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"I am sick and tired of this congestion": Perceptions of Sanandaj inhabitants on the family mental health impacts of urban traffic jam

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ABSTRACT

Introduction: Traffic and transportation are important determinants in the spectrum of social, economic and environmental factors outside the health sector which has been known to impact public health. The aim of this study was to explore the perceptions of inhabitants and key informants on the impacts of Sanandaj urban traffic jam (UTJ) on family mental health.

Methods: It was a qualitative study with semi-structured interviews. Applying purposeful sampling, 30 residents/key informants were invited to participate in the study. Data collection was conducted through 4 Focus Group Discussions (FGDs) with 22 residents and in-depth interviews with 8 key informants. To conduct analysis, interpretative thematic analysis was used. MAXQDA10 was applied for the purpose of data management.

Results: Based on the participants' perceptions, Sanandaj urban traffic jam had a wide range of impacts on family mental health, and, consequently, "life quality is diminished". Depending on the issue participants were reffering to, the health impacts were grouped into two main themes: (i) *impacts on families in general population*, including "trigerring stress and anxiety", "reducing tolerance threshold", "trigerring family quarrel/squabble", "regreting at traffic accidents" and "annoying about and bored with air/noise pollution"; and (ii) *impacts on the families of inner-city drivers*, including "lack of family cohesion", "dissatisfaction within family", "disturbance in family progression", and "frowning in concentration".

Conclusion: The UTJ in Sanandaj has led to diminished mental health and weakend life quality among families of both general population and inner-city drivers. Our results may help public health practitioners and urban traffic and transportation (UTT) stakeholders in finding a better understanding on potential health impacts of UTJs. In developing countries, like Iran, there is great need to health-oriented policymaking while developing UTT plans and projects.

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1. Introduction

The last three decades have been known as a period for schematizing health-oriented urban plannig, a proposition that was almost forgotten since urban sanitation movement in the middle of the 19th century (Corburn, 2007). The reasons for such a reinclination towards health-oriented urban planning may include concerns related to obesity, lack of physical activity, air pollution, climate changes and damages caused by road accidents (De Nazelle et al., 2011). Mortalities and morbidities resulted from pollutants released from motorized vehicles in traffic jams, have also caused a major challenge in public health (Cohen et al., 2005). Nowadays transportation, as one of the most important infrastructures, has impacted the development of cities, and, conversely, the expansion of cities has also affected transportation systems (Dannenberg et al., 2008).

Urban transportation system is a regular collection of interconnected infrastructures used to transport passengers and goods with the hope to make satisfaction among passengers. Traffic includes all vehicles that are moving and circulating, as well as those that are parked (Gharib Fereydoon, 1997). Although the word “traffic” publicly means road closure and slowing down the passage of motor vehicles, the following definition is more common among the specialists: “traffic is a phenomenon caused by transporting human and commodities and vehicles from a point to another” (Montazeri Mohammad, 2013). The issue of urban traffic and transportation (UTT) plays a vital role in the socio-political structure of societies, and forms a basis for modern urban life and the social needs of individuals (Kamran, 2015). Nowadays, UTT stakeholders and policymakers should be knowledgable on the ways that the development of transportation systems may impact health and the ways that the health of generations may be endangered, in the case of neglecting the issue while urban traffic and transportation planning programs.

Traffic and transportation are important determinants in the spectrum of social, economic and environmental factors outside the health sector, which have been known to impact public health (Cole et al., 2009). Such an impact may either harm health or promote it (ERHA, 2004). As instances, facilitating access to health services and expediting social communication are considered as the positive impacts of traffic and transportation on health. But, what are unfortunately common in developing countries, including Iran, are the damages that come into public health due to lacks in the UTT systems.

In Iran, repetitive urban accidents during days, pedestrian mortalities, injuries due to urban crashes, emission of pollutants, death due to air pollution, and subsidies for gasoline and oil (Kamran, 2015) are among the direct and indirect impacts that the UTT has had on the population health (Nadrian et al., 2014). Several environmental and psychological damages like noise pollution and waste of time may also be aossciated to the UTT in Iran. Haj-Narollahi in a previous study announced that about 500000 daily hours of the Iranian citizens are wasted in traffic jams (Kamran, 2015). These aforementioned impacts are only a part of the negative impacts that the UTTs may have on public health, in the case of improper urban traffic planning and management.

