 1 | 5.88 | - | - | 1 | 16.67 | 4 | 4.55 |
| Total | 33 | 37.5 | 23 | 26.1 | 17 | 19.3 | 9 | 10.2 | 9 | 10.2 | 88 | 100 |

Source of data: Municipality of Jazan District



Source: based on Data from Table 2

**Fig.4 Numerical and relative distribution of female educational institutes for Jazan city neighborhoods, 2023**

The previous analysis revealed the reasons behind the variation in distribution of educational institutes. The age of some neighborhoods, and the distinction of being an entertainment area, all have an obvious role in the localization and concentration of educational institutes. The Investment Area is a good example for the strong attraction factors that noted weak in other neighborhoods that exist in the outskirt of the city that extended in the agricultural lands, or those newly resided neighborhoods. For these reasons they are characterized by few or no institutes.

The study also revealed that the total number of girls' schools exceeds that of boys. Many reasons led to this result: Data obtained from the Saudi General Authority for Statistics showed that the number of females exceeds the number of boys. Added to that, the numbers in classes in boys' schools are more crowded than in girls' schools. Lastly because of transferring basic classes in boys' primary schools to girls' schools.

## 3. FEMALE EDUCATIONAL INSTITUTES DISTRIBUTION ACCORDING TO DEPENDENCY

ducational institutes in Jazan city vary, in their dependency between governmental, private, international and foreign institutes. The following section will be devoted to some details of this variability (see Table 4 and fig.5).

**(1) governmental educational institutes.** These institutes are categorized as follows:

- Neighborhoods with more than 10 % educational institutes. They included 75 governmental institutes distributed in 6 neighborhoods; those are**:** The Investment Area, Naseem, Marjan, Rawdah, Alnur, Alzuhur**.**

- Neighborhoods with 5% to less than 10 % educational institutes, including 10 institutes distributed in 2 neighborhoods; the Airport and Mawaddah**.**

- Neighborhoods with less than 5% (12) educational institutes, distributed in 5 neighborhoods; Safa, Nasiriya, Azizya, Suez, Thuriya.

**(2) National private educational institutes.** These institutes are categorized as follows (Table 5 and Fig. 6):
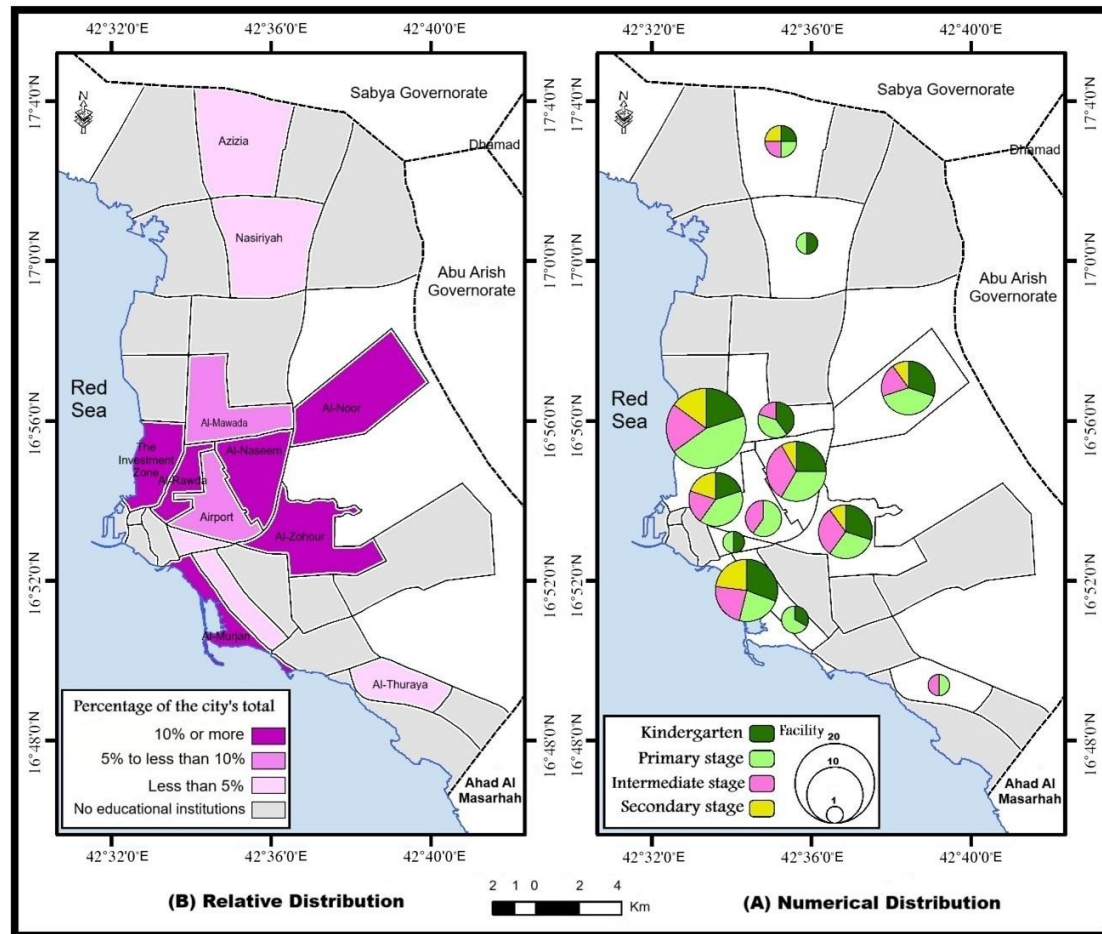
- Neighborhoods with more than 20 % (9) of the total national private educational institutes, distributed in the Investment Area and Rawdah.

- Neighborhoods with between 10% and less than 20 % (8) of the total national private educational institutes, distributed in

Mawaddah, Rehab, Alzuhur and Suez.

**Table 4 Geographical distribution of female governmental educational institutes according to dependency for Jazan city, 2023**

| Neighborhood | Kinder | | Primary | | Intermediate | | Secondary | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | No. | % | No. | % |
| Airport | 0 | 0 | 3 | 3.0 | 2 | 2.0 | 0 | 0 | 5 | 5.1 |
| Rawdah | 2 | 2.0 | 4 | 4.0 | 2 | 2.0 | 2 | 2.0 | 10 | 10.2 |
| Safa | 1 | 1.0 | 1 | 1.0 | 0 | 0 | 0 | 0 | 2 | 2.0 |
| Investment Area | 4 | 4.0 | 9 | 9.0 | 4 | 4.0 | 3 | 3.0 | 20 | 20.4 |
| Mawaddah | 2 | 2.0 | 2 | 2.0 | 1 | 1.0 | 0 | 0 | 5 | 5.1 |
| Nasiriyah | 1 | 1.0 | 1 | 1.0 | 0 | 0 | 0 | 0 | 2 | 2.0 |
| Alnur | 3 | 3.0 | 4 | 4.0 | 2 | 2.0 | 1 | 1.0 | 10 | 10.2 |
| Aziziyah | 1 | 1.0 | 1 | 1.0 | 1 | 1.0 | 1 | 1.0 | 4 | 4.0 |
| Naseem | 3 | 3.0 | 4 | 4.0 | 4 | 4.0 | 1 | 1.0 | 12 | 12.2 |
| Alzuhur | 3 | 3.0 | 3 | 3.0 | 3 | 3.0 | 1 | 1.0 | 10 | 10.2 |
| Suez | 1 | 1.0 | 2 | 2.0 | 0 | 0 | 0 | 0 | 3 | 3.0 |
| Marjan | 4 | 4.0 | 3 | 3.0 | 3 | 3.0 | 3 | 3.0 | 13 | 13.2 |
| Thurya | 0 | 0 | 1 | 1.0 | 1 | 1.0 | 0 | 0 | 2 | 2.0 |
| Total | 25 | 25.5 | 38 | 38.8 | 23 | 23.5 | 12 | 12.2 | 98 | 100 |

