TRANSPORT PLANNING: PLANNING DIMENSIONS OF TRAFFIC ACCIDENTS IN IRAQ FOR THE PERIOD (1979-2020)

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Abstract

Traffic accidents have negative repercussions on urban societies, including human, economic, social, and environmental and others. Where a high proportion of the population is killed, injured and disabled as a result of the occurrence of such accidents on the roads in the world. In Iraq, the analytical indicators of the official data for the period (1979-2020) indicate that there is a problem of the increase risk indicators for the dead and injured as a result of these accidents on the roads, as the research aims to reach scientific evidence in calculating risk rates, Assuming that there is an increase in risk indicators and for the purpose Reaching scientific standards in testing traffic accidents. The research adopted statistical methods, which is better in analyzing the phenomenon under study. In addition to the specialized engineering methods adopted in transportation planning studies, through which it became evident the continuous and frightening increase in the extent of the seriousness of these accidents, which indicates the inevitability of developing strategic studies that work to reduce these accidents.

Keywords: *Transport Planning*, Planning Dimensions, Traffic Accidents.

1- Overview

Traffic accidents have several damages and risks, including human, economic, social, and environmental and others. Its seriousness and trends are inferred through general and specialized quantitative measurements such as traffic violations, traffic volumes, population densities, the number of current vehicles, etc., which mostly depend on the outputs of numerical indicators drawn from accident data recorded with the official authorities. Among the approved measures of the severity of traffic accidents are the severity coefficients for total accidents. And for the injured and the dead as a result of these accidents on the roads. This was approved by general and specialized engineering, health, environmental and social studies. Where the research relied on defining the problem on the increasing indicators of those indicators, assuming that there is a compelling increase in human losses due to the occurrence of accidents on the road network in Iraq, and this has been proven through the mechanisms of using statistical and specialized methods in calculating those indicators, which are considered by urban transport planners as a phenomenon that must be studied As an objective of the research in terms of developing successful solutions for the purpose of reducing the occurrence of these accidents, as well as connections in building planning strategies to reduce these accidents.

2- Research problem

Through periodical publications and official data of the specialized departments concerned with recording and publishing the numbers of traffic accidents in Iraq, it appears that there are increasing numbers of dead and injured as a result of traffic accidents occurring on the transport network in Iraq.

3- Search target

The research aims to identify the digital indicators of the seriousness of traffic accidents in Iraq and review the official digital tables for them, and through the adoption of statistical and engineering methods for the purpose of reaching analytical results that are useful in interpreting the planning trends of traffic accidents in Iraq.

4- Research hypothesis

The hypothesis of the research is based on knowledge that there is a danger in the number of traffic accidents, which result in an increasing number of dead and injured in Iraq.

5- Spatial and temporal boundaries

The research relied on the description, interpretation and analysis of traffic accidents in Iraq on the official data of the Iraqi Ministry of Planning and the General Traffic Directorate for the period (1979-2020).

6- Traffic accidents

Traffic accidents have their causes represented by human, vehicle, road and other causes, and they also have their types such as collision, run-over, overturning and others, but their occurrence on the road network causes a kind of confusion in traffic and traffic, which can be done by the regulatory factor and time to carry out treatment to restore the flow of roads again, but it is considered One of the negative phenomena that face the development processes in the world due to the human and economic losses that they leave behind, as about 1.3 million people die annually as a result of traffic accidents. Low- and middle-income countries account for 90% of the world's road traffic deaths, even though they account for only about 45% of the world's vehicles. Road accidents in most countries cost 3% of GDP[2]. Traffic accident deaths in the world ranked 11th among 86 causes of death, and in Iraq, deaths due to traffic accidents in Iraq ranked third among the causes of death[3].

7- Traffic accidents in Iraq

Traffic accidents are one of the life phenomena that are concerned with the planning process, especially in recent urban planning studies, to take into account the future of traffic and existing cities in terms of conducting planning treatments to eliminate traffic jams, and to preserve people's lives from the scourge of traffic accidents that occur. Lives are lost and bodies are hampered, and in Iraq, official data on the number of traffic accidents indicate that there is an imminent danger in the numbers of dead and wounded, which claim the lives of large numbers of residents[4]. It is noted from the numerical data of traffic accidents in Iraq for the period (1979-2020) whose details are clear in Table (1), where the total number of accidents was distributed with an arithmetic mean (13819.50) and a standard deviation (9786.84), while the total number of injuries (dead and injured) was distributed with an arithmetic mean (14252.38) and a standard deviation (8358.29), both of which express the homogeneity of the data to some extent without dispersion, and this is one of the indications of the dependence and reliability of the research with data from its official sources

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[2] - https://www.who.int/ar/news-room/fact-sheets/detail/road-traffic-injuries.