Reviewing literature, we found a scarcity in the studies investigating the impacts of UTTs on public health in developing countries. Despite the emphasis of WHO (ERHA, 2004) on implementing the Ottawa Charter health promotion actions, like creating healthy public policy, in different countries, the application of these actions in Iran has yet been largely neglected. Identifying the impacts of the UTT policies and projects on residents’ health, from their own point of view, may be a pre-requeisite for designing health-oriented UTT programs. Therefore, we conducted a comprehensive multi-method research project from 2014 to 2017 to assess the health impacts of current UTT policies in Sanandaj, Iran, with the hope to identify their impacts on health and its determinants. This research was a part of the qualitative phase of that larger study to understand better how the residents explain the impacts of traffic jam on their health and its determinants.

The participants' viewpoints on the impacts of Sanandaj urban traffic jam (UTJ) on physical health (Nadrian et al., 2017) and social determinants of health (SDH) (Nadrian et al., 2018) are reported in two previously published Persian papers. The physical health impacts of UTJ in the city included direct (e.g., excessive fatigue, premature aging, and dysfunction in the bodily musculoskeletal, digestive, nervous, respiratory, and cardiovascular systems) and indirect (e.g., lack of physical activity (like walking and bicycling) due to the residents' reliance on private car use, premature death, diability, and bodily pain due to inner-city accidents, decreasing sleep and rest times as a result of getting stuck in the UTJs, loss of lives and property due to late arrival of emergency vehicles after getting stuck in the UTJs, and poor general health status due to air pollution-associated diseases/disorders (like asthma/allergy, skin/lung cancer, and older adults’ hypertension) impacts. The impacts of UTJ on the SDH were also reported in two categories: socio-cultural (e.g., poor safety of within-city commuting, delay in daily work trends, disruption in recreation and free times, hampering formal education, and increase in tobacco use) and environmental (e.g., destroying vegetation, expediting destruction in antiquities, air/noise pollution, destroying urban aesthetics and environment, and worsening the quality of soil, food, and water) determinants.

The participants’ perceptions on the original causes of UTJ in the city are also reported in another paper, in Persian (Nadrian and Mahmoodi, 2018). In this study, the causes of UTJ were grouped into two categories: (i) infrastructural causes, including physical infrastructures (e.g., old texture of the city, high number of worn out vehicles, and poor traffic/transport infrastructures), socio-economic status (e.g., poor politico-economic status of the city due to its proximity to Iran-Iraq boundary, lack of social justice, and cultural retardation in traffic-related issues), and demographic charachteristics (excessive immigrants to the city, and high rate of unemployment); and (ii) managerial causes, including poor policy-making of stakeholders at macro level (e.g., lack of planning in traffic behavior culturalization and education, lack of long-term policy-making, lack of governmental investment in the city, and lack of governmental budget allocation to the city), and poor executive functions of the traffic/transport stakeholders (e.g., lack of traffic engineering, poor management of public transportation). In the present manuscript, we only reported on one of the themes that emerged from the larger qualitative study, namely the impacts of UTJ on family mental health.

2. Methods

2.1. Participants and design

In this qualitative study, we applied thematic analysis approach to explore the family mental health impacts of the UTJ in Sanandaj, Iran. We presumed that the health impacts of the current UTJ is not completely understood, and, thus, conducting such a qualitative research may help us in uncovering the thoughts and opinions on the health impacts and diving deeper into the phenomenon.

The study setting was Sanandaj city, Kurdistan province, Iran. In 2014, applying purposeful sampling, 34 residents were invited to participate in the study. Four out of 34 residents declined to participate in the study, due to time limitations or lack of interest in participanting interviews. (Response rate = 88.2%). In order to obtain views across a range of social circumstances, the participants were invited from different socioeconomic backgrounds, based on their records at the urban health centers. Inclusion criteria for the study were living in Sanandaj for at least 10 years from the time of interview, 18 years of age and older, and willingness to participate in the study. Ethical approval to conduct the study was obtained from the Ethics Committee in Tehran University of Medical Sciences.