Source of data: Planning Section, Education Department, Jazan Administration Region,2023
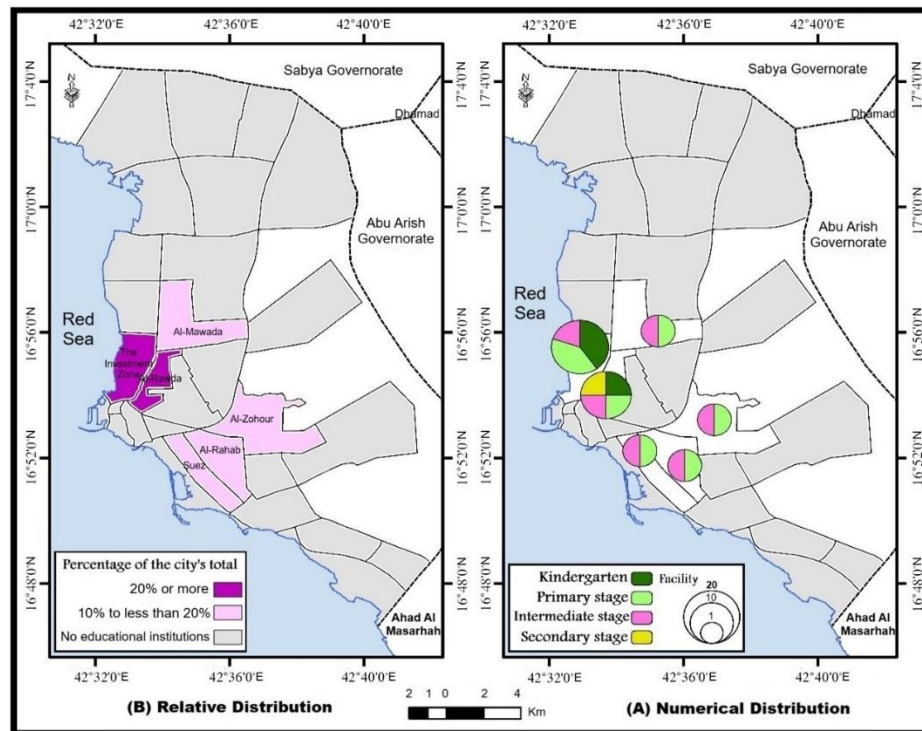
Source: Date from Table 4

**Fig.5 Numerical and relative distribution of female educational institutes according to dependency for Jazan city, 2023**

**Table 5 Distribution of female private educational institutes according to dependency for Jazan city, 2023**

| Neighborhood | Kinder | | Primary | | Intermediate | | Secondary | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | No. | % | No. | % |
| Rawdah | 1 | 33.3 | 1 | 14.3 | 16.7 | 1 | 1 | 100 | 4 | 23.5 |
| Investment Area | 2 | 66.7 | 2 | 28.6 | 16.7 | 1 | - | - | 5 | 29.4 |
| Mawaddah | - | - | 1 | 14.3 | 16.7 | 1 | - | - | 2 | 11.8 |
| Rehab | - | - | 1 | 14.3 | 16.7 | 1 | - | - | 2 | 11.8 |
| Alzuhur | - | - | 1 | 14.3 | 16.7 | 1 | - | - | 2 | 11.8 |

Source of data: Planning Section, Education Department, Jazan Administration Region,2023

Source: Date from Table 5

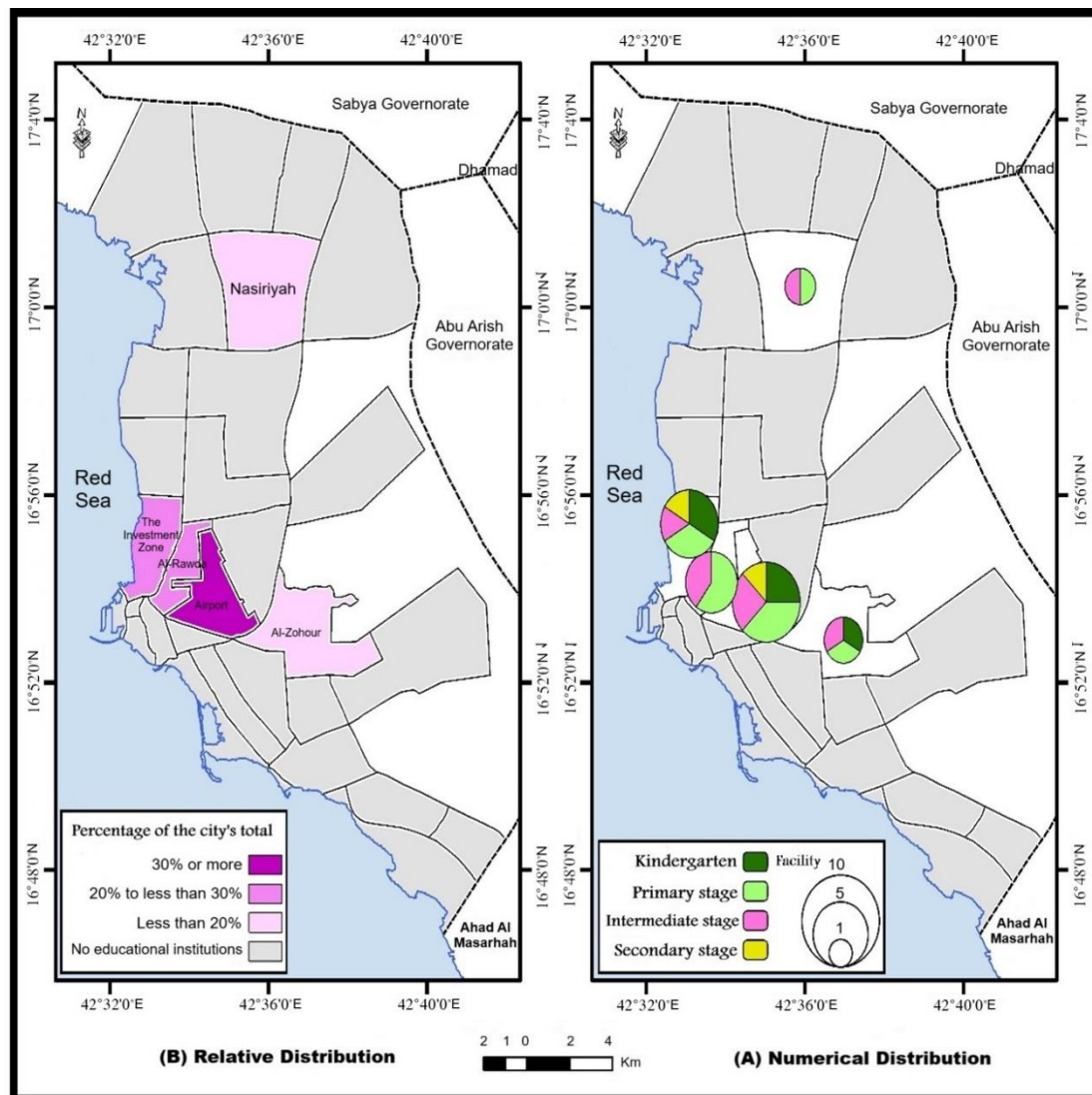**Fig. 6 Distribution of female private educational institutes according to dependency for Jazan city, 2023**

**(3) International and foreign educational institutes.** These institutes are categorized as follows (Table 6 and Fig. 7):

- Neighborhoods with more than 30% (8) of the total International and foreign educational institutes, distributed in Airport neighborhood.

- Neighborhoods with 20% to less than 30% (11) of the total International and foreign educational institutes, distributed in Rawdah and the Investment Area neighborhoods.

- Neighborhoods with less than 20% of the total International and foreign educational institutes; 3 schools established in Alzuhur and 2 in Nasiriyah.

