

Healthcare-related challenges of the taxi industry stakeholders in the city of Tshwane, South Africa

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Abstract

The minibus taxi industry underpins South Africa's public transport system, serving approximately 80.2% of daily commuters. Despite its economic importance, the sector operates in a high-stress, informal environment, exposing drivers to occupational health risks compounded by limited medical surveillance. This study explored healthcare-related challenges and barriers to healthcare access among taxi drivers, owners, and association representatives in the CoT. A participatory research design was used. Ninety-two participants (83 males, 9 females) were purposively sampled from taxi drivers, owners, and association representatives across CoT taxi ranks. Data were collected using eight focus group discussions, audio-recorded, transcribed verbatim, and analysed using framework-informed, deductive thematic analysis. Findings revealed layered systemic barriers: regulatory gaps, institutional distrust, and gendered stigma; geographic and infrastructural constraints, absent mental health services, and power imbalances between owners and drivers; conflicts between clinic hours and work schedules, rejection of medical certificates, and broken referral pathways; and deferred care, self-medication, and accumulated psychological strain. Taxi rank environments and rigid industry structures directly threaten drivers' physical and psychological well-being, fostering fatigue, substance use, and unresolved trauma. Interventions should prioritise decentralised, mobile healthcare aligned with operational hours and improved rank infrastructure to promote safer, dignified working conditions.

Keywords: Minibus taxi drivers || Occupational health || Healthcare access barriers || Informal sector || Public transport || South Africa.

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Introduction

Taxis are among the most readily available modes of public transportation. Globally, taxis are vehicles regularly used to complement mass public transport and serve as a safe, fast, reliable, 24-hour service (Katsapila & Grise 2024). Given the size and anticipated growth of the sector, driver health and health care disparities have substantial public health implications, as taxi drivers' health and safety are directly linked to those of passengers, pedestrians, and other road users. The ride-hailing market is expected to grow rapidly over the next few years. It will grow to \$252.14 billion in 2030 at a compound annual growth rate (CAGR) of 9% (Research and Markets, 2026).

International studies have identified multiple health-related challenges among taxi drivers. A study conducted in the United States of America by Murray et al. (2019) highlighted that taxi drivers, due to their occupation, are susceptible to illnesses such as chronic pain, sleep deprivation, cardiovascular disease, diabetes, kidney disease, and eye problems. In South Korea, a study of 965 participants found that, among taxi drivers, ageing is often associated with declines in health. Those entering their late 50s and early 60s face multiple challenges, such as chronic diseases and cognitive decline. Recent literature (Rezeai et al., 2024), Pickard et al. (2022), and Abere (2023) report that a range of occupational health problems among taxi drivers are largely associated with unfavourable working conditions.

In Africa, studies reflect similar trends. In Nigeria, Ajayi et al. (2025) reported a high prevalence of metabolic syndrome among taxi drivers. This condition is associated with the sedentary nature of the occupation and characterised by central obesity, dyslipidaemia, hypertension, impaired glucose metabolism, and an increased risk of hyperuricaemia (Saunders et al., 2020). Further research indicates that taxi drivers are frequently subjected to long and irregular working hours, extended periods of sitting, poor posture, elevated stress levels, and unhealthy dietary practices, all of which adversely affect their health (Ameen, 2024).

The minibus taxi industry is the backbone of public transportation in South Africa and remains the most preferred, accessible, and affordable mode of travel in the country (Mbatha, 2025). According to Stats SA (2022) and Kriel and Burger (2023), approximately 80.2% of commuters rely on taxis daily for travel to work, school, and other destinations. Despite ongoing challenges, including violent taxi conflicts, overloading, speeding, and poor vehicle roadworthiness (Ameen, 2024; Wust, Bekker, and Booysen, 2025), minibus taxis continue to dominate the public transport sector in SA. By 2023, the South African National Taxi Council (SANTACO, 2023) reported that the taxi industry comprised approximately 250,000 minibus taxis owned by 123,000 minibus taxi owners. Furthermore, the report highlights that the minibus taxi industry employs approximately 600,000 people. Thus, the sector plays a significant role in the national economy, contributing an estimated R90 billion to R100 billion in annual revenue and supporting thousands of jobs, including those of taxi drivers and queue marshals (Business Tech, 2025). Compared with other studies, a study by Ndibatya and Booysen (2021) conducted in Kampala, Uganda, confirms that most African travellers relied on minibuses for social commuting, although the contribution to the economy was not quantifiable.