Focus group discussions (FGDs) were initially held to collect data. In order to dig down deeper into the phenomenon, in-depth interviews were also performed. Among three municipality districts of Sanandaj, two districts were randomly selected as the setting of the work and the participants were selected based on their records at the health centers situated in the districts of interest.The participants were officially invited to participate in the study. Two weeks before the interview date, they were contacted through telephone. For those who expressed their consent to participate, a letter was sent stating the purpose of study and the reason for inviting them to be interviewed. One day before the interview date, a phone call was made for reminding the participants. The interview sessions were held at the health centers (a private room at the centers) colsest to the house of participants. Before interviews, the participants were explained about the research objectives and, all signed informed consent forms. The interviews were voice recorded with their permission.

2.2. Data collection

An interview schedule was developed by the team of research. The schedule consisted open-ended questions, with prompts used as required, to explore the residents' perceptions of the family mental health impacts of Sanadaj UTJ. At first, we conducted four FGDs with 22 residents (5–8 participants in each FGD) to find a general understanding on their views of the phenomenon. We, then, performed individually in-depth interviews with 8 key informant residents (those residents who may have particular information on the associations between UTT and health) to dig down deeper into the participants' perceptions of the impacts. After seven in-depth interviews, we rarely identified new codes and/or categories within the transcripts. At the eighths intervew, no new code, category or theme was emerged (Data saturation). So, we chose to terminate the interviews. The main question was ‘how would you explain Sanandaj urban traffic and transportation system?‘, and then some probing questions were asked according to the interview schedule and the participants' answers.

The FGD sessions were conducted by the first researcher, who had a considerable experience in conducting qualitative interviews. He facilitated the discussions by asking some probing questions and encouraging all participants to join in the discussions. Another researcher of the study supervised the sessions and wrote down the required notes and comments to promote the discussion process. On average, the FGDs and the in-depth interviews lasted 1.5 h and 45 min, respectively. All interviews were voice recoreded applying a digital voice recorder. After four FGDs and eight in-deph interviews, we achieved informative saturation of the data.

2.3. Data analysis

The interviews were transcribed verbatim and the texts were reviewed for accuracy. Then a thematic analysis was carried out using the qualitative data analysis software MAXQDA$_{10}$ (MAXQDA10 2011). There are two approaches to conduct thematic analysis; an essentialist/realist approach or a constructionist approach (Braun and Clarke, 2006). In the first approach, a qualitative researcher reports the experiences, meanings and the realities of participants, and in the latter approach, the researcher explores the ways that experiences may be affected by a range of discourses within a community. In the present study, the research team presumed that the residents' views of the family mental health impacts of the UTJ may be influenced by social determinants, like the history of contacts with the problems related to the policies, culture, and the social context of the society. Therefore, a constructionist framework, with a focus on latent/interpretative level of the underlying viewpoints, assumptions and conceptualizations of the residents, was applied. The transcripts were read and re-read, and the initial codes were drawn from the data. Then, in close discussion within the research team, the codes were collated into themes, and developed a coding frame. The first author conducted and analyzed all interviews, and derived the themes by his preconceptions. When conducting and analyzing the interviews, he had the research question in mind. The research team, therefore, took an epistemological strategy to uncover the residents’ perceptions of the family mental health impacts of the UTJ. A second researcher randomly selected and coded one in five raw transcripts, with the hope to account for inter-rater reliability. The agreement with the themes was checked and the team of research ensured that both researchers deduced similar themes from the texts. Eventually, some minor changes were made to terminology, although no change was made to the emerging themes.

Table 1
The charachteristics of residents and key informants participated in the sutdy

Participants	Charachteristic (n)
Residents (participated in the FGD sessions), n = 22	Adults older than 60 (2, one male and one female)/female adult (2)/adolescents (2, one male and one female)/youths (2, one male and one female)/lawyer (1)/bank employee (1)/educational planner (1)/drivers in inner-city travel agencies (2)/taxi driver (1)/inner-city bus driver (1)/ healthcare provider (1)/housing engineer (1)/bank retired (1)/construction worker (1)/pregnant woman (1)/university student (1)
Key informats (participated in the individual in-depth interviews), n = 8	Healthcare provider with 5 years of job experience in a Social Determinants of Health Rsearch Center (1)/Health, Safety and Environment (HSE) technician with job experience on driving electricity events emergency cars (1)/Ph.D. in Environmental Science (1)/Ph.D. in Health Education and Promotion (1)/Social Psychologyst (1)/B.S. in Environmental Health Engineering (1)/taxi driver with 10 years of job experience (1)/urban tarffic and transport engineer in municipality (1)

3. Results

The participants were between eighteen to seventy years of age (Mean age was 39 ± 13), and all were resident in Sanandaj since 10 years ago. Twenty-five participants were born in the city. Three were residents for more than 20 years, and two were inhabitant in the city for about 12 years. Participants' charachteristics are presented in Table 1.

