DESCTIPTIVE STUDY OF TAXIS SERVICES IN DUHOK CITY

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ABSTRACT

Taxis in the city of Duhok are widely used as an alternative public transportation service due to the minimal or non-existent usage of public transportation by expats and locals, and the predominance of private cars. In this study a questionnaire survey was conducted targeting the study area citizens, with a sample size of 500 taxi passengers. The forms were distributed to the respondents in different areas within the city. From the questionnaire survey it was found that 40% of the respondents had one or two trips during the day by taxi, where the morning period recorded the highest percentage by 63%. This is due to the fact that 65% of these trips are for the purpose of going and returning from work. To improve the taxi service in Duhok city 41% of the respondents encouraged the use of Uber as the best solution because in their opinion Uber will reduce the congestion inside the city and thereby reduces the percentage of pollution. 41% of the respondents do not have a bad experience with a taxi, while 25% of them have one bad experience. Therefore, some citizens specially women don't use taxis, firstly, because of the customs and traditions and secondly, fear of bad experiences that may happen with them. One of the reasons of delaying the taxi trip was the city congestion which corresponds to the highest percentage of 78%. Finally, the interviewer asked if the respondent used public buses and if they were available in the city. Participants who claimed that they use buses were 58%.

INTRODUCTION

Public transportation is important to the wellbeing of any country, and the advantages of a well-designed and effectively managed transportation system extend well beyond the domain of transportation because it is necessary for industry, human mobility, and good communication. (Matthews 2013; Russel 2012; Singh et al. 2014, (Govender, 2016).

Taxi, as a very important part of urban public transit, has become one of the main modes of transport that influence the management and planning of urban road traffic due to its "door to door" transit characteristic of moving users from one location to another (S. Yang et al., 2019). Travelers frequently find that using taxis to go around cities is very comfortable. Even the locals use taxis occasionally, are much more expensive than other forms of public transportation. The bulk of the problems related to either not receiving a taxi, waiting too long for one, being turned away from going to their destination, getting trapped in traffic for hours, or being forced to overpay. However, booking a taxi is not that simple and has a lot of problems. (Peungnumsai et al., 2017).

When other modes of transport are limited, taxis provide a comfortable and frequently supplementary mobility option for city citizens. To the best of the authors' knowledge, little attention has been paid to the service quality of taxi services in developing countries, owing to the fact that the literature on passengers' perceptions of taxi services has generally concentrated on urban transportation in developed countries. As a result, applying their findings and conclusions to developing-world cities raises concerns about transferability. It is critical to understand users' wants, attitudes, expectations, and travel demand factors in order to provide quality service (Askari et al., 2021).

Looking ahead and trying to predict the future of taxi service, it would be useful to look back from a century ago to obtain a better understanding. In most urban areas, taxis are a significant transit option that provide quick, convenient, and direct transport. (H. Yang & Wong, 1998).

Taxis are a type of vehicle that can be rented with a driver for a short period of time, usually based on miles or time. Taxis typically have four seats, while some have three or five. A taxi conveys passengers between places of their choice. Reservations can be made by phone

calls, the Internet, and mobile apps, in addition to hailing a taxi by hand. In the past, taxi was extensively welcomed by people as a comfortable means of public transit. The development of Internet technology has brought about the spread of online car-hailing all over the world, and its market is gradually taken over by online car-hailing, which has a significant effect on the business and income of the traditional taxi industry (S. Yang et al., 2019, Jiahui & Leela Tiangsoongnern, 2019).

Many specialists have regarded taxis as public transit and part of a city's main transport master plan. For instance, Viegas (2008) said that ''Taxis are a form of public transportation found throughout the world''. (Aarhaug & Skollerud, 2014) also added that, ''Taxis provide a point-to-point service available to the public and as such a part of public transport'' (Aarhaug & Skollerud, 2014, Shaaban & Kim, 2016).

Since taxis are considered to be a type of public transportation, taxi operations have received considerable attention from public transportation organizations. "Taxis form a significant part of the public transport network, offering flexible responsive 24-hour service at relatively little expense to the taxpayer," according to a report produced by the Queensland government in Australia in 2010. (Plan, 2010, Shaaban & Kim, 2016).

In most cities, prices of trips are not fixed because it depends on traffic conditions and length of trips (Schwieterman & Smith, 2018) (Sun et al., 2019). For example, when passenger request a trip at rush or late hours, rises can be occurred in prices (Schwieterman & Smith, 2018). But as they do not have set price tariffs, they can provide cheaper services for their passengers. Also, some studies have used data to develop a recommendation system for improving driver profits; for example, Hung Hwang (2015) propose a taxi recommender system for determining the next cruising location, which could be a value-added module in fleet management systems. The simulation results indicate that although the statistics of the historical data may be different from real-time passenger requests, their recommender system is still effective in terms of recommending more profitable cruising locations. (Qu et al., 2014)

Talking about the most category used taxis and care about the quality of the service, Wong (2020) found that women are more sensitive to service quality, and drivers' attitudes. The respondents aged 65 or above prefer a better service quality and a higher comfort level. Students and others (e.g., retirees and housewives) were less likely to select the premium taxi option (Jiahui & Leela Tiangsoongnern, 2019).