The taxi industry in South Africa plays a crucial role in transporting commuters between areas. Yet, it operates in a high-stress, informal environment that poses severe risks to its workforce's health and safety. Various studies have reported a high prevalence of obesity, hypertension, and an increased risk of type II diabetes among South African minibus taxi drivers (Ramukumba and Mathikhi, 2016) and Mabetwa et al. (2022) also reported that health challenges faced by minibus taxi drivers included diabetes (46%), hypertension (36%), and obesity (36%), alongside high rates of physical inactivity (71%), alcohol use (59%), and smoking (30%).

Despite the sector's vital economic role in South Africa, minibus taxi drivers face occupational health hazards compounded by a lack of regular medical surveillance. Various studies conducted in other countries in the taxi sector indicated that the taxi industry was mostly male-dominated, reported poor health-seeking behaviour, and was exposed to occupational health problems related to their job

(Abdullah, Arsat, Aziz, and Kubaisy 2022; Fan et al. 2017; Crimmins, 2019; Nyalela et al. 2018). The socioeconomic factors and lifestyle of this cohort also affect their views on healthy practices (Sekgala et al. 2023). There is a scarcity of studies in South Africa, particularly in the CoT, that focus on access to healthcare and related challenges among minibus taxi drivers. This study is essential for exploring the healthcare-related challenges faced by minibus taxi drivers in the CoT. This aligns with the United Nations' Sustainable Development Goals 3 and 8, which aim to promote good health and well-being for all individuals and promote decent work environments. This will help policymakers, taxi industry leaders, and researchers gain insights into the health-related challenges faced by minibus taxi drivers in the CoT.

Method

Study setting

The research was conducted at selected taxi ranks of the City of Tshwane (CoT), the largest metropolitan area in Gauteng, South Africa. The CoT covers approximately 6,298 km² and has an estimated population of 4,040,315. The minibus taxi industry comprises about 250,000 minibus taxis, 123,000 taxi owners, and an estimated 600,000 taxi drivers (Business Tech, 2025).

Research design

A participatory design was employed to examine the health-related challenges and barriers to healthcare access within the taxi industry. Participatory design is a collaborative movement that breaks down traditional professional barriers to drive social change. It is rooted in decentralised, democratic decision-making, ensuring that individuals directly affected by a system shape the decisions impacting their lives (Sanoff, 2022).

Population and sampling

The target population comprised 92 participants from three distinct stakeholder groups: taxi drivers, taxi owners, and taxi association representatives active within the CoT. Participants were selected using purposive sampling to ensure they possess the deep, contextual industry knowledge required to co-create meaningful healthcare solutions (Ahmad & Wilkins, 2025). To ensure data richness and ethical compliance, the eligibility criteria require all participants to have experience in the CoT taxi industry and to provide voluntary, informed, and signed consent. The sampling was conducted through the field worker's industry entry to gain the cooperation of various stakeholders within the taxi industry.

Data collection

Data were collected using eight focus group discussions. To ensure content validity, the guide was developed based on existing literature on the taxi industry. Focus group interviews (FSGs) were held in designated private areas at the taxi ranks to ensure confidentiality. Furthermore, interviews were audio-recorded with participants' consent and transcribed verbatim for subsequent analysis. All sessions were facilitated by a research team comprising a lead researcher, a moderator, and a field worker, who documented nonverbal cues in field notes. Data collection continued until data saturation was reached, when the researchers deemed that no new information could be obtained from FGD and that the research aim and objectives were sufficiently addressed (Bouncken, Czakon, & Schmitt, 2026).