The predominant theme arising during data analysis was termed **"life quality is diminished due to current urban traffic jam"**. Based on the residents' perceptions, UTJ in Sanandaj had a wide range of negative impacts on family mental health of the residents and, consequently, on life quality within the families. Depending on the issue residents were reffering to, the health impacts were grouped into two main themes: (i) impacts on the families in general population, and (ii) impacts on the families of inner-city drivers.

3.1. Impacts on the families in general population

The impacts of urban traffic jam on family mental health of general population were grouped as follow:

3.1.1. Trigerring stress and anxiety

According to 24 participants, stress and anxiety among the residents are increased due to the UTJ and its consequences, like late arrivals, disputes and strifes caused by the collision of two cars, and long staying in traffic congestions and behind the red lights. They believed that such high level of stress and anxiety has led to an increased risk of poor mental health and obscure headaches within the families.

" …. the traffic might cause a mental problem for example I myself experience the anxiety caused by arriving late, being late to work, delay in the appointment that I have …" (p.18).

" …. these long queues that you see in the city, in bus queues, at taxi queue, it makes every one worry and anxious, worry about to reach the destination and not to get home late …" (p.16).

"… when somone stays in traffic for a long time while he's tired and he wants to get home, and he sees that he must stay behind the red lights regularly, staying behind the red lights exacerbates stress …. "(p.27).

3.1.2. Reducing tolerance threshold

Fourteen residents reported that their tolerance threshold has decreased due to staying in traffic and behind the red lights for long times, and the tension of getting stuck between cars. Such a reduction in their tolerance has caused aggression and anxiety, and weakening nerves and sensitizing. They believed that they do not have that level of tolerance that they had before.

" …. when one become aggressive and nervous from staying in traffic for a long time, he may have any reaction …"(p.29).

3.1.3. Regreting at traffic accidents

Eleven participants believed that frequent occurance of inner-city accidents due to the high volume of UTJ has weakened family mental health through filling with remorse after accidents, grief and sorrowing due to the loss of family members and relatives, and the shock and sadness after inner-city accidents.

" …. .Those two crashes was that much horrible that I think it reduced ten years of my life … I repeat those moments every minute in my mind, and I review that what happened and what did not …. . and do you know how much it drive me nerveuse? …. ?(p.2).

3.1.4. Annoying about and bored with air/noise pollution

As 25 participants reported, car hornings and noise pollution was another product of UTJ that has attenuated family mental health. They also believed that air pollution caused by the UTJ has made the drivers and the inhabitants who lives at houses close to

crowded streets peevished with irascible temperament, and has, therefore, attenuated the accuracy of drivers while driving.

" … for two years, we were at a house … near the street and we were really sick and tired of car smoke …. and noise pollution, we were easily getting angered … this pollution is a lot particularly at nights when trucks pass …"(p.5).

"… the air pollution have affected the parent's accuracy while driving … in those familys that …. their houses are near to the crowded streets … (p.3).

3.1.5. Trigerring family quarrel/squabble

Seven residents believed that the traffic congestion has generally led the families towards angry arguments and noisy quarrels. Such tensions have also affected the entire family living and quality of life.

"… these routine accidents caused by traffic result in daily disputes and tensions in the drivers and those around them. Well, a person with that level of tension certainly affects his family."(p.9).

" …. traffic congestion in sanandaj is too much. I've seen myself, for example when an adolescent of a family is at school and … after taking taxi, she gets trapped in traffic for a long time, her family is constantly worried that something happened to their child and they call him, …and she couldn,t hear his phone rings due to noise pollution and she won't answer, they will be so worry and then …. when she gets home, even her parents may have dispute with her that why you're late and this make a routin tension in family "(p.10).