In accordance with Emmanuel Horsu (2015), customers usually felt safe in using the mini cab taxi services because the cars were mostly fitted with functioning seat belt and the drivers drove cautiously, had excellent knowledge of route, communicated and handled payment transactions well. Further, regarding drivers' behaviour, commuters felt the drivers showed appropriate driving behaviour, were generally well behaved and normally had their vehicles in clean and good condition (Horsu & Yeboah, 2015).

Past surveys have shown that taxis serve several markets older residents, higher-income groups, and lower-income house-holds without a car (Webster et al., 1974) (Rayle et al., 2016).

One of the disadvantages of taxi service is that taxi passengers complain that "the taxis just vanish before the peak hour". In some cities, the problem becomes worse with growing passenger and visitor numbers. However, during non-peak hour, there are many taxis waiting in a long queue but no passengers (Shi & Lian, 2016).

Travel time, as an effective measure of traffic conditions, can be easily understood by both travellers and transportation managers (Zhang & Haghani, 2015). In the city of Duhok the travel time depends on the trip length, the destination and also on the road type.

There are no services or facilities for taxis services in the study area. Taxi drivers suffer from several issues, including congestion inside the city of Dohuk, which leads to delays, harassment by private cars, as well as the lack of parking spaces. The reason for the existence of these issues is due to the way to get a taxi, because it is a random method, as well as the lack of special programs for requesting taxis, such as Taxi Karim, the Airport Taxi or Uber, which are available in Erbil, Baghdad and other cities.

Duhok city is one of the most congested cities with 8394 taxis out of 16068 numbers of total registered taxis are operating in Duhok governorate at the end of 2021 according to the Traffic directorates in Duhok city (*The General Traffic Directorate, "Number of Recorded Vehicles in Duhok City," Duhok City, 2021.*, 2021).

The objective of this study is to understand taxi passengers' characteristics and the taxi service performance inside the study area.

1. METHODOLOGY AND DATA COLLECTION

a. Study area

This study was carried out in Duhok city which is considered the centre of Duhok governorate, which is located in the north of the Iraqi Kurdistan Region. The city has the position of (36°51'43.56"N) as latitude and (42°59'51.47"E) as a longitude and is also about 585 m above sea level. As a fact, the Duhok governorate comprises seven districts, namely Duhok, Semel, Zakho, Amedi, Shikhan, Akre, and Bardarash. In the same vein, Duhok district, comprises three sub-districts, namely Duhok city, Zawita, and Mangish. The questionnaire included the responses of citizens in the city of Duhok only as shown in figure (1) below (Noor A. Al-Ani).

Fig. (1): Study area map (source: Google Maps)

b. Method of finding the sample size

In general, the population in the Duhok governorate has increased within the past 11 years, from 2010 up to 2021. The data collected from the Statistical Directorate in Duhok city showed that the population in Duhok governorate was about 1,212,375 citizens in 2010 and reached up to 1,695,920 citizens according to a census conducted by the end of 2021 (*Statistical Directorate, "Duhok Population Census Report," Duhok City, 2021.*, 2021). But the sample size of the questionnaire was selected depending on the population of Duhok city only which was 405,634 citizens at the end of 2021.because the population was known so the below equation was used to calculate the sample size: -

$$sample\ size = \frac{\frac{z^2 * p(1-p)}{e^2}}{1 + [\frac{z^2 * p(1-p)}{e^2 * N}]}$$

Where: -
z = z-score = 1.96
p = standard deviation = 0.5
e = margin of error = 5% = 0.05
N = population size = 405,634 citizens

(z) is the z-score being a value that indicates the placement of your raw score (meaning the percent of your confidence level) in any number of standard deviations below or above the population mean. The confidence level corresponds to the (z-score). The most common

confidence levels are 90%, 95% and 99%. Researchers most often employ a 95% confidence level that's mean the z-score in the above equation will be equal to 1.96. Z-score for the most common confidence levels: -

90% = 2.576
95% = 1.96
99% = 2.576

(p) is the standard deviation that measures how much individual sample data points deviate from the average population. Most researchers used the standard deviation equal to 0.5.

(e) is the margin of error which indicates how much you're willing for your sample mean to differ from your population mean. It's often expressed alongside statistics as a plus-minus (±) figure, indicating a range which you can be relatively certain about. 5% is the best value that most researchers used as a margin of error

(N) is the population size which is equal to 405,634 of Duhok centre only depending on the Duhok Statistical Directorates 2021.

$$sample\ size = \frac{\frac{1.96^2 * 0.5(1-0.5)}{0.05^2}}{1 + [\frac{1.96^2 * 0.5(1-0.5)}{0.05^2 * 405634}]}$$

$$sample\ size = 383.79 \approx 384$$

This value (384) is the minimum limit that can be taken. In the questionnaire, 500 samples were used to give better results. After completing the distribution of forms, they were entered into Excel software to obtain the results in the form of figures and charts.

c. Questionnaire Survey

Taxi passengers are present in all areas, so interviewees went to the most crowded areas inside the city, including shopping malls, commercial areas such as Duhok Bazaar, residential complexes such as Avro City and several other areas. Hence, the questionnaires were distributed to taxi passengers in these locations.

Questionnaire survey in January 2022 were carried out for data collection. In this study, 500 taxi passengers were interviewed within different areas in Duhok city and with 24

different questions covering personal, financial, usage, and problems related to taxis to understand taxi passengers' characteristics and the taxi service behaviour inside the city.