From the presented Tables, it could be generalized that the distribution of female educational institutes varies amongst neighborhoods; be it governmental, national private, international foreign ones. Governmental educational institutes occupied the largest number (98) for all levels, the private national (24), and the international and foreigner (17) from the total number of educational institutes

**Table 6 Distribution of female educational institutes by dependency in international and foreign section in Jazan city, 2023**

| Neighborhood | Kinder | | Primary | | Intermedi-ate | | Secondary | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | No. | % | No. | % |
| Airport | 2 | 40 | 3 | 30 | 2 | 28.6 | 1 | 50 | 8 | 33.3 |
| Rawdah | - | - | 3 | 30 | 2 | 28.6 | - | - | 5 | 20.8 |
| Investment Area | 2 | 40 | 2 | 20 | 1 | 14.3 | 1 | 50 | 6 | 25.0 |
| Nasiriyah | - | - | 1 | 10 | 1 | 14.3 | - | - | 2 | 8.3 |
| Alzuhur | 1 | 20 | 1 | 10 | 1 | 14.3 | - | - | 3 | 12.5 |
| Total | 5 | 20.8 | 10 | 41.7 | 7 | 29 | 2 | 8.3 | 24 | 100 |

Source of data: Planning Section, Education Department, Jazan Administration Region,2023

Source: Data from Tabe 6

**Fig. 7 Distribution of female educational institutes in the international and foreign sector according to dependency in Jazan city for the year 20**

## 4. MALE EDUCATIONAL INSTITUTES DISTRIBUTION ACCORDING TO DEPENDENCY

Educational institutes in Jazan city vary, in their dependency between governmental, private, international and foreign institutes. The following section will be devoted to some details of this variability (see Table 7 and fig.8).
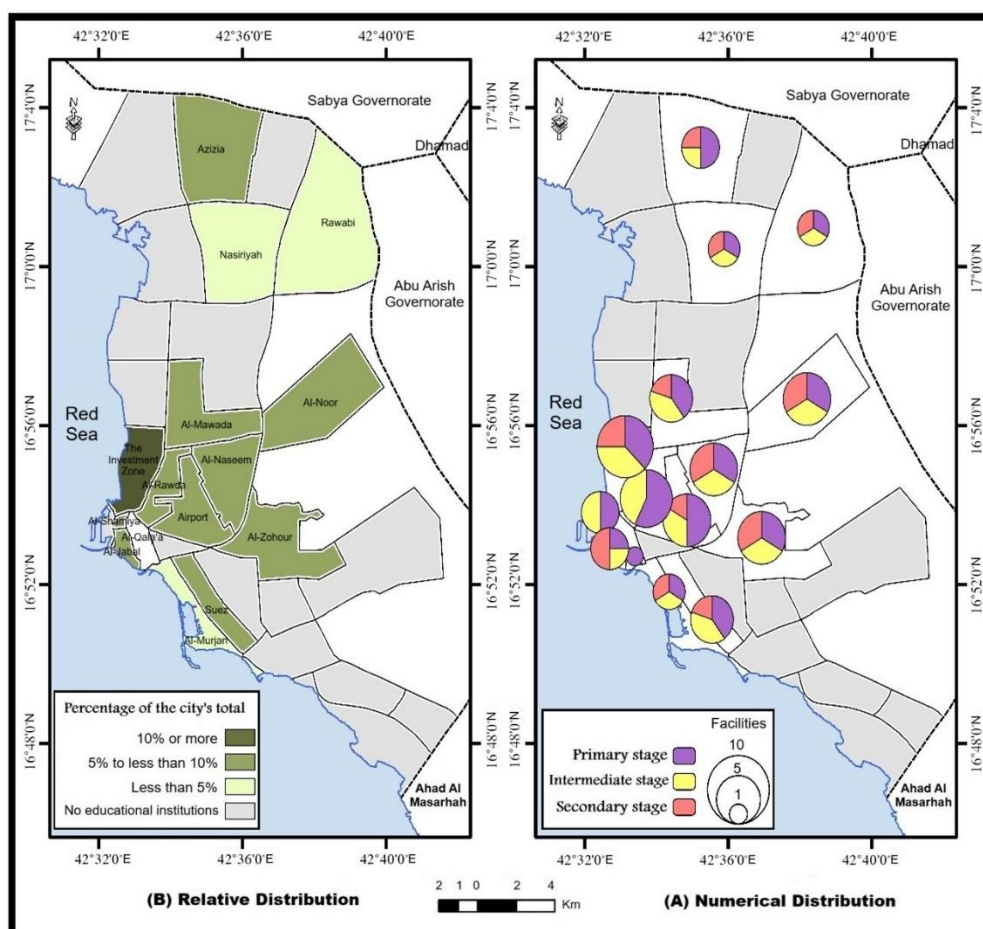
**(1) governmental educational institutes.** These institutes are categorized as follows:

- Neighborhoods with more than 10% of the governmental educational institutes, distributed in 6 neighborhoods: The Airport, Rawdah Investment Area, Alnur, Naseem, and Alzuhur. They have 54.6% (39) of the total number of governmental institutes.

- Neighborhoods with 5% to less than 10% of the total male governmental educational institutes in Mawaddah and Suez neighborhood.

- Neighborhoods with less than 5% of the total male governmental educational institutes, distributed in 6 neighborhoods: Nasiriyah, Aziziyah, Rawabi, Marjan, Qalaa, Shamiyah and Jabal.

**Table 7 Distribution of private male educational institutes according to dependency in Jazan city for the year 2023**

| Neighborhood | Primary | | Intermediate | | Secondary | | Total | |
|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | No. | % |
| Airport | 3 | 4.2 | 2 | 2.8 | 1 | 1.4 | 6 | 8.4 |
| Rawdah | 4 | 5.6 | 3 | 4.2 | 0 | 0 | 7 | 9.8 |
| Investment Area | 3 | 4.2 | 3 | 4.2 | 2 | 2.8 | 8 | 11.2 |
| Mawaddah | 2 | 2.8 | 2 | 2.8 | 1 | 1.4 | 5 | 7.0 |
| Nasiriyah | 1 | 1.4 | 1 | 1.4 | 1 | 1.4 | 3 | 4.2 |
| Alnur | 2 | 2.8 | 2 | 2.8 | 2 | 2.8 | 6 | 8.4 |
| Aziziyah | 2 | 2.8 | 1 | 1.4 | 1 | 1.4 | 4 | 5.6 |
| Naseem | 2 | 2.8 | 2 | 2.8 | 2 | 2.8 | 6 | 8.4 |
| Rawabi | 1 | 1.4 | 1 | 1.4 | 1 | 1.4 | 3 | 4.2 |
| Alzuhur | 2 | 2.8 | 2 | 2.8 | 2 | 2.8 | 6 | 8.4 |
| Suez | 2 | 2.8 | 2 | 2.8 | 1 | 1.4 | 5 | 7.0 |
| Marjan | 1 | 1.4 | 1 | 1.4 | 1 | 1.4 | 3 | 4.2 |
| Qalaa | 1 | 1.4 | 0 | 0 | 0 | 0 | 1 | 1.4 |
| Shamiyah | 2 | 2.8 | 2 | 2.8 | 0 | 0 | 4 | 5.6 |
| Jabal | 1 | 1.4 | 1 | 1.4 | 2 | 2.8 | 4 | 5.6 |
| Total | 29 | 100 | 25 | 100 | 17 | 100 | 71 | 100 |

Source of data: Planning Section, Education Department, Jazan Administration Region,2023



Source: Data from Tabe 7

**Fig. 8 Distribution of governmental educational institutes according to dependency in Jazan city for the year 2023**

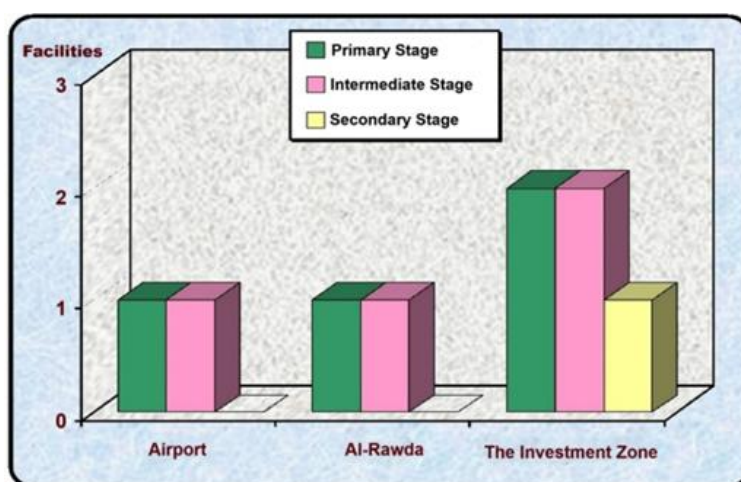**(1)    Private national educational institutes**

Looking to Table 8 and Fig. 9 it is noted that neighborhoods included private national educational institutes could be put into two categories as follows:

- Neighborhood included more than 5 private national educational institutes; all in Investment Area neighborhood and this represents 55% of the total educational institutes.