3.2. Impacts on the families of inner-city drivers

The impacts of urban traffic jam on family mental health of the drivers in the transportation system were grouped as follow:

3.2.1. Lack of family cohesion

Six participants, as inner-city drivers, reported that UTJ has led to lack of time for them to be with their spouse and their children, which has consequently resulted in separation and some forms of divorce between the family members. Therefore, family cohesion in this subgroup of the population is, indirectly, damaged by traffic jam.

" …. I work from 7 a.m to 8 p.m on my taxi and it repeats every day. I get nervous while I drive and I get exhauseted physically and mentally and when I go home, I can't talk to my wife and to my children, it slowly causes dispute between husband and wife and father and child … and it cause separation"(p.7).

"..my child …. expect me, as her father, ….that when I get home, she start to play with me and talk to me..and …. if I can't talk to my child and make her satisfied, she will emotionally detached from me little by little"(p.11).

3.2.2. Dissatisfaction within family

According to 9 participants, traffic jam in Sanandaj causes excessive fatigue of father (as a driver) and reduces his tolerance threshold during familial and social relationships. Such traffic jam-induced problems inhibit the father from playing well his roles as a husband and/or a father within family relations, which may, thus, result in prevailing a feeling of insecurity in the family. As an outcome, level of dissatisfaction is arised among the family members.

" …. when I come home, I must do my own duty as a father at home. When I get tired in that traffic, as I said, … the traffic has made me exhausted, and so I can't play well my roles as I should …. "(p.8).

" …. .when I come home at night, that exhaustion makes me, as a taxi driver, to struggle with my own family because i'm tired, when I'm back home, my wife and my child expect me to talk to them and play with my child, my wife was alone at home whole day, isn't it?...."(p.9).

3.2.3. Disturbance in family progression

As 12 participants believed, UTJ in Sanandaj has disrupted the progress of family affairs. A participant states the consequences of staying in traffic as follows:

" …. I myselfe when come home, I've got so much clutch and braking that my legs are aching and naturally my back aches, when I go home, I don' have that positive energy to do my works, I can't have that positive effect at home that I should have, for example I can't study my lesson, cook food or homeworks like that …. "(p.22).

3.2.4. Frowning in concentration

Ninteen participants (particularely the rutine drivers) reported that long wasting of time in traffic congestions leads the drivers of public transportation system to be with low mood and feel nervous, which consequently have reduced their level of concentration over time.

" …. it [traffic congestion] affects the soul and spirit except for body, actually when I have the tension of losing my time my mood and

thinking are influeced …. "(p.14).

" …. .people who stay more in traffic, such as me as a taxi drivers, are usually nervous, you remain in traffic so much that you can no longer concentrate on what you want" (p.15).

4. Discussion

To our knowledge, this was the first qualitative study to explore the impacts of UTJ on family mental health. We unearthed that the UTJ in Sanandaj have impacted the mental health of families in various ways, suggesting that the UTT policies, plans, and measures may have various mental health impacts on the families within a community. These findings highlighted the need for prospective health impact assessment of such policies and projects to evaluate how much the implementation of the plans may have either positive or negative impacts on public health. Our findings also supported the action "creating healthy public policies" announced in Ottawa Charter (1986) (Thompson et al., 2018). In Iran, as a developing country, health promotion actions are mainly undermined and are paid low attention, particularly during policymaking for and desigination of nationwide and communitywide plans.

Our results complement previous studies (Nieuwenhuijsen et al., 2017; Mahdavi and Binaei, 2017; McAndrews et al., 2017) that have documented the impacts of UTJs on health status and quality of life (QOL) in different communities. Chronic tensions and frowned concentration due to frequent getting stuck in traffic jams, regretting at inner-city accidents and grief due to the loss of family members and relatives, and the shock and sadness after car collsions, as well as dissatisfaction within families were all UTJ-related factors impacting family mental health and QOL, as detrimental health outcome indicators (Khosravi Ardeshir et al., 2010).