A total of 24 questions, further subdivided into four sections as mentioned before: personal, financial, usage, and problems related to taxis, were designed and surveyed by direct interview with taxi passengers in different areas within the city.

2. RESULTA AND DISCUSSION

a. Personal information

Based on the results of the questionnaire, it was found that 68% of the respondents were males while 32% were female and the majority (37%) were between the age range of 21-30 years old followed by 32% with 31-40 years old as shown in the figures (2) and (3) below.
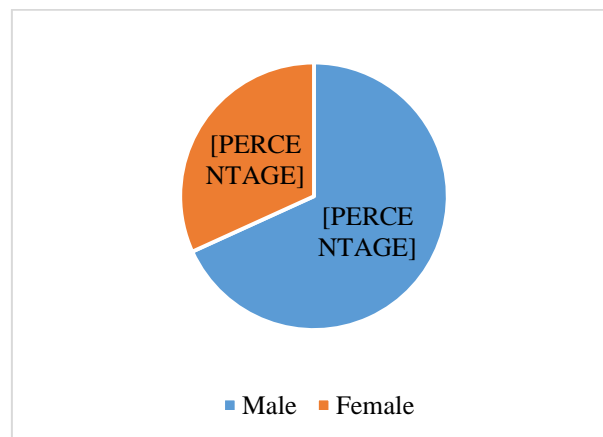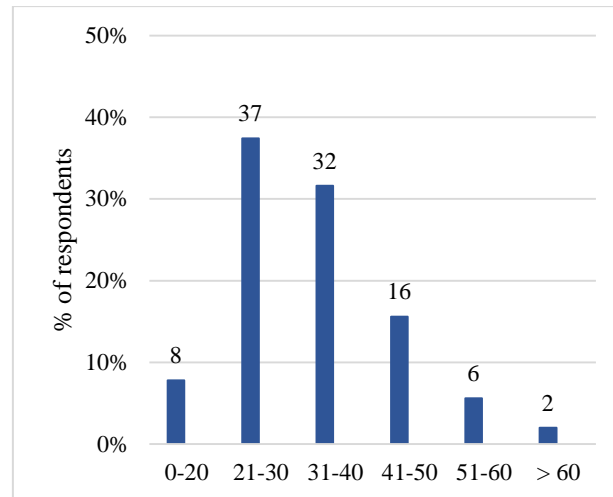

Fig. (2): Respondents gender

Fig. (3): Respondents age

It was also found that the ratio of the family of passengers has 4-6 members were 56% (See figure 4) and 53% of these families have 1-3 members over 18 years old as in figure 5.
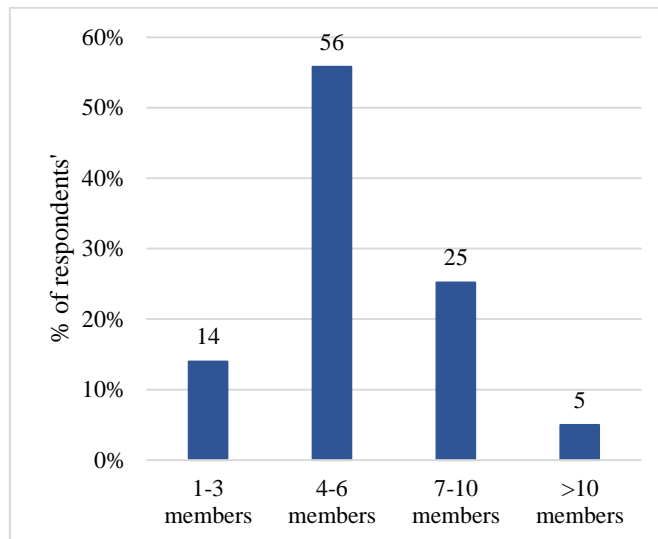

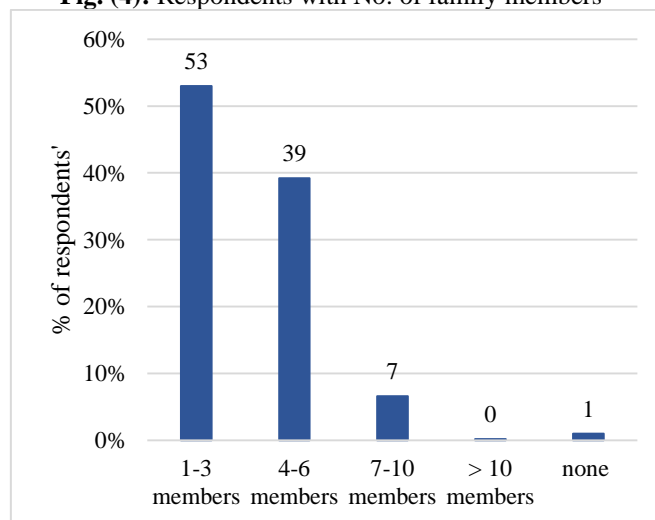**Fig. (4):** Respondents with No. of family members