[3] - https://www.worldlifeexpectancy.com/world-rankings-total-deaths.

[4] - Mohammed, Mahmoud Ismael. "Transport planning: A study of the affecting characteristics of traffic accidents in Iraq." *AIP Conference Proceedings*. Vol. 2437. No. 1. AIP Publishing, 2022.

Table (1)

The number of traffic accidents in Iraq for the period (1979-2020)

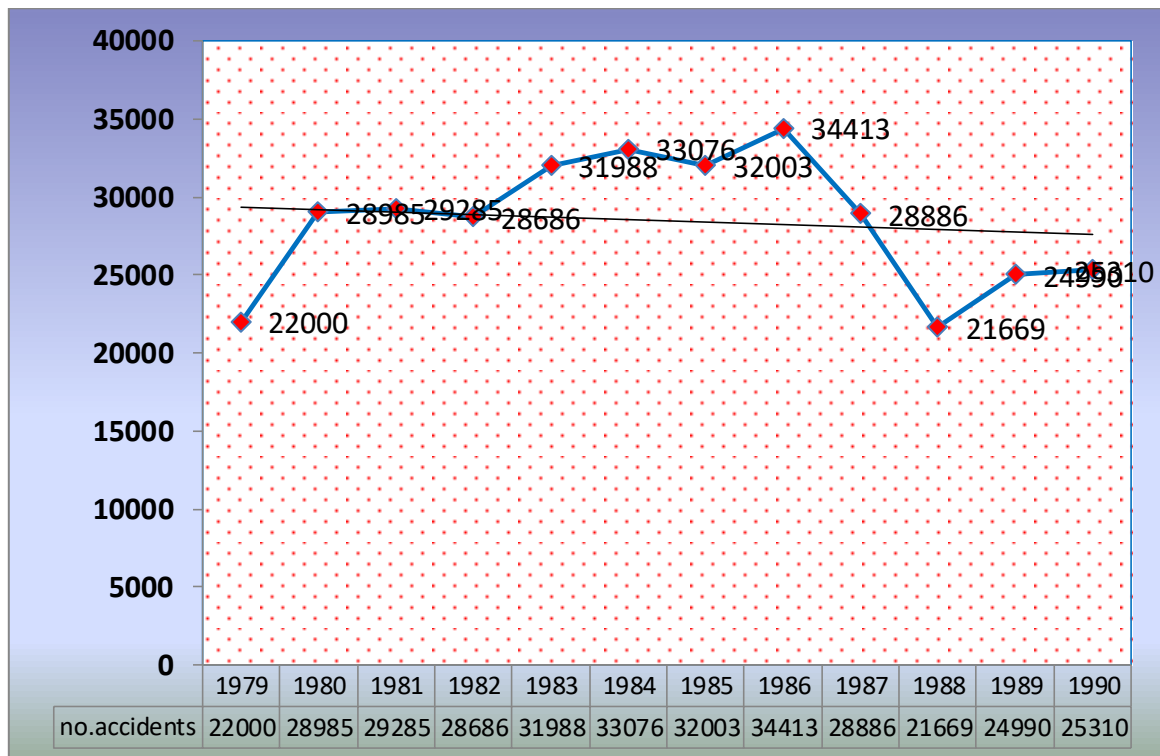| No.	years	No. of accidents	No.	years	No. of accidents	No.	years	No. of accidents
1	1979	22000	15	1993	8998	29	2007	3135
2	1980	28985	16	1994	5765	30	2008	5502
3	1981	29285	17	1995	5223	31	2009	7452
4	1982	28686	18	1996	5331	32	2010	8861
5	1983	31988	19	1997	6752	33	2011	10082
6	1984	33076	20	1998	6400	34	2012	10709
7	1985	32003	21	1999	6767	35	2013	9725
8	1986	34413	22	2000	6795	36	2014	8814
9	1987	28886	23	2001	7759	37	2015	8836
10	1988	21669	24	2002	8535	38	2016	8763
11	1989	24990	25	2003	6826	39	2017	8824
12	1990	25310	26	2004	8191	40	2018	9852
13	1991	11512	27	2005	9010	41	2019	10753
14	1992	12381	28	2006	3389	42	2020	8186