Annoying about traffic noise and car hournings was common among the participants in our study. Similarly, Pierra et al. (Pirrera et al., 2010) found that traffic-induced noise pollution may lead to a shift in night-time sleep patterns, night-time wakeups, and overall changes in mood and mental health. Other studies have also associated noise pollution to depression and poor QOL (Lercher, 1996; Öhrström, 2004, Ali et al., 2018), as a long-term impact, which are consistent with the findings of the present study. Oweisi et al. (2007) (Oweisi Elham et al., 2008) examined the impacts of traffic-based noise pollution on the general and mental health of residents in Yazd, Iran, and found that the traffic officers had experienced the highest negative effects from traffic noise pollution and had higher levels of sleep and speaking disorders, anger, headaches and dizziness, premature fatigue and muscle weakness, compared to other residents.

Twenty-five residents also indicated that the air pollution caused by motorized vehicles in the traffic jams has attenuated the residents' mental health. As they believed, the air pollution intensifies their level of aggressive behaviors, which may dwindle their level of accuracy while driving. In a previous study, Kulur (2013) stated that the air pollution caused by traffic congestion can affect nervous system and may increase the risk of damaging brain (Kulur, 2013). Neurodegenerative disease (Levesque et al., 2011), low intelligant qutient, lack of concentration and memory loss, epilepsy, migraine, and blurred vision are other effects of air pollutants on the nerves system (Kulur, 2013) and human mental health (Sui et al., 2018).

Our data confirmed that late arrivals, disputes and quarrels due to car collisions, and long-time staying in traffic jam have triggered stress and anxiety among residents. Several previous studies have, similarly, emphasized the effect of traffic congestions on increasing the levels of stress, anxiety, and nervous tension (Pirrera et al., 2010; Kulur, 2013; Yap et al., 2004; Vlachokostas et al., 2013; ERHA, 2004). As Kulur noted, traffic congestion affects both mental and physical health in different ways, and its most common direct complications on health are frustration, stress and headache (Kulur, 2013).

Aggression and anxiety due to long-time staying in traffic, and staying behind the red lights for several times were often reported by the participants as the factors that reduce their tolerance threshold in familial relationships. Kulur (2013) explained that the sensation of getting stucked in a place filled with vehicles is intolerable for many people. He, thus, reported traffic jams as one of the main causes of stress-related disorders.

Our data also confirmed poor family mental health of the inner-city drivers, as individuals who have constant exposure to traffic congestions. Hossein Abadi et al. (Hossein-Abadi Seddigheh et al., 2010), in a study investigated the effects of traffic-induced stress on the levels of adrenaline hormone in the blood of urban bus drivers.They announced that agitational reactions and stress can lessen the level of accuracy, concentration and judgment of the drivers (Hossein-Abadi Seddigheh et al., 2010).

According to the inner-city drivers in our study, the waste of time in traffic jams leads to tension in the drivers of public transportation system and gradually reduces their level of concentration over time (Hossein-Abadi Seddigheh et al., 2010). In another study conducted in Balifermot, the drivers reported that a large number of red lights in the area had led to a sense of frustration in the drivers (Authority, 2004). In our study, almost all residents who were either taxi or bus drivers believed that the UTJ in Sanandaj has led to poor relationships between the drivers and their family members, which has eventually resulted in family squabbles. In a Canadian qualitative study (McDonough et al., 2014) among a population (truck drivers and their managers) different from those participated in our study, the concerns of many truck drivers were somewhat similar to those reported by public transport drivers in the present study. Both populations reported inability to meet family responsibilities due to the nature of their jobs (long hours of work as a driver).

Based on our data, many problems related to poor family mental health among the public transport drivers were due to two main reasons: (1) their long absence at home, due to the nature of their work, as noted in a previous study (McDonough et al., 2014), and (2) the UTJ-induced fatigue when attending their families. Many drivers stated that after retuning home they did not have the ability to deal with home affairs, talk to their spouse and children, and make them satisfied with their requests. They also reported the reason for such an inability as the fatigue due to traffic congestion which was extra to job tiredness. In addition, due to the nature of their job

as a public transportation driver, they deal with lots of people with different characteristics and different subcultures. Moreover, driving in traffic congestions and staying behind of several red lights faced them with an extra fatigue that reduces their tolerance threshould during family relationships, and thus hinders playing their role as a husband/father at home.