Fig. (5) : Respondents with No. of members more than 18 years

Figure (6) showed that 61% of the respondents owned a vehicle while 39% of them don't have, and a ratio of 38% have 1-2 trips by their private vehicle followed by 37% of them do not use their vehicles as in figure (7).
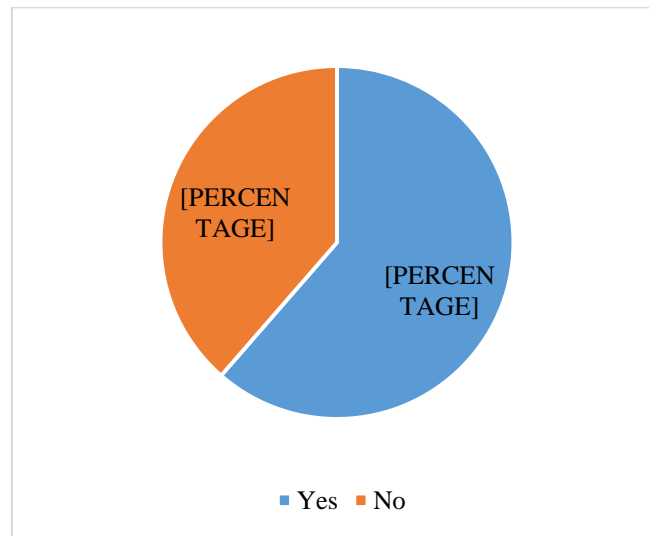
Fig. (6): Respondents owing a vehicle
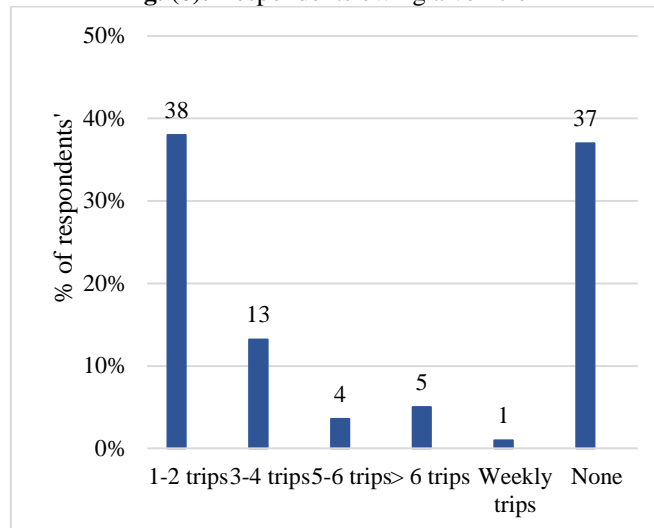
Fig. (7): Respondents No. of trips by private car

Figure (8) showed that 65% of the respondents owned a driving license while 35% of them don't have it. Also, figure (9) shown that a ratio of 40% of the respondents had 1-2 trips only each day by taxi. This few numbers of trips using taxis is due to the fact that most citizens had driving licenses and private vehicles that they use during the day.
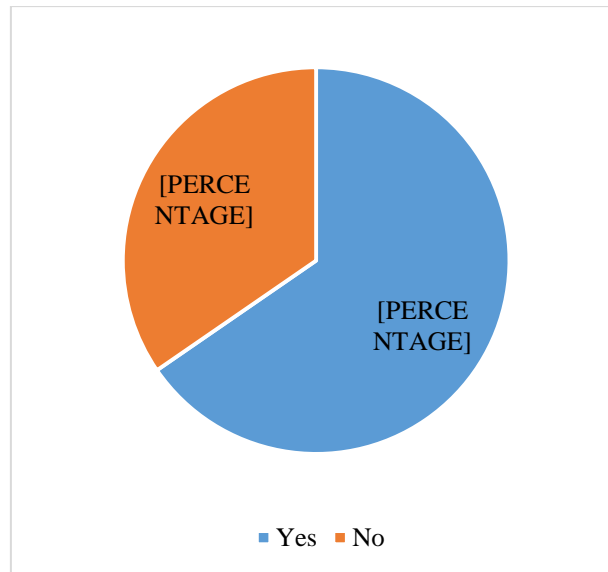
Fig. (8): Respondents owning a driving license
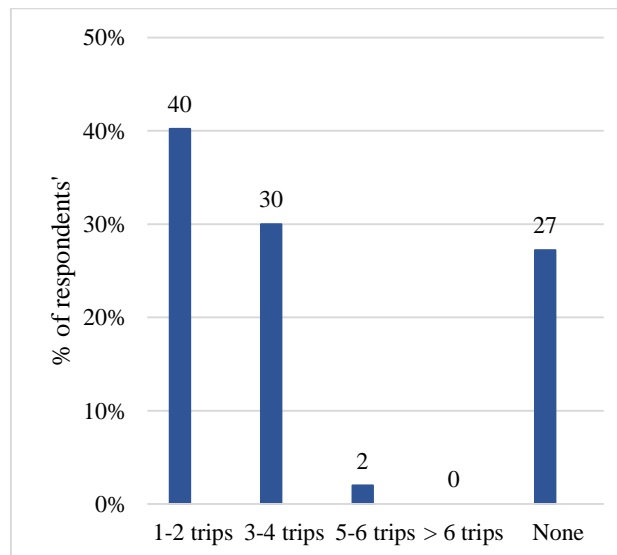
Fig. (9): Respondents No. of trips by taxi