Source: Annual statistical releases for the period (1979-2020) / Iraqi Ministry of Planning

It is also noted from Figure (1) that there is a general trend increase in the number of traffic accidents for the period (1979-1990), which was modeled on the basis of equation (1).

$$Y = 29479 - 159.63X \ \dots\dots\dots\dots\dots\dots \ (1)$$

Figure (1)

The number of traffic accidents in Iraq for the period (1979-1990)

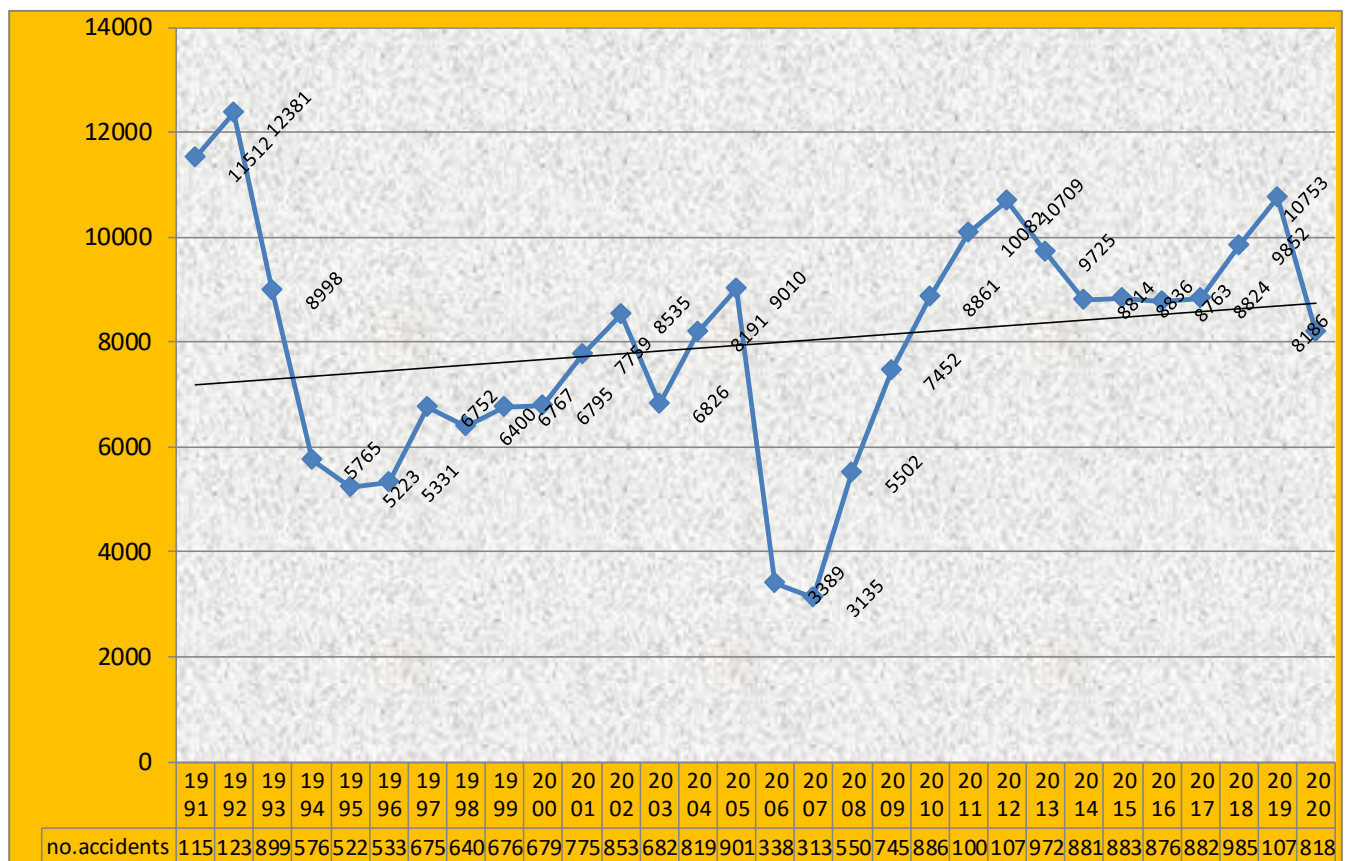| no.accidents	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
	22000	28985	29285	28686	31988	33076	32003	34413	28886	21669	24990	25310