Ethical considerations

Ethical approval was sought from the Tshwane University of Technology Human Research Ethics Committee, reference number: (REC Ref #: REC2023-12-047Science).

Data analysis

The FGD transcripts were analysed using a framework-informed, deductive thematic analysis, following Braun and Clarke's (2022) six-phase approach. All interview recordings were transcribed

verbatim, including both verbal responses and documented non-verbal cues. Atlas Ti version 8 was used for data organisation and analysis.

Results

The study's demographic profile consists of 92 participants, with 83 being male and 9 being female. In terms of age distribution, the sample trends toward an older demographic; 22 participants fall into the 41–50 age bracket, while the largest segment comprises 36 participants who are 50 years of age or older. Educational status, a majority of 65 participants completed their schooling up to the secondary level. Regarding their roles within the taxi industry, 48 of the interviewed participants were taxi drivers. Table 1 shows the summarised demographic data of the participants.

Table 1: Demographical data

Variables	Total (s)
Gender	n=9 females and n=83 males
Age	41-50yrs: 22 and 50+ n36
Highest Qualification	Secondary: n=65
Role	Taxi drivers n=48 and owners n=44
Number of years in a role	20+ n34

Systemic Barriers to Healthcare Access

Utilising Bronfenbrenner's ecological systems theory, qualitative data reveal that taxi industry workers face multi-layered barriers to healthcare, spanning from regulatory vacuums in the macrosystem and environmental, infrastructure, and power dynamic constraints in the exosystem, to severe friction between work demands and health services in the mesosystem. These systemic failures create an unfriendly work environment, necessitating specialised, accessible, and mobile health services for operators. All the barriers are categorically presented.

Category 1: Macro-Policy Frameworks and Institutional Barriers (The Macrosystem)

At the broadest level, healthcare access is severely restricted by a regulatory vacuum within the public transport sector, coupled with deep-seated institutional distrust. Participants highlighted a complete absence of protective labour laws or standardised occupational health and safety mandates. This macro-level failure leaves taxi operators exposed to exploitative workplace conditions where basic medical leave is unrecognised.

"We are not allowed to take leave in this industry; even when you're sick, you have to be at work sickly and would rather die at work." (FG8P2)

This policy failure is worsened by a profound breakdown in communication and trust between state entities and taxi industry workers. Structural barriers are reinforced by an information deficit regarding policy implementations, which produces intense doubt toward government-led health initiatives:

"The only problem is that [government] are full of crooks; we can submit the memorandum, but the development might fail to take off." (FG1P2)

"Remember, a lack of information can cause obstacles... if something comes to you, it's only two minutes you attend..." (FG7P11)

These structural deficiencies are further compounded by socio-cultural barriers inherent to the male-dominated taxi sector. Gender norms within the male-dominated industry further create a culture of help-seeking avoidance, where displaying physical vulnerability or seeking medical attention is socially stigmatised:

"Men are afraid to go to the clinic; some are afraid of people. Then, when they wake up in the morning around four o'clock, they work until late." (FG6P4)

Category 2: Inaccessibility of healthcare services due to infrastructure and environmental barriers (The Exosystem)

The physical and operational architecture of taxi ranks serves as a direct, external barrier. Participants described their work environment within the taxi rank and its facilities as fundamentally incompatible with their daily operational realities due to extreme geographic distance and severe administrative bottlenecks:

"If you want help, brother! and you go early at 05h00 to George Mukhari (an academic hospital), but you will still finish at 17h00." (FG3P5)

"Maybe you can try to meet us halfway by building or bringing a mobile clinic closer... Steve Biko (academic hospital) is far..." (FG5P1)

Despite the high-stress environment of the taxi ranks, specialised psychological care and mobile mental health care outreach are non-existent, leaving taxi operators without access to the necessary counselling resources they need:

"There are a lot of things that the psychologist can check us for, and people can have someone to talk to. Isn't the brain also getting tired? Then counselling services should be part of the mobile clinic services." (FG7 P2)

This structural accessibility barrier is reinforced by the unchecked power dynamics of an unregulated industry. In the absence of labour law enforcement at the rank level, taxi owners hold absolute authority. Consequently, taxi drivers face the immediate threat of dismissal if they prioritise their health-seeking over labour:

"It is a problem because I've lost my job because I could not see. When I came back from the hospital after being admitted for seven days because of a problem with diabetes mellitus, I found out that I lost my job." (FG1P1)

Category 3: Inter-Systemic Friction and Operational Barriers (The Mesosystem)

Severe friction occurs at the mesosystemic junction where the demands of the workplace directly collide with the rigid operating structures of the public health system. Taxi drivers face a direct financial loss and an operational penalty for absenting themselves from work to seek medical attention. Because clinic operational hours overlap with peak transport hours of work, leaving the taxi rank means the taxi driver forfeits their position in the loading queue, resulting in immediate income loss:

"If my turn comes and I still go for consultation at a far-reaching clinic, then I will be jumped on the queue and lose the opportunity to make money. We can use nearest clinics temporarily, but mobile clinics are needed for accessibility at the taxi ranks." (FG2P7)

This systemic conflict is worsened by rigid workplace undocumented practices where formal medical certificates (sick notes) are actively rejected by taxi owners and managers, rendering healthcare visits useless to the taxi drivers:

"As queue marshal like as of now, it will be difficult to move and go to the clinic... in my workplace, there is no way I can bring a sick letter or a doctor's letter; do you understand me?" (FG4P2)

"Do you see today, as I'm talking to you, it's a Saturday; we work abnormal hours... you guys come with the mobile clinic and park it here so that you can do checkups on ourselves." (FG6P6)

This inter-systemic disconnect is further illustrated by broken institutional referral pathways. Even when health outreach campaigns occasionally visit the taxi ranks, they operate in isolation. They function merely as screening mechanisms rather than entry points, failing to link taxi drivers and taxi owners directly into primary healthcare services and pushing them back into the already existing healthcare access challenges:

"Yes, I've been waiting for the call. They checked on me again when they came back for a campaign, and they said they could not refer me because I needed to go there (to the healthcare facility) and queue for help." (FG3P10)

Category 4: Proximal and Psychological Barriers (The Microsystem & Chronosystem)

At the innermost levels of experience, the combination of daily challenges and long-term socio-economic strain forces taxi drivers to adopt high-risk, localised survival strategies. Driven by extreme time constraints, taxi drivers systematically defer formal medical attention, pushing health-seeking behaviour into an indefinite future:

"It sometimes happens that I have a cough, or I have to go to the clinic and get pills or something... I must wait for the day that I am off, otherwise, time is over for me." (FG7P5)

To survive the physical demands of demanding work hours while bypassing the structural barriers of formal clinics, operators resort to unprescribed self-medication. They make use of unprescribed medications simply to mask bodily pain and maintain their labour outputs:

"Whether you are sick or not sick, he (the taxi owner) wants money... I just buy those pills and drink them, and I don't know what they do when they get inside my body, but they ease the pain." (FG2P9)

Over time, this results in severe, long-term physiological and psychological deterioration among drivers. Participants expressed that unaddressed, daily occupational trauma and chronic financial strain accumulate over years, ultimately manifesting as deep-seated workplace aggression, unresolved grief, and advanced disease progression:

"We are sick, and for that reason, what I can tell is that we are unable to recover because we can't go to the hospital because of long queues." (FG1P2)

"There's so much that is in us that we've not talked about. That's why you see aggression every time, because there's so much that is in us that we've not talked about." (FG7P4)

Ultimately, sustained financial desperation entrenches these barriers over time. Operators are trapped in a perpetual loop where economic survival permanently overrides physical and psychological healing:

"Somebody might be driving, and two days ago, he experienced somebody being shot in front of him. And today, it affected him mentally. And today, he must transport people without counselling." (FG8P5)