The survey results show that 63% of the respondents required a taxi each day and, in the morning, as shown in figure (10). This is because most taxi users use taxi service for the purpose of going to work, school …. etc., so the morning period has the highest ratio. Then, the interviewer asked how much the respondent was satisfied with taxi service in Duhok city. According to the results 45% of participants responded they were somewhat satisfied followed by 18% not satisfied (See figure 11).
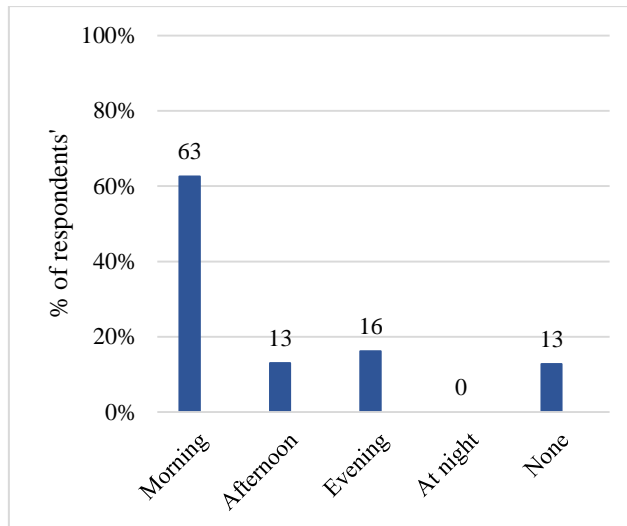
Fig. (10): Respondents time/day required a taxi
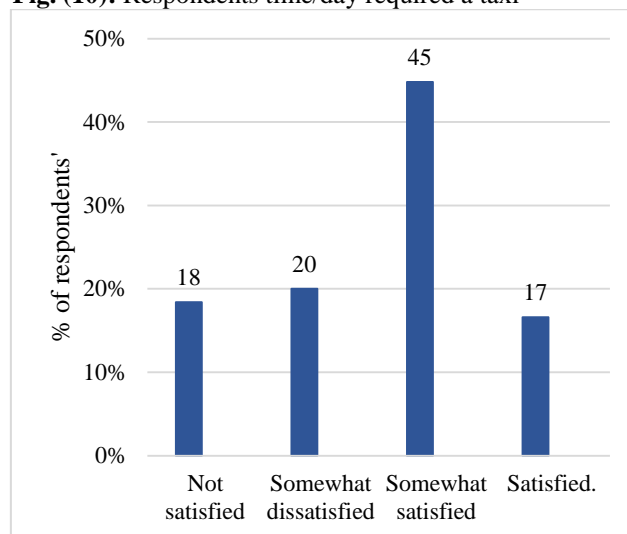
Fig. (11): Respondents taxi service satisfaction

Finally, to improve the taxi service in Duhok city 41% of the respondents encouraged the use of Uber as the best solution (as shown in figure 12) because in their opinion Uber will reduce the congestion inside the city and will reduce the percentage of pollution. Figure (13) shows some respondents suggestions to improve the taxi service in the city.
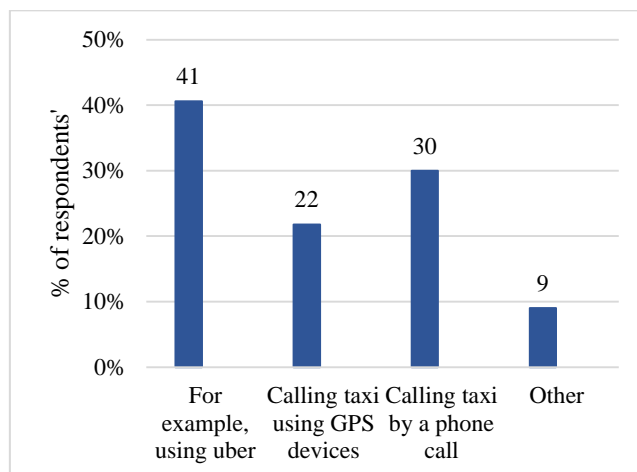

Fig. (12): Respondents improving taxi service
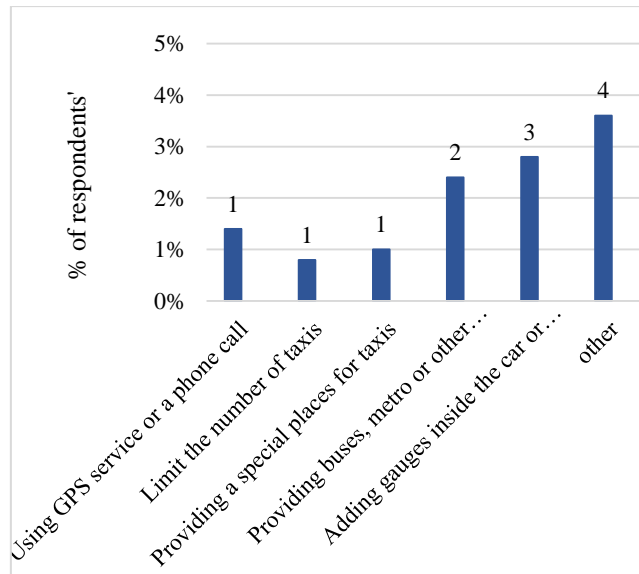
Fig. (13): Respondents suggestions