- Neighborhood included less than 5 private national educational institutes (4), distributed into Airport and Rawdah neighborhoods, and this represents 44% of the total educational institutes.

**Table 8 Distribution of private male educational institutes according to dependency in Jazan city for the year 2023**

| Neighborhood | Primary | | Intermedi-ate | | Secondary | | Total | |
|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | No. | % |
| Airport | 1 | 25 | 1 | 25 | - | - | 2 | 22.2 |
| Rawdah | 1 | 25 | 1 | 25 | - | - | 2 | 22.5 |
| Investment Area | 2 | 50 | 2 | 50 | 1 | 100 | 5 | 55.5 |
| Total | 4 | 44.4 | 4 | 44.4 | 1 | 11.2 | 9 | 100 |

Source of data: Planning Section, Education Department, Jazan Administration Region,2023



Source: Data from Tabe 7

**Fig. 9 Distribution of private male educational institutes according to dependency in Jazan city for the year 2023**

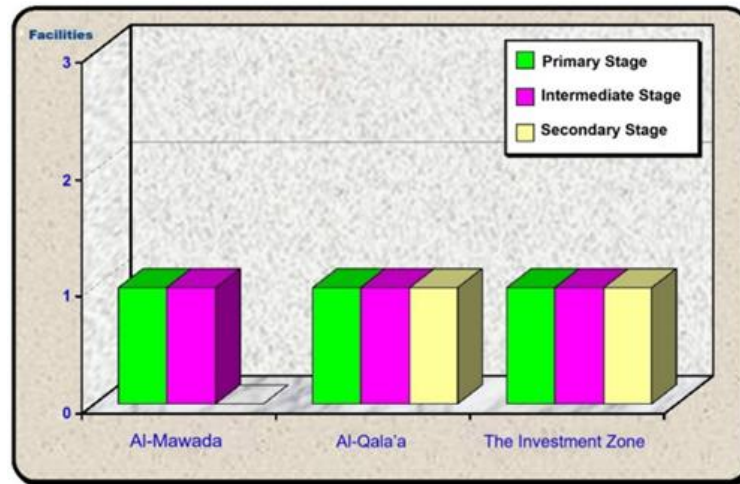**(2)    International and foreign educational institutes**

From Table 9 and Fig. 10 it is noted that three neighborhoods only included all international foreign educational institutes (8); those are: Mawaddah, Qalaa and Investment Area neighborhood.

**Table 9 Distribution of male educational institutes in the international and foreign sector according to dependency in Jazan city for the year 2023**

| Neighborhood | Primary | | Intermedi-ate | | Secondary | | Total | |
|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | No. | % |
| Mawaddah | 1 | 12.5 | 1 | 12.5 | – | - | 2 | 25 |
| Qalaa | 1 | 12.5 | 1 | 12.5 | 1 | 12.5 | 3 | 37,5 |
| Investment Area | 1 | 12.5 | 1 | 12.5 | 1 | 12.5 | 3 | 37,5 |
| Total | 3 | 37.5 | 3 | 37.5 | 2 | 25 | 8 | 100 |

Source of data: Planning Section, Education Department, Jazan Administration Region,2023

Source: Data from Tabe 7

**Fig. 10 Distribution of male educational institutes in the international and foreign sector according to dependency in Jazan city for the year 2023**

By and large, and inspecting Tables 7, 8, 9, and 10 it is noted that distribution of all kinds of male educational institutes varies between neighborhoods. Governmental, private and international male educational institutes in Jazan city reached 71, 9, 8 respectively.

## 5. DISTRIBUTION OF EDUCATIONAL INSTITUTES ACCORDING TO AREA AND POPULATION

Establishing of educational institutes in any city neighborhoods is affected by their population numbers and areas. As they constitute the cornerstone of the development of cities and regions. The increase in the number of educational institutes is an indicator of population growth and areal expansion, the thing that results in the need for more than one educational institute in each neighborhood.

From Table 10 and Figs. 11 and 12 we note the following about population and area in neighborhoods of Jazan city:

- **Population numbers**

The population number in Jazan city reached 165457 persons in the year 2023. In the present study neighborhoods of the city are categorized as follows:

**Category 1.** Ten neighborhoods with less than 10 thousand persons. Those are: Aziziyah, Naseem, Alzuhur, Thuriya, Alnur, Marjan, Rehab, Shamiya, Jabal, and Qalaa. This category included 59 females and 19 male educational institutes from the total number in Jazan city.

**Category 2.** One neighborhood; Safa with 10 – 20 thousand persons. This neighborhood included 3 female educational institutes and no one for males.
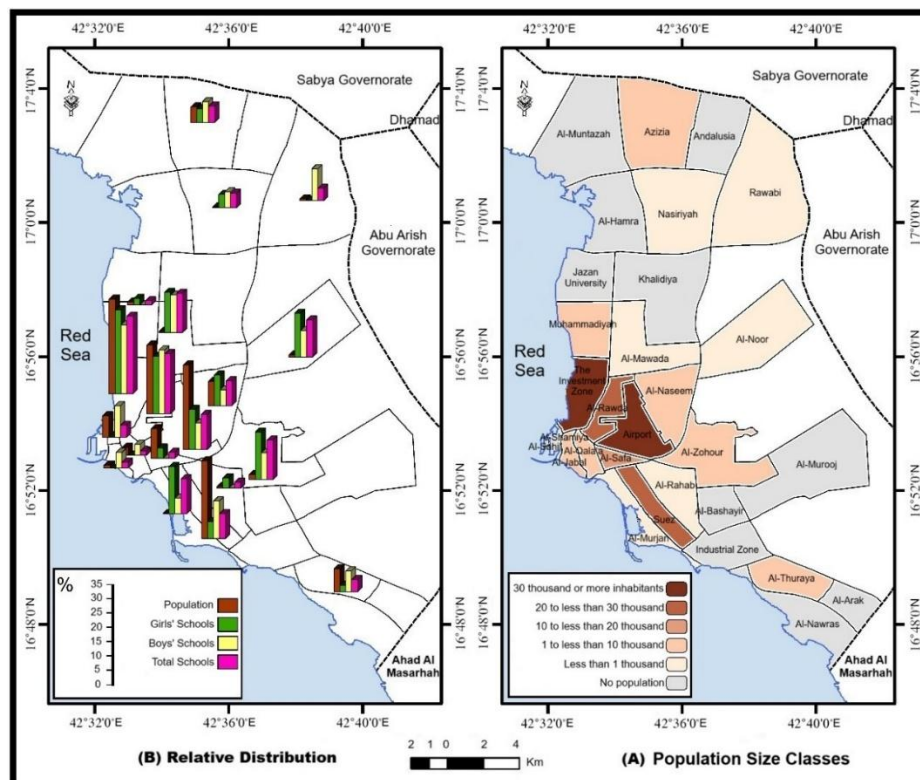
**Category 3.** Three neighborhoods; Airport, Rawdah and Suez with 20 – 30 thousand persons. This category included 34 females and 24 male educational institutes.

**Category 4.** One neighborhood; the Investment Area (plans 5 - 6-7- 8) with more than 30 thousand persons and with 25 educational institutes. This neighborhood included 3 female educational institutes and none for males.