Participants indicated that the UTJ has resulted in chronic tension within all families. The tension is due to several traffic-related issues including family involvement in the car collision disputes, stress and mental pressure on the family of injured persons (as reported by two participants who lost one of their members in inner-city accidents), and the familys' worries and concerns about the member's traffic-induced delays (as noted by seven participants). About 70 percent of the dead and injured persons in the worldwide traffic accidents are houshold attendants, whose death may result in disastrous outcomes and poverty to the families (Richardson and Mitchell, 2010). Similar with our findings, Ulrich (1984) reported the loss of family member lives due to accident or imprisonment as another impact of traffic and transportation on family health (Ulrich, 1984). Also, nearly 40 percent of traffic accident-related deaths are among younger that 25 years old population (Richardson and Mitchell, 2010), which imposes a mental health crisis to the relatives and family members.

In our previously published paper (Nadrian and Mahmoodi, 2018), the level of UTJ was reported to be at the highest level in the downtown area, as the old texture of the city with the highest population density, which exacerbated the health status and life quality of the residents. Such results urge the need for comprehensive urban planning, in a way that not only the residential areas to be shifted to the less condenced areas of the city, but also the organizational and administrative places to be relocated to a unique place outside the downtown. Such measures along with constructive UTJ diminishing measures, like expanding the sidewalks, and adding a bus lane and high-visibility crosswalks in the crowded streets may alleviate the level of heavy motor traffic volumes in the area.

In that study (Nadrian and Mahmoodi, 2018), lack of traffic and transport planning was reported as one of the main managerial causes of the UTJ in Sanandaj. Poor UTT policy-making and lack of traffic engineering have resulted in traffic congestion and delay in daily work trends, which consequently lead to stress. As the participants reported, the UTT descision-makers have poorly managed the transport planning. For example, one may be absolutely astounded by the number of single occupant vehicles commuting into the city, which may be due to poor planning for the promotion of other modes of commuting beyond motorised vehicles. In Sanandaj UTT system planning, the roles of public transport, walking and cycling are poorly managed (Nadrian et al. 2017, 2018; Nadrian and Mahmoodi, 2018). As suggested by participants (Nadrian and Mahmoodi, 2018), the UTT stakeholders should consider the following strategies while desgining urban traffic/transport plans: 1) making the public transport efficient through modernization of public transport fleet, eliminating the worn out taxies/buses, and setting up a bus rapid transit (BRT) system; 2) setting-based UTT planning, which means taking into account the structural and environmental factors, and the health impacts of their descisions while planning functional programs for a particular area; 3) having an inter-sectoral approach while planning traffic behavior educational/culturalization programs; 4) developing traffic-related infrastructures, like constructing non-intersecting lines, and urban street tunnels where needed; and 5) decentralization of governmental/non-governmental organizations from the downtown.

5. Conclusion

The UTJ in Sanandaj has led to diminished mental health and weakend life quality among families of both general population and inner-city drivers. The participants, as residents of the city, described multiple impacts of the UTJ on family mental health. It seems that such health impacts have not been taken into account in the UTT system of the city, which may partly explain why the UTT policies and projects do not lead to life satisfaction and better urban QOL from the viewpoints of residents. The study depicted family mental health impacts of the UTJ in an Iranian community. Our results may help public health practitioners and UTT stakeholders in finding a better understanding on potential health impacts of UTJs. In developing countries, like Iran, there is great a need for health-oriented policymaking while developing UTT plans and projects. The results may be also helpful in inclining the descisions of the UTT policymakers and stakeholders toward health-oriented descision making while designing UTT plans and policies. Urban traffic policymakers and public health professionals should develop prospective health impact assessment plans prior to implementing the UTT plans, with the hope to identify the potential health risks of their descisions on populations.

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Authors' contributions

Study design: HN, MHT, KP, and TB. Study conduct: HN, MHT, and MKP. Data collection: MKP and HN. Data analysis: HN, MHT, and KP. Data interpretation: HN, MHT, KP and TB. Drafting manuscript: HN and KP. Revising manuscript and content: HN, KP, and TB. Approving final version of manuscript: All authors. HN takes responsibility for the integrity of the data analysis.

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Conflicts of interest

The authors declare no competing interests.

Ethical approval

This research was approved by the Ethics Committee in Tehran University of Medical Sciences and Health Services (ethical approval code: IR.TBZMED.REC.1396.1067). The participants were told about the aim of study and were assured on the confidentiality of data. All participants and one of their parents signed a consent form before data collection.

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