b. Financial information

Around 33% of the respondents have an average monthly income range between 510,000-750,000 ID. 49% voted that the taxi prices in Duhok city are moderately affordable and 62% voted that surely yes, the daily use of taxi service is expensive. (See figure 14,15,16).
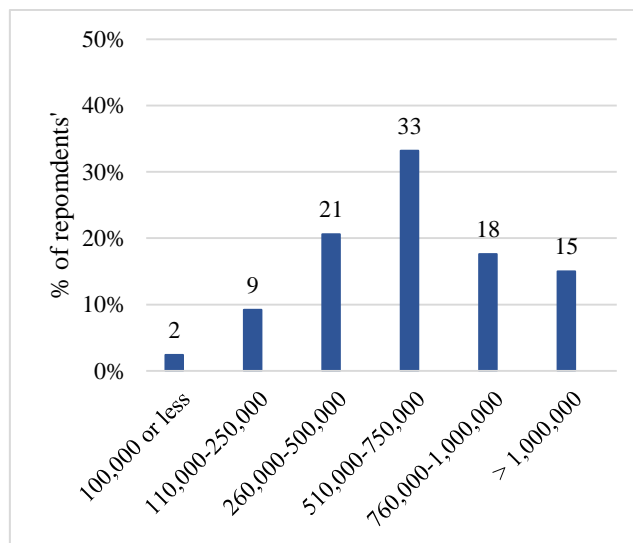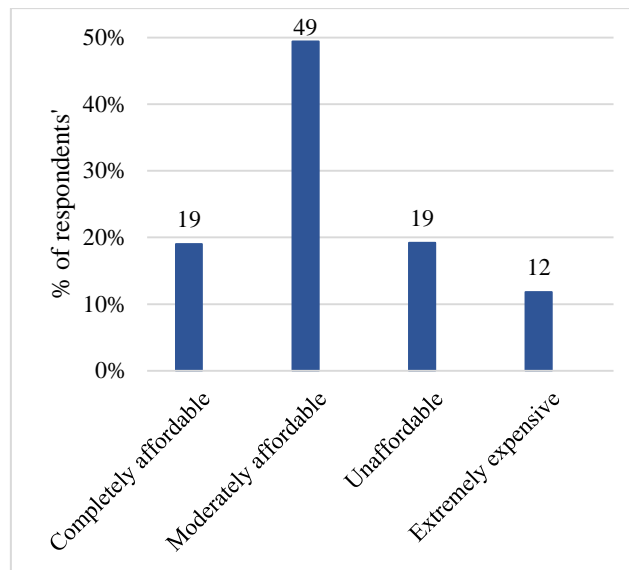

Fig. (14): Respondents monthly income

Fig. (15): Respondents the affordability of taxi prices
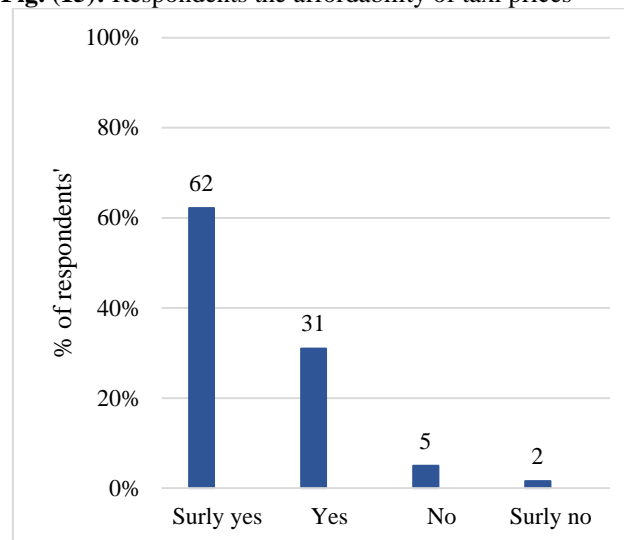

Fig. (16): Respondents daily using of taxi is expensive

c. Problems of taxis

Taxi service in Duhok city has many problems and the passengers suffer from these problems so in this questionnaire survey some of these problems are taken into consideration. 35% of the respondents answered that they do not use the taxi service for the reason of their high price (See figure 17). Figure (18) showed that 41% of the respondents do not have a bad experience with a taxi while 25% of them have one bad experience. Therefore, some citizens specially women don't use taxis firstly, because of the customs and traditions and secondly, fear of bad experiences that may happen with them.
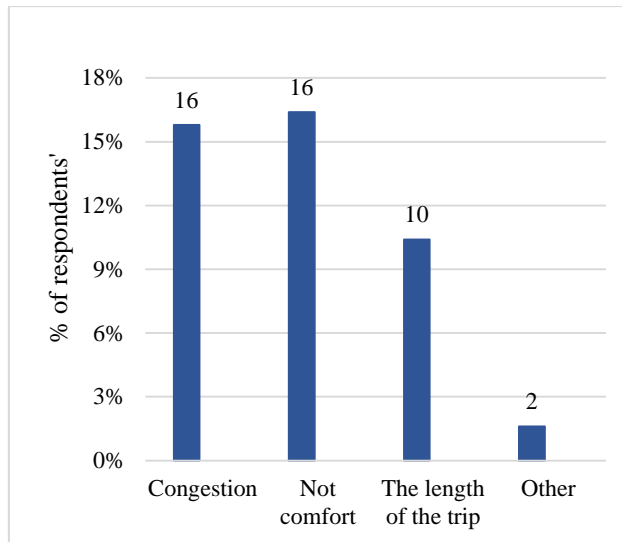
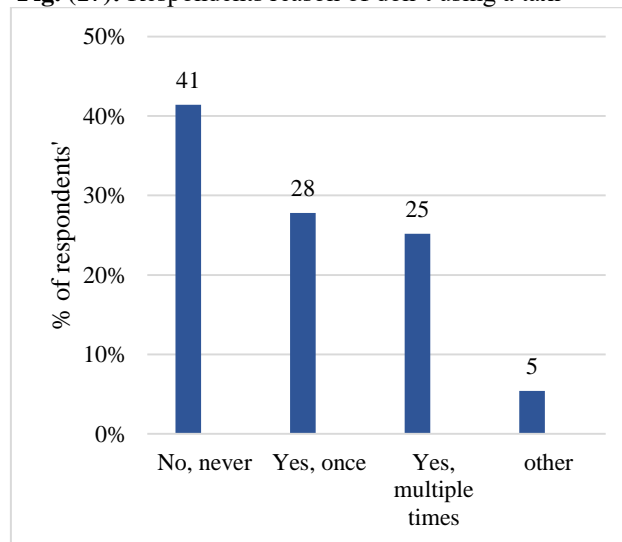**Fig. (17):** Respondents reason of don't using a taxi