**Table 10 Numerical and relative distribution of educational institutes in Jazan city neighborhoods according to population and area in the year 2023**

| Neighborhood | Population | | Area | | School | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | No | % | Km² | % | Females | % | Males | % | Total | % |
| Thurayia | 8093 | 4.9 | 7.00 | 2.4 | 2 | 1.4 | 4 | 4.5 | 6 | 2.6 |
| Indust. Area | 0 | 0 | 7.77 | 2.6 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bashair | 0 | 0 | 5.36 | 1.8 | 0 | 0 | 0 | 0 | 0 | 0 |
| Suez | 27396 | 16.6 | 5.61 | 1.9 | 5 | 3.6 | 7 | 8.0 | 12 | 5.3 |
| Rehab | 655 | 0.4 | 7.57 | 2.5 | 3 | 2.2 | 0 | 0 | 3 | 1.3 |
| Safa | 10582 | 6.4 | 1.95 | 0.7 | 3 | 2.2 | 0 | 0 | 3 | 1.3 |
| Shamiyah | 7633 | 4.6 | 0.45 | 0.1 | 0 | 0 | 6 | 6.8 | 6 | 2.6 |
| Qalaa | 2900 | 1.8 | 2.32 | 0.8 | 0 | 0 | 2 | 2.3 | 2 | 0.9 |
| Alzuher | 1606 | 1.0 | 13.42 | 4.5 | 14 | 10.1 | 5 | 5.7 | 19 | 8.4 |
| Moruj | 0 | 0 | 21.38 | 7.2 | 0 | 0 | 0 | 0 | 0 | 0 |
| Airport | 30001 | 18.1 | 8.18 | 2.8 | 12 | 8.6 | 5 | 5.7 | 17 | 7.5 |
| Naseem | 8660 | 5.2 | 9.72 | 3.3 | 9 | 6.5 | 3 | 3.4 | 12 | 5.3 |
| ALnur | 630 | 0.4 | 16.85 | 5.7 | 13 | 9.4 | 5 | 5.7 | 18 | 7.9 |
| Khalidiyah | 0 | 0 | 19.63 | 6.6 | 0 | 0 | 0 | 0 | 0 | 0 |
| Nasiriyah | 280 | 0.2 | 18.24 | 6.1 | 4 | 2.9 | 3 | 3.4 | 7 | 3.1 |
| Nauras | 0 | 0 | 9.97 | 3.4 | 0 | 0 | 0 | 0 | 0 | 0 |
| Arak | 0 | 0 | 4.86 | 1.6 | 0 | 0 | 0 | 0 | 0 | 0 |
| Marjan | 154 | 0.1 | 5.28 | 1.8 | 14 | 10.1 | 3 | 3.4 | 17 | 7.5 |
| Mawaddah | 380 | 0.2 | 11.37 | 3.8 | 12 | 8.6 | 7 | 8.0 | 19 | 8.4 |
| Rawdah | 24340 | 14.7 | 4.42 | 1.5 | 17 | 12.2 | 12 | 13.6 | 29 | 12.8 |
| Jazan Univ. | 0 | 0 | 7.97 | 2.7 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mohamadiyah | 1218 | 0.7 | 7.60 | 2.6 | 2 | 1.4 | 0 | 0 | 2 | 0.9 |
| Rawabi | 613 | 0.4 | 26.93 | 9.1 | 0 | 0 | 6 | 6.8 | 6 | 2.6 |

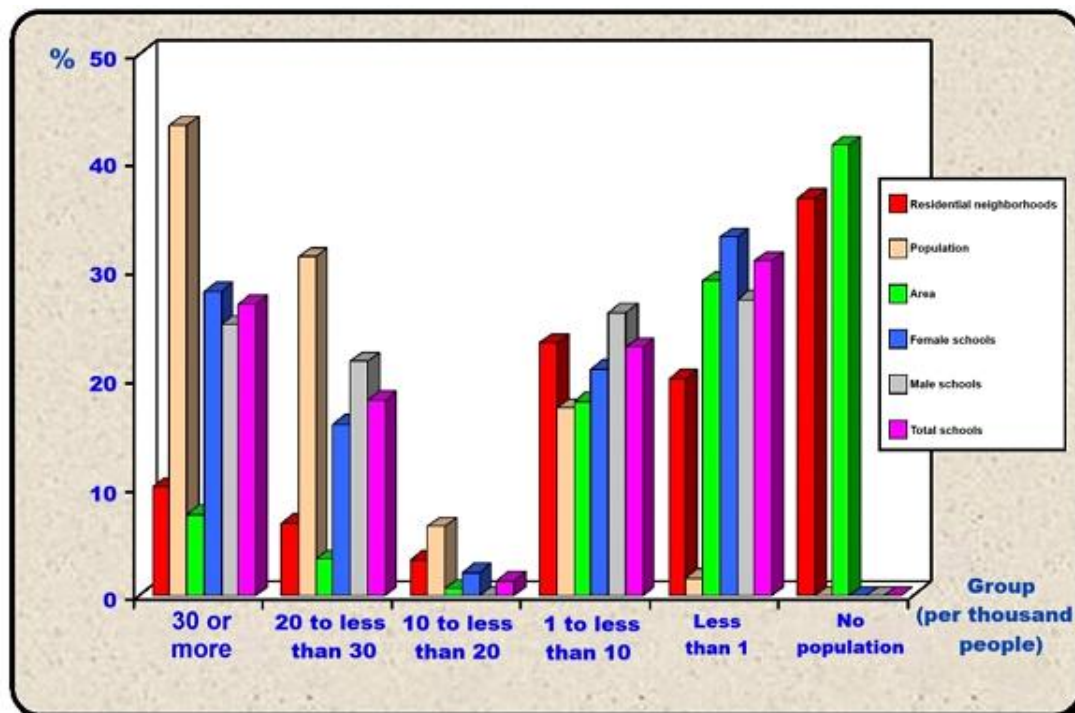Source of data: Planning Section, Education Department, Jazan Administration Region,2023



Source: Data from Tabe 10

**Fig.11 Numerical and relative distribution of educational institutes in Jazan city neighborhoods according to population and area in the year 2023**

**Table 11 Population numbers and educational institutes in neighborhoods of Jazan city in the year 2023**

| Category 1000 persons | neighborhood | | Population | | Area | | School | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No | % | No | % | Km² | % | Females | % | Males | % | Total | % |
| + 30000 | 3 | 10.0 | 71761 | 43.4 | 22.3 | 7.5 | 39 | 28.1 | 22 | 25 | 61 | 26.9 |
| -30000 | 2 | 6.7 | 51736 | 31.3 | 10.0 | 3.4 | 22 | 15.8 | 19 | 21.6 | 41 | 18.1 |
| -20000 | 1 | 3.3 | 10582 | 6.4 | 2.0 | 0.7 | 3 | 2.2 | 0 | 0 | 3 | 1.3 |
| -10000 | 7 | 23.3 | 28666 | 17.3 | 53.2 | 17.9 | 29 | 20.9 | 23 | 26.1 | 52 | 22.9 |
| -1000 | 6 | 20.0 | 2712 | 1.6 | 86.3 | 29.0 | 46 | 33.1 | 24 | 27.3 | 70 | 30.8 |
| Unpopulated | 11 | 36.7 | - | - | 123.4 | 41.5 | - | - | - | - | - | - |
| Total | 30 | 100 | 165457 | 100 | 297.13 | 100 | 139 | 100 | 88 | 100 | 227 | 100 |

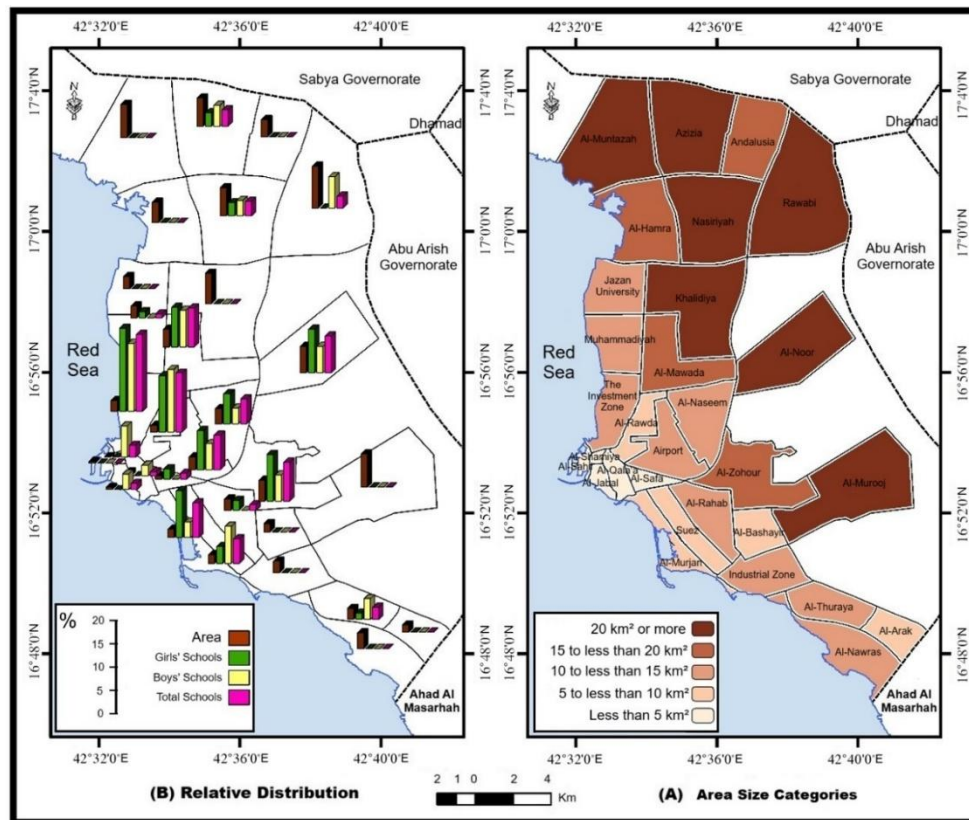Source of data: Planning Section, Education Department, Jazan Administration Region,2023