"Do you expect me to be fit for transporting these people and talk smoothly with them, because I'm still stressed, because I'm being forced to come back on duty because of the financial strain?" (FG3 P2)

Discussion

The current study explored the healthcare-related challenges faced by minibus taxi drivers in the CoT. The minibus taxi sector is a crucial component of South Africa's public transport system, serving as the most widely used, accessible, and cost-effective travel option (Mbatha, 2025). As reported by Stats SA (2022) and Kriel and Burger (2023), around 80.2% of commuters rely on taxis each day to reach their workplaces, educational institutions, and other destinations. While minibus taxis play a vital role in the transportation landscape, the industry faces numerous challenges that impact drivers, operators, and the overall service quality. Issues such as regulatory compliance, safety concerns, fluctuating fuel prices, and competition from other transport modes contribute to a complex operating environment. Additionally, government policies and regulations often aim to address these challenges but may not fully align with taxi drivers' needs. This discussion will examine the healthcare-related challenges faced by minibus taxi drivers in the City of Tshwane.

The taxi industry is the most preferred, dominant mode of public transportation for South African commuters. The industry employs many South Africans but also presents many challenges, including precarious working conditions and obstacles to accessing health services. Sectoral Determination 11 (SD11) outlines the minimum wages and employment conditions for the South African Taxi Sector, covering workers such as drivers, rank marshals, and administrative staff, and stipulating that employers must comply with basic conditions, including working hours, leave, and the minimum wage (Department of Labour, 2017). In the current study, participants described their work environment at the taxi rank, longer working hours and unregulated leave processes as fundamentally incompatible with their daily operational realities. As a result, they resort to driving while fatigued and when they are sick. The contextual challenges at taxi ranks expose drivers to a lack of access to health care, to ill health, and to indignity. According to Muntaner (2016), precarious working conditions with no leave, even when they are sick, lead to fatigue that may result in minibus taxi accidents and injuries. Globally, studies have reported that fatigue and sleep deprivation are prevalent among drivers (Ramukumba & Mathikhi, 2016; Tang et al., 2024). These findings support the argument that sleep deprivation is a notable risk factor for mental health among taxi drivers worldwide.

The current study revealed that challenges faced by taxi stakeholders include long-term socio-economic and psychological strain, forcing taxi drivers to adopt high-risk, localised survival strategies such as resorting to substance abuse. Recent literature supports this; a recent review highlighted that African taxi drivers face significant psychological disorders across various African countries, such as depression, insomnia, stress, PTSD, anxiety, and elevated rates of substance use (Harerimana & Mchunu, 2026). Patterns of coping strategies involve consumption of alcohol, cannabis, and tobacco, indicating habitual and entrenched behaviours rather than isolated substance use (Laraqui et al., 2018; Ramukumba & Mathikhi, 2016). These patterns collectively illustrate how occupational demands, socio-cultural contexts, and the need for coping strategies significantly contribute to substance use among taxi and other commercial drivers across African settings. Therefore, the substance abuse among taxi drivers may be attributable to environmental challenges within the work environment.

This study revealed that the taxi industry in the South African selected city is male dominated, with majority of participants being male. Abdullah et al. (2022) suggest that men's health-seeking behaviours are influenced by multifaceted factors, including self-preservation attitudes and masculinity. In support of this, although conducted in a different population (Langa, Netshapapame, & Goon, 2025) highlight that barriers to healthcare access among adult males included personal factors such as stigma, long waiting times, unfriendly treatment and societal expectations around masculinity. Participants in the current study reported long working hours and peak hours that differed from those of health facilities,

and they were unable to attend check-ups or even consult at healthcare facilities. Arguably, participants may be using busy working conditions to avoid confronting the realities of their health status, especially since there are non-work hours when they are not occupied with work in taxi ranks and businesses, which they can use to access healthcare.