Source: researcher

Followed by a kind of numerical stability for the period (1991-2020) as in Figure (2), where the general trend line calculated according to linear equation (2) appears, and since it is described as raw data that has not been processed on a specialized scientific, statistical or planning basis, which cannot be Relying on it as a standard in analyzing the time series of those accidents, as reliance is made on specialized standards with specialized concepts, including the severity coefficients for the wounded and the dead.

$$Y= 7145.5 + 53.28 \ X \ .... \ (2)$$

Figure (2)

The number of traffic accidents in Iraq for the period (1991-2020)

	19 91	19 92	19 93	19 94	19 95	19 96	19 97	19 98	19 99	20 00	20 01	20 02	20 03	20 04	20 05	20 06	20 07	20 08	20 09	20 10	20 11	20 12	20 13	20 14	20 15	20 16	20 17	20 18	20 19	20 20
no.accidents	115	123	899	576	522	533	675	640	676	679	775	853	682	819	901	338	313	550	745	886	100	107	972	881	883	876	882	985	107	818

Source: researcher

## 8- Severity scales of traffic accidents

Traffic accident standards differ according to the descriptive and analytical vision of analyzing the phenomenon, and the severity standards are considered one of the most important standards adopted by planners for the purpose of analyzing the phenomenon and determining its importance, as well as the possibility of employing these indicators in making planning decisions for building strategies for reducing the number of traffic accidents and in turn reducing indicators Danger of dead and wounded[5]. Most of the planning studies of traffic accidents rely on risk factors for the purpose of building strategies to reduce accidents in those countries, including the United Kingdom, where the British authorities were able, based on a government decision, to reduce the rates of fatal traffic accidents in the year 2000 to more than 3:1 from the ratios of previous years and through Stages that extended to 20 years. It was adopted in its long-term strategy (1968-1998) for the purpose of reducing traffic accidents, which relied on the indicator of risk

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[5] - Mohammed, Mahmoud Ismael. "Transport planning in Iraq: Study of traffic accidents for the period (2010-2018)." *AIP Conference Proceedings.* Vol. 2437. No. 1. AIP Publishing, 2022.

factors as one of the effective indicators in building and implementing the strategy[6], note Figure (3).

Figure (3)

The number of (fatal) traffic accidents in Britain for the years (1968-1998)
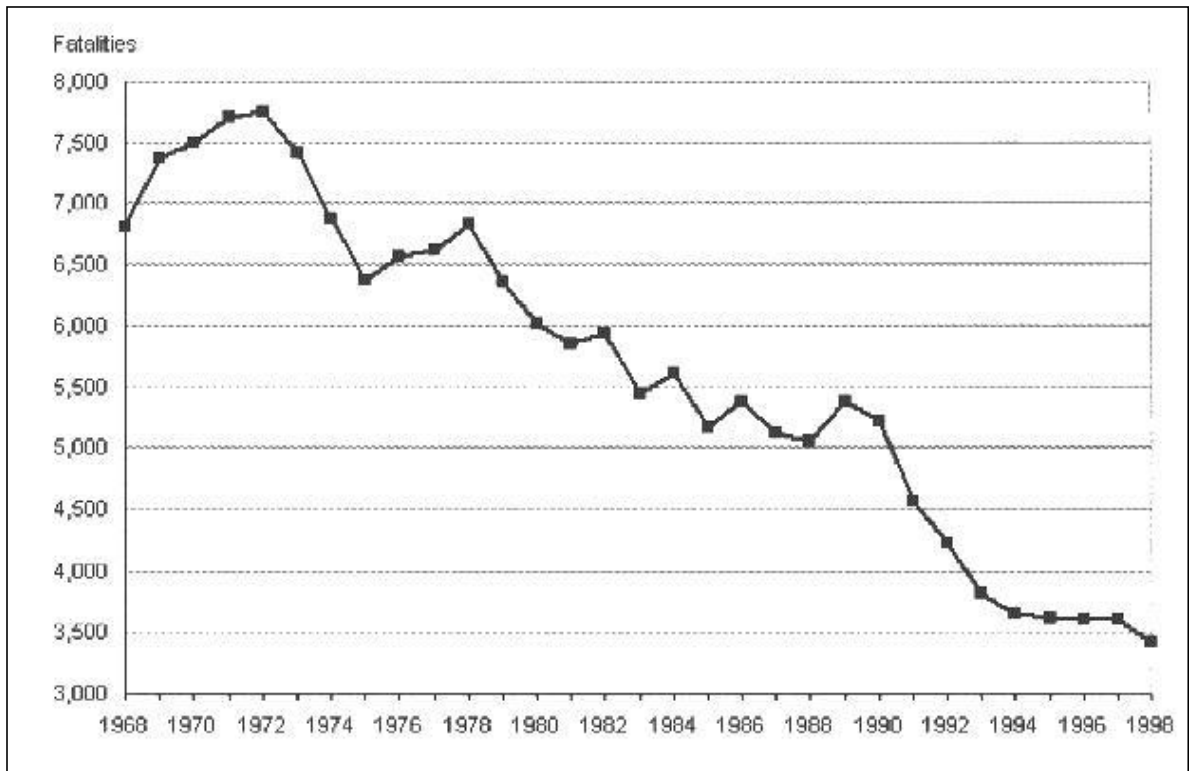
There are scientific foundations based on specialized equations in extracting those coefficients that are employed as real digital indicators that can be adopted for scientific, academic and practical purposes, including[7]:

A- The risk coefficient for traffic accidents (H) as in equation (3)

$$H = Tv/Ta *100 \dots\dots\dots\dots\dots\dots\dots\dots (3)$$

Where:

H: represents the total risk coefficient for traffic accidents.

Tv = total dead and wounded

Ta = the total number of accidents

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[6] - Mohammed, Mahmoud Ismael," planning aspects of models representing traffic accidents", MSc. Theses of urban and regional planning for postgraduate studies-university of Baghdad, 2011.p33.

[7] - Ibid,pp34-37

B- The risk coefficient for fatalities (K)

$$Fatality\,Ratio(FR) = \frac{No.\,of\,deaths}{No.\,of\,accidents} \times 100$$

K = Tk/Ta *100 .... (4)

Where:

K: represents the risk factor for the dead

T_k: Total dead

Ta: the total number of accidents

C- The risk coefficient for injured (I)

$$Injury\,Ratio\,(IR) = \frac{No.\,of\,injeny}{No.\,of\,accidents} \times 100$$

I = Ti/Ta *100 .... (5)

Where:

I: represents the risk factor for fatalities

Ti: total wounded

Ta: the total number of accidents
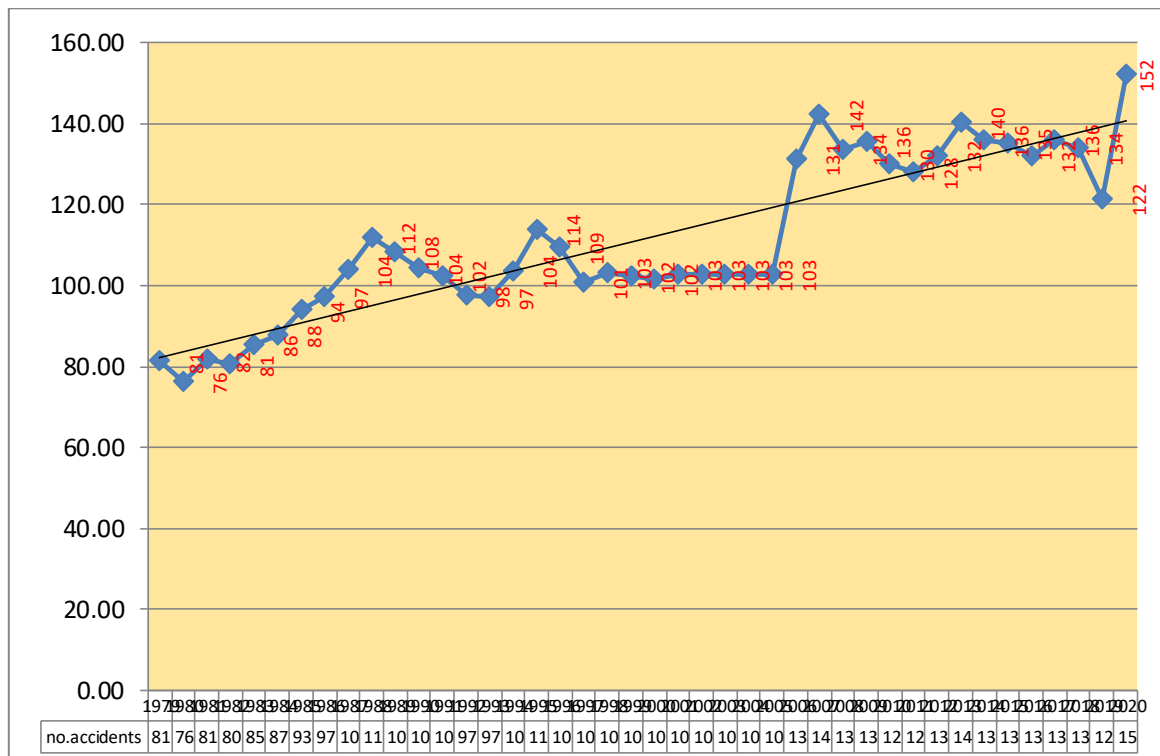
A-1 Traffic accident severity coefficient in Iraq