Source: Data from Tabe 11

**Fig. 12 Relative weights of Jazan city neighborhoods according to population categories for the year 2023**

**Table 12 Numerical and relative distribution of educational institutes in Jazan city according to area (Km²) for the year 2023**
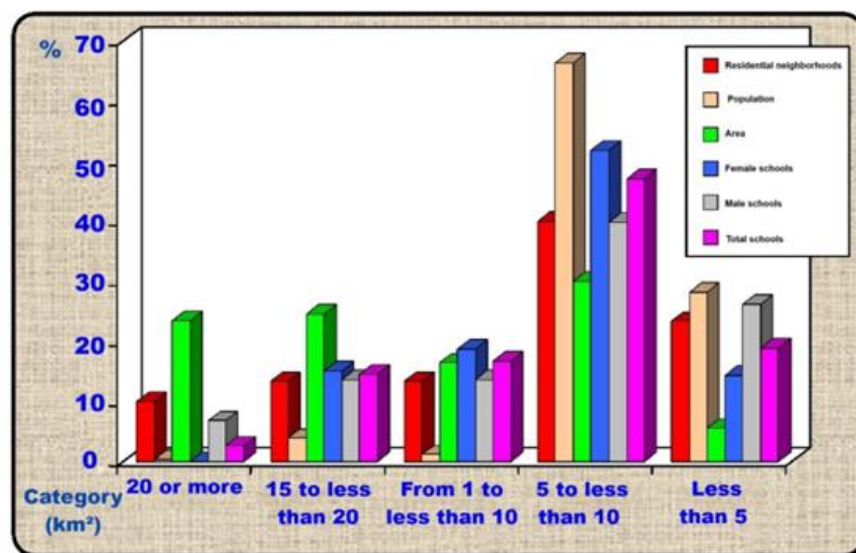
| Category (Km²) | neighborhood | | Population | | Area | | School | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No | % | No | % | Km² | % | Females | % | Males | % | Total | % |
| + 20 | 3 | 10.0 | 613 | 0 | 69.74 | 23.5 | 0 | 0 | 6 | 7 | 6 | 2.6 |
| - 20 | 4 | 13.3 | 6397 | 3.9 | 72.97 | 24.6 | 21 | 15.1 | 12 | 13.6 | 33 | 14.5 |
| -15 | 4 | 13.3 | 1986 | 1.2 | 48.76 | 16.4 | 26 | 18.7 | 12 | 13.6 | 38 | 16.7 |
| -10 | 12 | 40.0 | 109844 | 66.4 | 89.14 | 30.0 | 72 | 51.8 | 35 | 39.8 | 107 | 47.1 |
| -5 | 7 | 23.3 | 46617 | 28.2 | 16.52 | 5.6 | 20 | 14.4 | 23 | 26.1 | 43 | 18.9 |
| Total | 30 | 100 | 165457 | 100 | 297.13 | 100 | 139 | 100 | 88 | 100 | 227 | 100 |

Source of data: Planning Section, Education Department, Jazan Administration Region,2023

Source: Data from Tabe 12

**Fig. 13 Numerical and relative distribution of educational institutes in Jazan city according to area (Km$^2$) for the year 2023**



Source: Data from Tabe 12

**Fig. 14 Areas (Km²) and educational institutes in Jazan city for the year 2023**

- **Area**

Residential neighborhood areas are arranged into three categories as follows:

**Category 1.** Neighborhood with area bigger than 10 km$^2$. They are six: Mohamadiyah, Investment Area, Nasiriyah, Aziziyah, Suez and Alnur. This category included 62 females' and 30 males' educational institutes.

**Category 2.** Neighborhood with area 5 - 10 km$^2$. This category included five neighborhoods: Marjan, Thurayia, Airport, Naseem, and Rehab. It contains 40 females' and 17 males' educational institutes
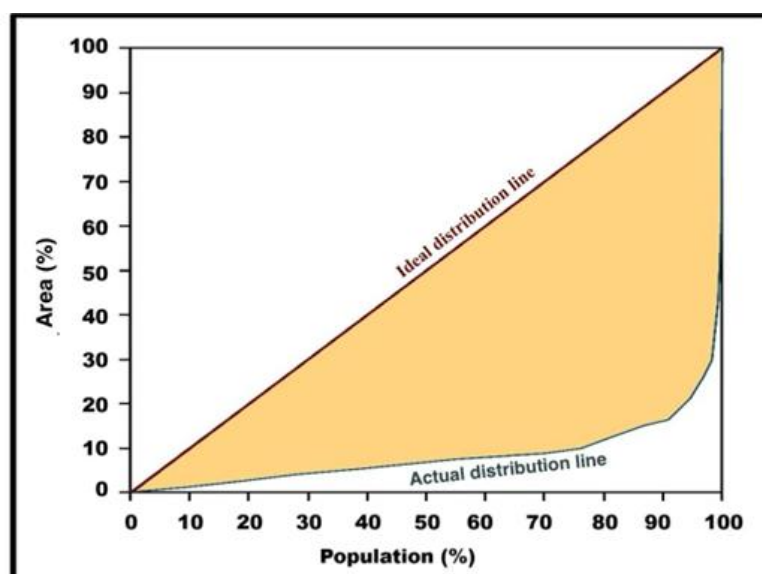
**Category 3.** Neighborhood with area less than 5 km$^2$. This category included 7 neighborhoods: Rawdah, Safa, Mawaddah, Qalaa, Jabal, Shamiyah and Rawabi. It contains 33 females and 36 males educational institutes

Table 13 presents the correlations coefficient between pairs of many variables considered in the present study. The firt thing we notice is the negative weack relationship between numbers of residents and areas they live in (- 0.28). It is known that the old neighborhood have been densly populated, added to the fact that the rich people, especially in the new neighborhoods mostly own bigger areas for their residence. Fig. 15 (Lorenz curve) shows that the relation of Jazan city population distribution with its area is nither ideal nor balanced, as only 10% of its population live in 45% of its total area. Another noticeable thing is the very strong positive significant relationship between both female (0.97) and male (0.90) pupils with the educational institutes. Ofcourse these results are generally logical, but the the big difference between the two genders needs some words to say. As mentioned elsewhere in the present study female numbers in the area in the presnt day became more than males. Added to that in Jazan city the junior classes of primary male schools are annexed to the female schools.