Fig. (18): Respondents having a bad experience

As shown in figure (19), of the problems faced during a taxi trip, 34% chose the third option, which was that the taxi driver speaks without asking permission, and this annoys the passenger. One of the reasons of delaying the taxi trip was the city congestion and this option take the highest percentage which was 78% as shown in figure (20). The reason of congestion in Duhok city is that, it is a small city that contains narrow streets that cannot accommodate the large number of vehicles presence inside the city, and it is difficult to expand the city streets because it is a mountainous area.
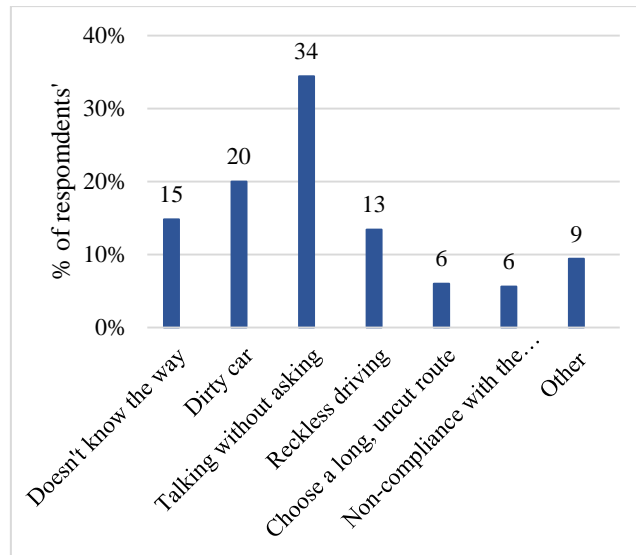
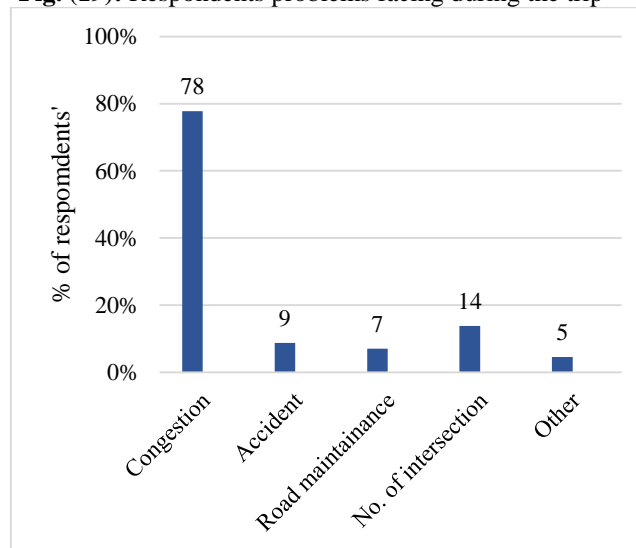**Fig. (19):** Respondents problems facing during the trip