The severity scales for traffic accidents are considered one of the most important planning scales adopted in practice in explaining the phenomenon of traffic accidents. As it is clear from Figure (4) that there is a general upward trend for the total severity coefficient of traffic accidents in Iraq, explaining the time series under discussion and calculated by equation (6)

Y = 80.831 + 1.4222 X.................... (6)

It clearly expresses the environmental problem that the Iraqi city suffers from as a result of road accidents, which is one of the most important planning problems that urban cities suffer from.

Figure (4)

Traffic accident severity coefficient in Iraq for the period (1979-2020)

Source: researcher

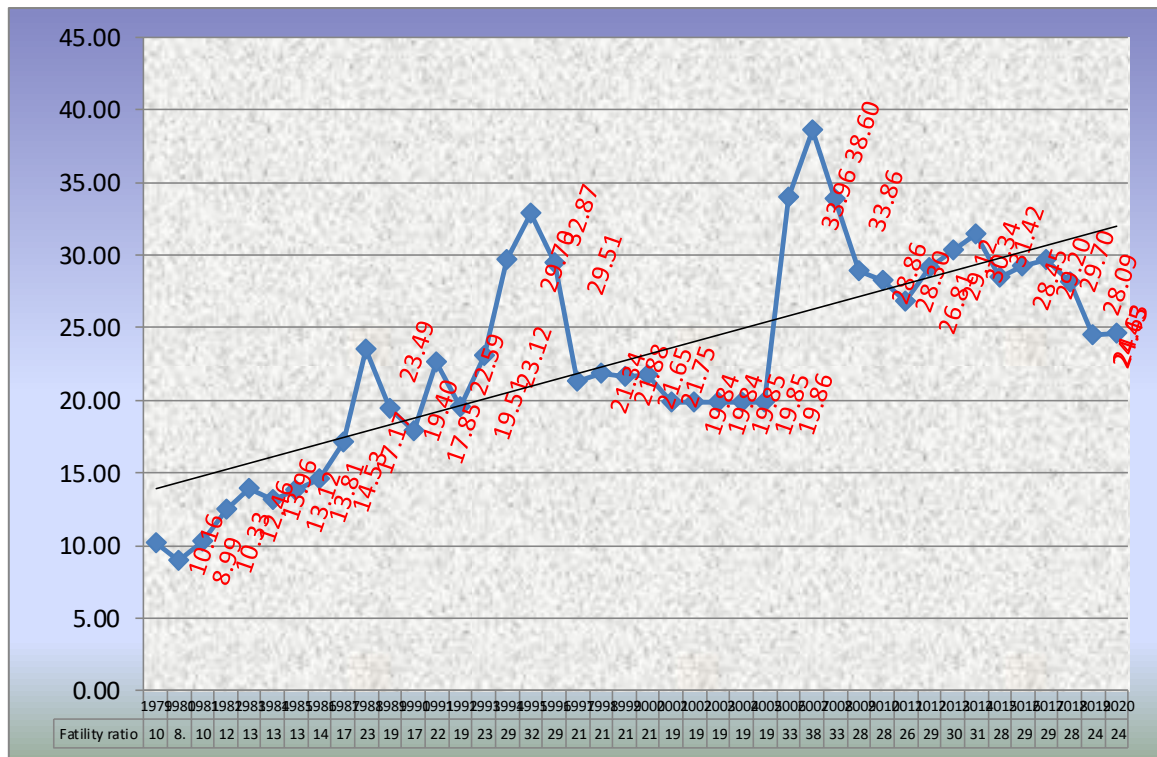**B-1 coefficient of the severity of deaths in traffic accidents in Iraq**

Studying and diagnosing the risk factor for those killed as a result of traffic accidents is one of the most dangerous transactions that must be calculated because it gives the main indicator of the seriousness of the accident, and it is one of the most important planning measures adopted in practice in diagnosing the seriousness of the phenomenon of traffic accidents. As it is clear from Figure (5) that there is a general upward trend for the risk coefficient of fatalities, explaining the time series under discussion and calculated by equation (7).