Limitations

Several limitations should be considered when interpreting the findings derived from the current study. First, although the qualitative design enabled in-depth exploration of lived experiences, the sample was drawn exclusively from drivers working in the urban area, which is the capital city of South Africa. This may limit the transferability of the findings to other taxi industry contexts, such as rural taxi services. Secondly, the interviews were conducted in groups, which were part participatory action research, and may have led to biased responses, as some participants may not have expressed their true lived experiences, while others may have exaggerated what happens in the taxi ranks and taxi industry.

Conclusion

The findings of the current study underscore the precarious nature of the South African taxi industry, revealing a complex intersection of environmental, systemic, and psychological barriers to access and utilisation of health services. Highlighting that the taxi rank environment, characterised by poor sanitation, inadequate hygiene, and a lack of health-related training, poses a direct threat to taxi operators' dignity and physical well-being. Furthermore, the research illustrates that the industry's rigid structure, defined by long working hours and a lack of formal leave, not only fosters mental health strain and substance abuse but also creates a significant clash of schedules with existing healthcare services.

Combined with a pervasive lack of trust in government intervention and gendered barriers to health-seeking behaviour, these factors leave taxi workers uniquely vulnerable. To improve health outcomes within this essential sector, it is imperative that future interventions move beyond mere information sharing. Effective strategies must include the decentralisation of health services to accommodate the industry's operational hours and the urgent modernisation of taxi rank infrastructure to ensure a safe, hygienic, and dignified working environment.

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Authorship contributions: MSM, the first author, was responsible for the conceptualisation and design of the study, data collection and analysis. SAN assisted with data collection, analysis and writing up of the manuscript. and TSR assisted with data analysis and supervising of the study. All authors have read and agreed to the published version of the manuscript.

Consent to participate: All participants provided written informed consent to take part in this study.

Consent for publication: All participants provided written informed consent for the publication of anonymised data.

Ethical approval: Ethical approval was sought from the Tshwane University of Technology Human Research Ethics Committee, reference number: (REC Ref #: REC2023-12-047Science).

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Data availability: The datasets generated and analysed during the current study are not publicly available due to privacy and ethical restrictions. Anonymised data may be made available upon reasonable request from the corresponding author.

References

- Abere, G., Yenealem, D. G., & Worode, E. A. (2023). Prevalence and associated factors of low back pain among taxi drivers in Gondar City, North West Ethiopia: A community-based cross-sectional study. *BMJ Open*, 13(6), Article e069631. doi:10.1136/bmjopen2022-069631
- Abdullah, N. N., Arsat, M. H. M., Aziz, N. R. A., & Al-Kubaisy, W. (2022). Men health seeking behaviour: A literature review. *Environment-Behaviour Proceedings Journal*, 7(20), 247–254. doi:10.21834/ebpj.v720.3834
- Ahmad, M., & Wilkins, S. (2025). Purposive sampling in qualitative research: A framework for the entire journey. *Quality & Quantity*, 59(2), 1461–1479. doi.org/10.1007/s11135-024-02022-5
- Ajayi, D. D., Raimi, T. H., & Dada, S. A. (2025). Prevalence and association of components of metabolic syndrome and uric acid among commercial drivers in South-West Nigeria. *Annals of African Medicine*, 24(1), 152–160. doi: 10.4103/aam.aam_70_24
- Ameen, B. B. (2024). Health problems and health compliance among taxi drivers: A cross-sectional study. *Kufa Journal for Nursing Sciences*, 14(2), 145–155. doi: 10.36321/kjns.vi20242.17498
- Bouncken, R. B., Czakon, W., & Schmitt, F. (2026). Purposeful sampling and saturation in qualitative research methodologies: Recommendations and review. *Review of Managerial Science*, 20(2), 579–615. doi.org/10.1007/s11846-025-00881-2
- Braun, V., & Clarke, V. (2024). Thematic analysis. In *Encyclopedia of quality of life and well-being research* (pp. 7187–7193). Springer . doi.org/10.1007/978-3-031-17299-1_3470
- BusinessTech. (2025, September 25). *The R100 billion taxi industry in South Africa*. businesstech.co.za
- Crimmins, E. M., Shim, H., Zhang, Y. S., & Kim, J. K. (2019). Differences between men and women in mortality and the health dimensions of the morbidity process. *Clinical Chemistry*, 65(1), 135–145. doi: 10.1373/clinchem.2018.288332
- Fan, Y. H., Lin, A. T. L., Huang, Y. H., & Chen, K. K. (2017). Health-seeking behavior in benign prostatic hyperplasia patients. *Urological Science*, 28(3), 169–173. doi:10.1016/j.urols.2016.12.003
- Harerimana, A., & Mchunu, G. (2026). Driving in distress: Mapping psychological disorders among taxi and other commercial drivers in Africa. A scoping review. *Transportation Research Part F: Traffic Psychology and Behaviour*, 119, Article 103570. doi:10.1016/j.trf.2026.103570
- Katsapila, M., & Grisé, E. (2024). What makes public transit demand management successful? A systematic review of ex-post evidence. *Transport Reviews*, 44(3), 1–24. Doi.10.1080/01441647.2024.2349151
- Kriel, R., & Burger, M. (2023, July). *Electrifying South Africa's minibus taxi industry: A data-driven approach*. TheCityFix. thecityfix.com. Produced by World Resources Institute