Fig.16 shows that the relation of population distribution with male educational institutes is nither ideal nor balanced, as only 25% of its population gained 85%, and the rest (75%) of them have only 15% of the total number. It also shows that the distribution of educational institutes among Population residences, in Jazan city for the year 2023 is far from being ideal or balanced. Only 25% of the population have 85% of the male institutes, while the rest of population (75%) have only 15% of them. This fact is also real for the female institutes. 20% of the people own 80% of them. Only 10% of them own 50% of those educational institutes
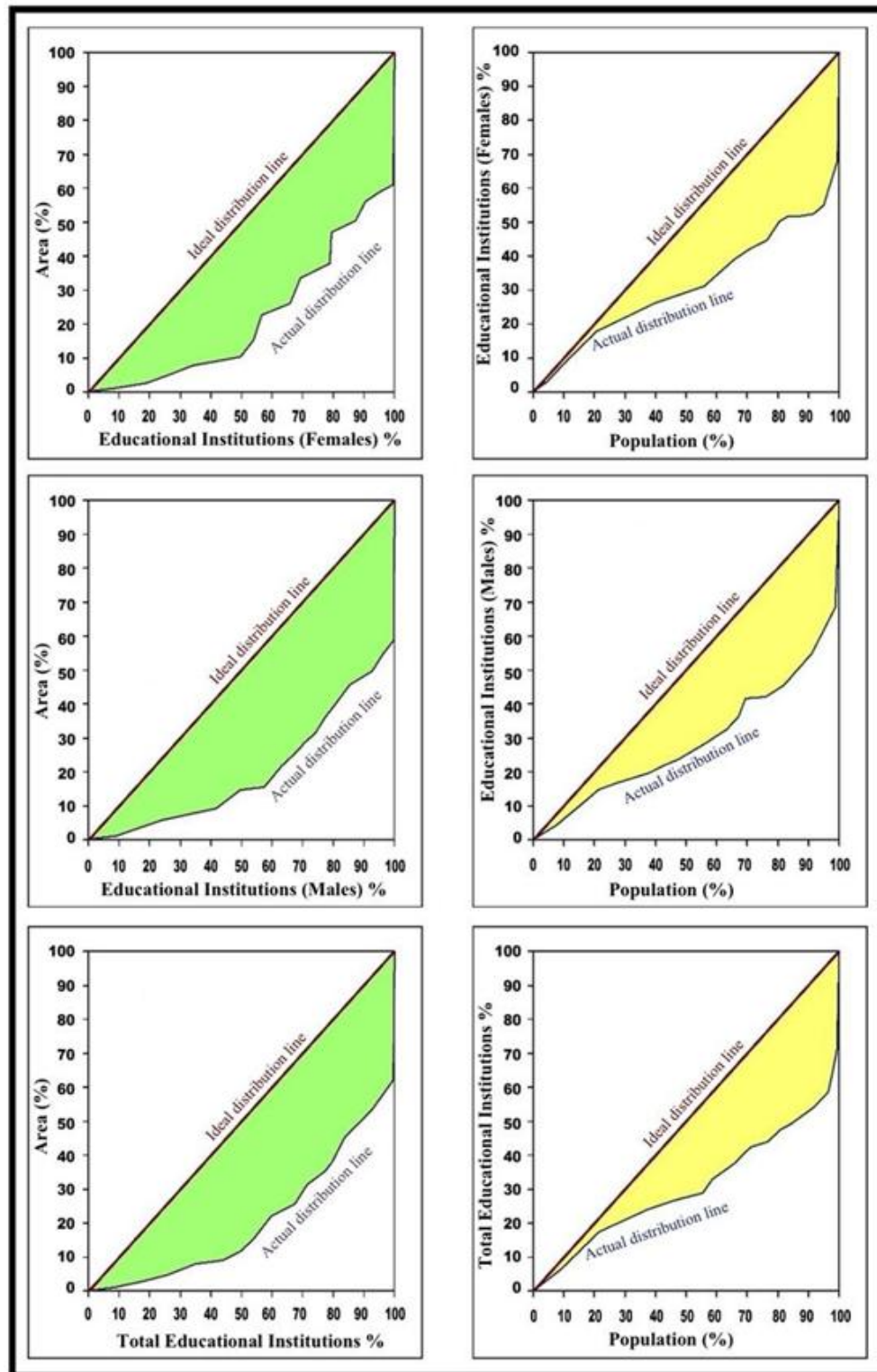
**Table 13 Correlation coefficients of the variables used in the study**

| Variable | Correlation-coefficient | Population (persons) | Area (Km) | Educ.Instit. (Females) | Educ.Instit. (Males) | Educ. Instit. |
|---|---|---|---|---|---|---|
| Population (persons) | Pearson Correlation | 1 | | | | |
| | Sig. (2-tailed) | | | | | |
| Area (Km) | Pearson Correlation | - 0.28 | 1 | | | |
| | Sig. (2-tailed) | 0.14 | | | | |
| Educ.Instit. (Females) | Pearson Correlation | 0.62 | - 0.07 | 1 | | |
| | Sig. (2-tailed) | 0.0003 | 0.72 | | | |
| Educ.Instit. (Males) | Pearson Correlation | 0.72 | - 0006 | 0.78 | 1 | |
| | Sig. (2-tailed) | 0.00001 | 0.76 | 0.00 | | |
| Educ.Instit. Total | Pearson Correlation | 0.69 | - 0.07 | 0.97 | 0.90 | 1 |
| | Sig. (2-tailed) | 0.00002 | 0.72 | 0.00 | 0.00 | |



Source: Data from Tabe 12

**Fig. 15 Lorenz curve showing the relationship between Population and area in Jazan city for the year 2023**

Source: Data from Tabe 12

**Fig. 16 Lorenz curve showing the relationship between Population, area and educational institutes in Jazan city for the year 2023**

## 6. DISTRIBUTION OF EDUCATIONAL INSTITUTES ACCORDING TO POPULATION DENSITY

The efficiency of educational services is considered one of the basic issues in geographical studies. Of those is study of population density, that affects the geographical distribution of educational

institutes, as well as the relationship of those services with building numbers. The results coming from those studies show the necessity of applying for more male or female educational institutes. They show also whether the neighborhoods reached saturation stage of educational services.

In the following section of the study, Tables 14 and 15, and Figs. 17 and 18 present the results obtained from the processes of the variables under consideration in Jazan city neighborhoods. According to the present study results, Jazan city neighborhoods are categorized as follows:

**Cat.1.** neighborhoods with less than 10 thousand persons. They constitute 79.1% of population and 8.5% of building numbers of Jazan city. They are distributed into 10 neighborhoods representing 66.6% of the city's totals. Those neighborhoods are characterized by variety of land use for educational, health and agricultural services, and they are also annexed to the center. This situation made them monopolize 94 educational institutes constitute 48.7% of the total male and female educational institutes of Jazan city.

**Cat. 2.** neighborhoods with 10 - 20 thousand persons. They constitute 1.7 % of population and 7.7% of building numbers of Jazan city. They are found in one neighborhood representing 6.6% of the city's total. The neighborhood included 3 educational institutes that represent 1.5% of the total.

**Cat. 3.** neighborhoods with 20 - 30 thousand persons. They constitute 13.6 % of population and 58.7% of building numbers of Jazan city. They are distributed into 3 neighborhoods. The neighborhoods included 58 educational institutes that represent 30.1% of the total.
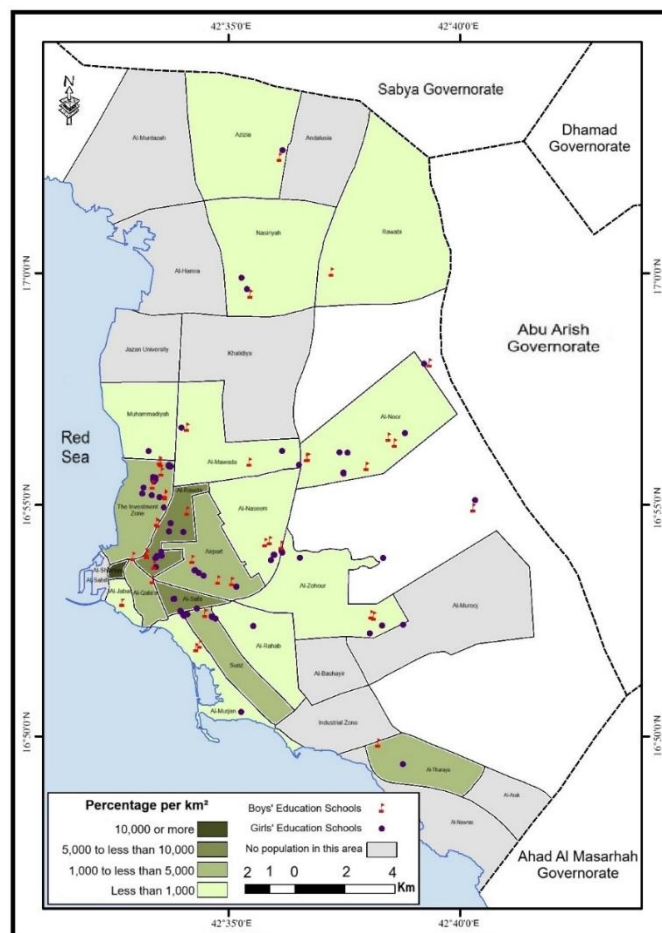
**Cat. 4.** neighborhoods with more than 30 thousand persons. They constitute 5.5 % of population and 24.8% of building numbers contained in one neighborhood of Jazan city. The neighborhood included 38 educational institutes of the city total.