Y = 13.452 + 0.4421 X..................... (7)

It expresses the clarity of the environmental problem that the Iraqi city suffers from as a result of road accidents that kill the lives of citizens, which is one of the most important planning problems that urban cities suffer from.

Figure (5)

Coefficient of deaths from traffic accidents in Iraq for the period (1979-2020)

| Fatility ratio | 10 | 8. | 10 | 12 | 13 | 13 | 13 | 14 | 17 | 23 | 19 | 17 | 22 | 19 | 23 | 29 | 32 | 29 | 21 | 21 | 21 | 21 | 19 | 19 | 19 | 19 | 33 | 38 | 33 | 28 | 28 | 26 | 29 | 30 | 31 | 28 | 29 | 29 | 28 | 24 | 24 |

Source: researcher

## C-1 coefficient of the injured in traffic accidents in Iraq

One of the coefficients that are calculated from the digital outputs of the irrigated accident tables approved in planning studies, as well as other coefficients, which indicate the extent of minor and severe residues and disability of human damage as a result of accidents. The amount under consideration is calculated by equation (8).

$$Y = 67.379 + 0.9801\ X \ldots\ldots\ldots\ldots\ldots\ (8)$$

Like other transactions, it expresses the clarity of the environmental problem that the Iraqi city suffers from as a result of road accidents that harm citizens, which is also one of the planning problems that urban cities suffer from. Figure (6)

Figure (6)

Severity coefficient of injured from traffic accidents in Iraq for the period (1979-2020)
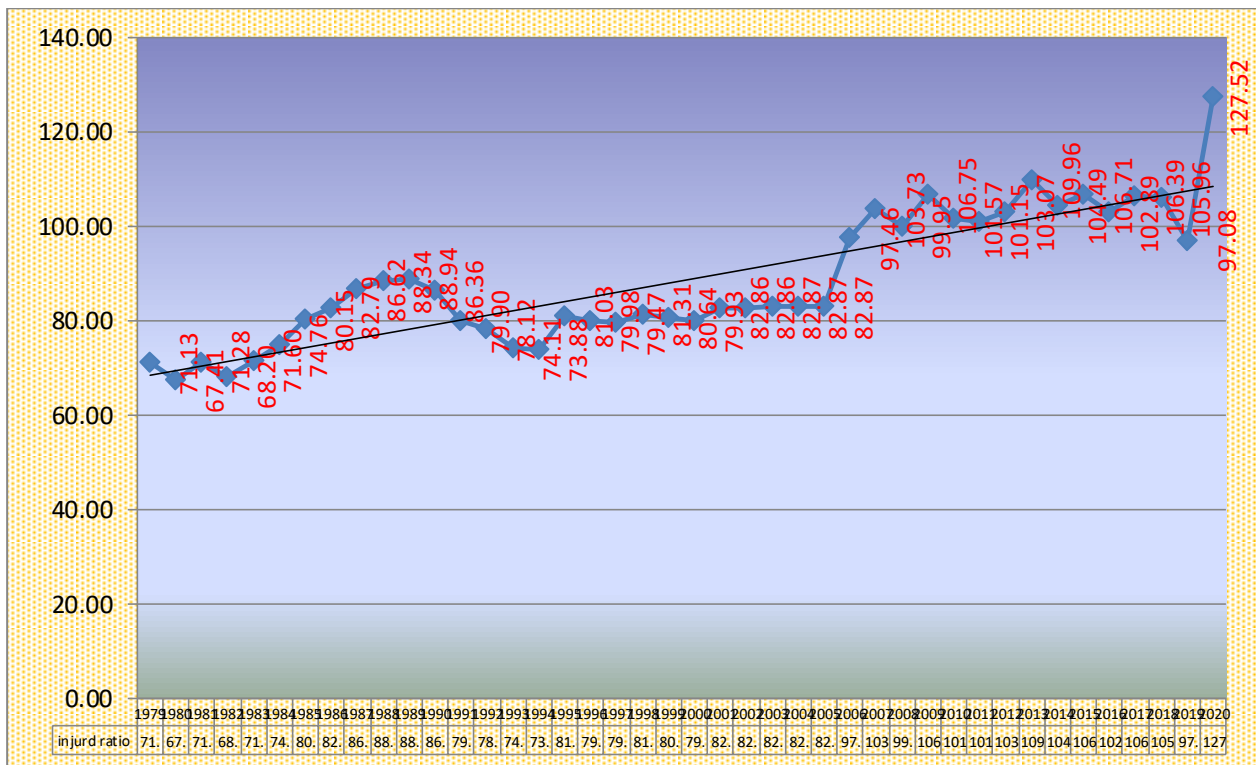
Source: researcher