Fig. (20): Respondents reasons of delay

d. Usage

The interviewer asked about the purpose of using the taxi service, 65% of the respondents answered for going and back from work while 15% used the taxi for other purposes like trips to the doctor (See figure 21). Figure (22) showed that 43% of the respondents use taxi service daily followed by 23% using it weekly.
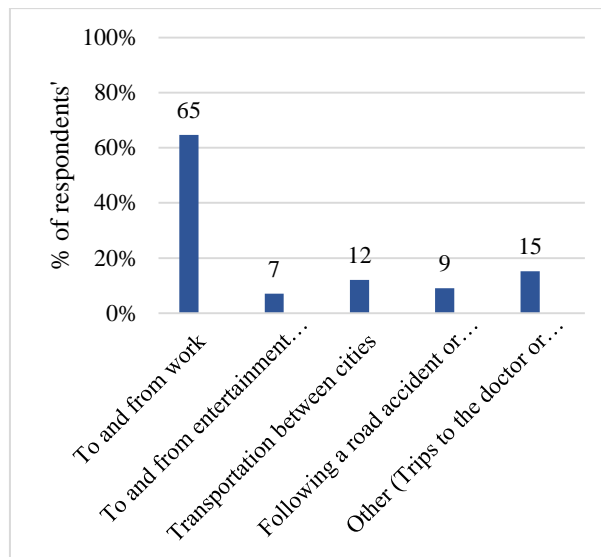
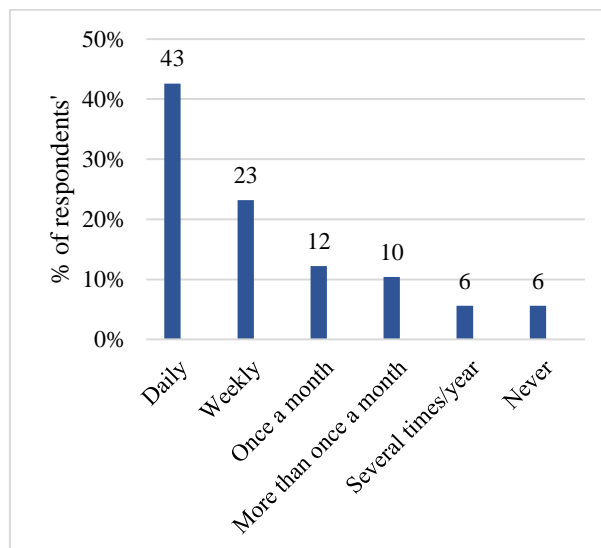**Fig. (21):** Respondents purpose of using a taxi

Fig. (22): Respondents usage of taxi

51% of the respondents were somewhat satisfied with the taxi trip time while 20% were not satisfied as shown in figure (23) and that is due to the congestion inside the city as mentioned earlier. And finally, the interviewer asked if the respondent used public buses and if they were available in the city and 58% was the percentage of yes, they use buses. (Figure 24)
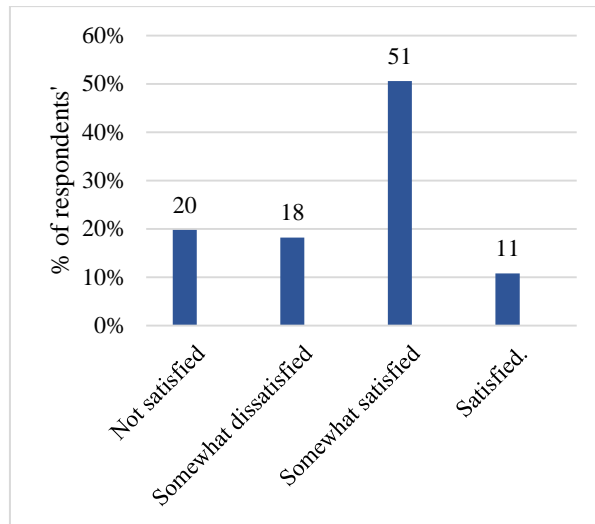
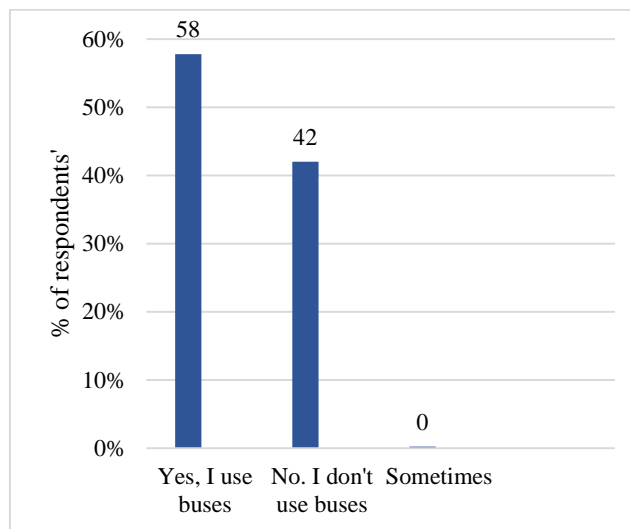**Fig (23) :**Respondents journey time of taxi

Fig. (24): Respondents preferring of using buses

3. CONCLUSION

By analysing the results obtained from the questionnaire, it was found that:

1. Most of the respondents were males between the ages of 21-30 years, 56% of them had 4-6 members and 53% had 1-3 members over 18 years old. It was also found that 61% of them own private vehicles and 65% have a driver's license, and this reduces the use of taxi service within the city despite the presence of large numbers of taxis in the city and this is one of the reasons for the high rates of congestion.

2. Regarding the number of trips, the questionnaire showed that 40% of the sample members make one or two trips per day by taxi, where the morning period recorded the highest percentage by 63%. This is due to the fact that 65% of these trips are for the purpose of going and returning from work.

3. As for the positives and the negatives of this service, 45% of the respondents were somewhat satisfied with the taxi service in the city of Duhok. As for the negatives, which included the cleanliness of the car, the driver's gossip, the long road taken by the driver and others, the highest percentage was 34% about Dissatisfied with the driver's gossip.

4. The questionnaire also shed light on some of the problems faced by taxi service users, including overcrowding and the lack of alternative public transportation.

5. It is possible to recommend to the concerned authorities to develop a future plan to add public transportation to be an alternative or auxiliary service for taxis.

4. ACKMOELDEGMENTS

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