In general, we note that how neighborhood's population and its general area are related to the existence of educational institutes in it. The availability of the basic needs of population, and larger space in the neighborhood, are of the main attractive factors to educational institutes. It is also noted that educational institutes serving people in one neighborhood may serve others in another neighborhood.

**Table. 14 General population density in the neighborhood of Jazan city for the year 2023**

| Neighborhood | Population | Area km² | Schools | | | Pop.density (per/km²) |
|---|---|---|---|---|---|---|
| | | | Females | Males | Total | |
| Investment Area | 33667 | 7.09 | 25 | 13 | 38 | 4749 |
| Airport | 30001 | 8.18 | 12 | 5 | 17 | 3668 |
| Suez | 27396 | 5.61 | 5 | 7 | 12 | 4883 |
| Rawdah | 24340 | 4.42 | 17 | 12 | 29 | 5504 |
| Safa | 10582 | 1.95 | 3 | - | 3 | 5416 |
| Naseem | 8660 | 9.72 | 9 | 3 | 12 | 891 |
| Thuraya | 8093 | 7.00 | 2 | 4 | 6 | 1156 |
| Shamya | 7633 | 0.45 | - | 6 | 6 | 17141 |
| Azizya | 5487 | 18.25 | 4 | 4 | 8 | 301 |
| Qalaa | 2900 | 2.32 | - | 2 | 2 | 1252 |
| Alzuhur | 1606 | 13.42 | 14 | 5 | 19 | 120 |
| Muhammadiyah | 1218 | 7.60 | 2 | - | 2 | 160 |
| Gabal | 1162 | 1.43 | - | 3 | 3 | 810 |
| Rehab | 655 | 7.57 | 3 | - | 3 | 86 |
| Alnur | 630 | 16.85 | 13 | 5 | 18 | 37 |
| Rawabi | 613 | 26.93 | 0 | 6 | 6 | 23 |
| Mawaddah | 380 | 11.37 | 12 | 7 | 19 | 33 |
| Nasiriya | 280 | 18.24 | 4 | 3 | 7 | 15 |
| Marjan | 154 | 5.28 | 14 | 3 | 17 | 29 |
| Industrial area | - | 7.77 | - | - | - | - |
| Bashyr | - | 5.36 | - | - | - | - |
| Almoruj | - | 21.38 | - | - | - | - |
| Khalidiya | - | 19.63 | - | - | - | - |
| Nawras | - | 9.97 | - | - | - | - |
| Arak | - | 4.86 | - | - | - | - |
| Jazan Univ. | - | 7.97 | - | - | - | - |
| Andalus | - | 11.12 | - | - | - | - |
| Almuntazah | - | 21.42 | - | - | - | - |
| Alhamrah | - | 12.86 | - | - | - | - |
| Alsahel | - | 1.09 | - | - | - | - |
| Total | 165457 | 297.13 | 139 | 88 | 227 | 557 |

Source of data: Planning Section, Education Department, Jazan Administration Region,20
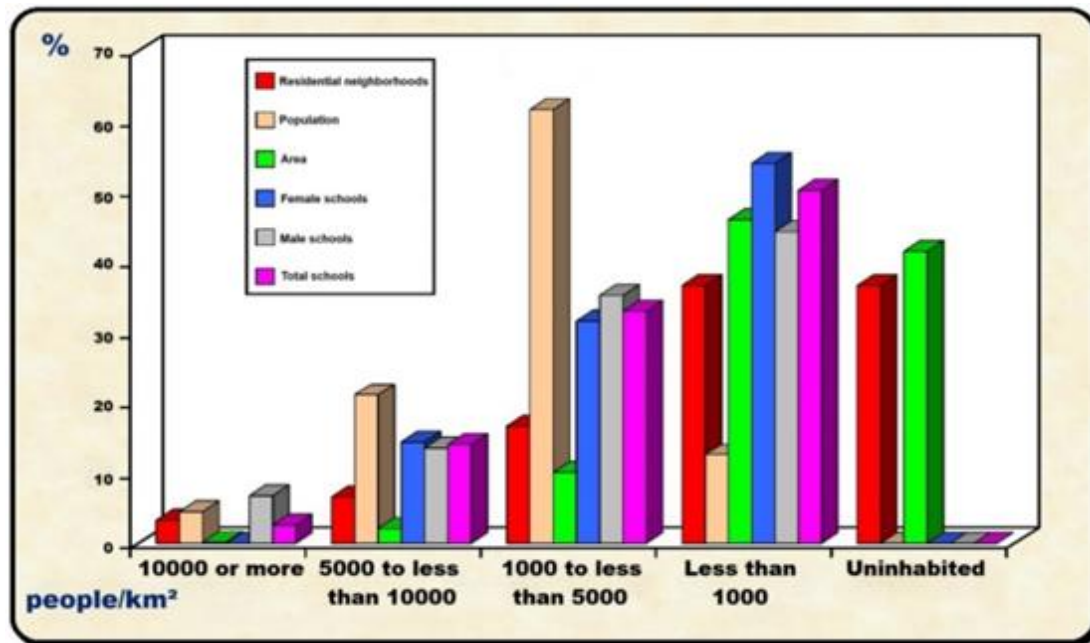
Source: Data from Tabe 14

**Fig. 17 General population densities by neighborhoods in Jazan city for the year 2023**

**Table 15 Population densities and educational institutes in Jazan city for the year 2023**

| Pop. Density category Pre/km² | Neighborhood | | Population | | Area | | Schools | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | Km² | % | Females | % | Males | % | total | % |
| 10000 + | 1 | 3.3 | 7633 | 4.6 | 0.4 | 0.15 | - | - | 6 | 6.82 | 6 | 2.64 |
| 5000 to - 10000 | 2 | 6.7 | 34922 | 21.1 | 6.4 | 2.15 | 20 | 14.39 | 12 | 13.64 | 32 | 14.10 |
| 1000 to - 5000 | 5 | 16.7 | 102057 | 61.7 | 30.2 | 10.16 | 44 | 31.65 | 31 | 35.23 | 75 | 33.04 |
| -1000 | 11 | 36.7 | 20845 | 12.6 | 136.7 | 46.00 | 75 | 53.96 | 39 | 44.32 | 114 | 50.22 |
| Unpopulated | 11 | 36.7 | - | - | 123.4 | 41.54 | - | - | - | - | - | - |
| Total | 30 | 100 | 165457 | 100 | 297.13 | 100 | 139 | 100 | 88 | 100 | 227 | 100 |

Source of data: Planning Section, Education Department, Jazan Administration Region,2023

Source: Data from Tabe 15

**Fig. 18 Population densities and educational institutes in Jazan city neighborhoods for the year 2023**

## 7. RESULTS

The present study came out with many results; of most important are: unbalanced figures in the educational institutes by gender. Those gained by females were 139 (62.2%) compared with 88 gained by male (38.8%)

The study showed that the distribution of education institutes was compatible with urban blocks of Jazan city neighborhoods, except for Safa which was in short of many (males or females).

The study predicts that, in future, concentration might appear in the center and the west of Jazan city.

## 8. RECOMMENDATION

It became necessary to reconsider the spatial distribution of the pre-University education institutes to fit the population densities within the study area neighborhoods.

The study found that it is time to make many studies in related fields such population, urban characteristics ecology that help more realistic results. Achieving this will support successful future planning for services in general, and for educational institutes in

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