9- Discussion

Urban cities suffer from several problems resulting from urbanization, continuity, details of life, and jobs that depend on them in those cities. There is no doubt that mobility and the generation of trips of all kinds on the road network are practically employed in the sustainability of life for citizens[8], and since the occurrence of traffic accidents of all kinds has become a given in our contemporary world for reasons known and unknown. Known, the urban planner must diagnose the problem and develop solutions. In the Iraqi cities as in the cities of the world (especially the developing ones), there were traffic accidents in large numbers that left negative effects on the Iraqi environment, and among them the most influential ones are those related to the lives of citizens as a result of accidents on the roads and left behind dead, injured and human handicaps, and that standing on their details depends Basically, on what can be available of detailed data on traffic accidents, and the more detailed the data, the more effective it will be to adopt it in building strategic plans effective in reducing traffic accidents and thus reducing the number of dead and injured, as the official data of the Iraqi state on traffic accidents indicates that there is a danger

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[8] - Al-jumaili, Mahmoud Ismael "the planning characteristics of the urban transportation system in the Fallujah town, testing the system efficiency", PhD. Theses of urban and regional planning for postgraduate studies-university of Baghdad, 2011.

Imminent due to traffic accidents that occur on the Iraqi road network. This is evident when calculating the risk coefficients for accidents, which were distributed with an arithmetic mean (111.41) and a standard deviation (19.68), indicating the lack of dispersion and homogeneity of the data, which are higher than the general Arab and international averages, as well as the risk coefficient for the dead, as they were distributed with an arithmetic mean (22.9) and a standard deviation (7.2), that is, indicative of the lack of dispersion in the data and its homogeneity, which is higher than the general Arab and international averages, as well as the risk coefficient for the injured, which was distributed with an arithmetic mean (88.5) and a standard deviation (13.9), indicating the lack of dispersion in the data and its homogeneity. These indicators are considered very high in their values compared to the Arab and foreign countries of the world, as they reached higher than the Arab rates for the two dead laboratories at the top, which reached 46, and the international ones, which reached 67, as in the United States of America. This requires the development of strategic studies for reducing traffic accidents in Iraq, which has not yet issued an official decision obligating the relevant authorities to develop a mechanism concerned with reducing traffic accidents.

Conclusions

1- There is a kind of relative stability observed in the number of traffic accidents in Iraq for the time series under discussion (1979-2020).

2- It is clear that there is a negative planning indicator, represented by the increase in the risk factors for the dead and injured as a result of the occurrence of those numbers of traffic accidents on the road network in Iraqi cities.

3- The methods of dealing with the problem of traffic accidents at the present time are not feasible or sufficient to reduce the escalation of risk factors, which have reached limits that exceed most of the Arab world proportions.

4- The problem of traffic accidents is multi-faceted, and access to ways of treatment pertains to several scientific and administrative specialties, which must interact and combine their efforts to develop a strategy for traffic safety, as well as benefit from the world's experiences in this regard.

5- There are no interests at the government level or organizations, especially in preparing studies on reducing traffic accidents in Iraq.

Recommendations

1- Emphasizing the need to record traffic accidents in the relevant specialized departments with all their professional details.

2- Conducting periodic analytical studies of traffic accidents, the purpose of which is to extract numerical indicators that contribute to the development of strategies for diagnosing and reducing traffic accidents.

3- Adopting the severity coefficient for traffic accidents as a planning indicator that shows the seriousness of traffic accidents in Iraq instead of adopting the numbers of accidents, at least at the present time, until the completion of the work mechanism to include the registration of all traffic accidents on the roads.

4- Adopting the general and specialized mathematical, engineering and statistical analytical methods that the planner resorts to when digital data on the phenomenon of traffic accidents is available.

5- Directing departments related to planning, traffic, academics, and others to conduct studies and develop strategies for reducing indicators of dead and wounded as a result of traffic accidents in Iraqi cities.

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