- Langa, J. M., Netshapapame, T. S., & Goon, D. T. (2025). Men's perspective on barriers and challenges towards accessing healthcare services in the City of Mbombela, Mpumalanga Province, South Africa. *BMC Research Notes*, 18, Article 112. doi:[10.1186/s13104-025-07612-6](https://doi.org/10.1186/s13104-025-07612-6)
- Laraqui, O., Manar, N., Laraqui, S., Ghailan, T., Deschamps, F., & Laraqui, C. E. H. (2018). Occupational risk perception, stressors and stress of fishermen. *International Maritime Health*, 69(4), 233–242. doi: 10.5603/IMH.2018.0038
- Mabetwa, E. M., Mokwena, K. E., Mphekgwana, P. M., & Modjadji, P. (2022). Metabolic syndrome and its components among taxi drivers in the City of Tshwane, South Africa. *Applied Sciences*, 12(3), doi.org/10.3390/app/2031176
- Mbatha, S., Gumbo, T., & Kalaoane, R. (2025). Enhancement of minibus taxis through technological innovation: A case of Soweto, Johannesburg, South Africa. In *Proceedings of REAL CORP 2025: Urban Innovation* (pp. 415–424). doi:10.48494/REALCORP2025.9030.
- Muntaner, C. (2018). Global precarious employment and health inequalities: Working conditions, social class, or precariat? *International Journal of Health Services*, 48(4), 615–619. DOI: [10.1590/0102-311X00162215](https://doi.org/10.1590/0102-311X00162215)
- Murray, K. E., Buul, A., Aden, R., Cavanaugh, A. M., Kidane, L., Hussein, M., ... & Checkoway, H. (2019). Occupational health risks and intervention strategies for US taxi drivers. *Health Promotion International*, 34(2), 323–332. <https://doi.org/10.1093/heapro/dax082>
- Ndibatya, I., & Booysen, M. J. (2021). Characterizing the movement patterns of minibus taxis in Kampala's paratransit system. *Journal of Transport Geography*, 92, Article 103001. <https://doi.org/10.1016/j.jtrangeo.2021.103001>
- Nyalela, M., Dlungwane, T., Taylor, M., & Nkwanyana, N. (2018). Health-seeking and sexual behaviour of men presenting with sexually transmitted infections in two primary health care clinics in Durban. *South African Journal of Infectious Diseases*, 33(4), 93–98. DOI: <https://doi.org/10.4102/sajid.v33i5.147>
- Ok, J., Kang, K., & Kim, H. (2022). Factors affecting the deterioration of the physical health status of taxi drivers by age group. *International Journal of Environmental Research and Public Health*, 19(6), Article 3429. doi:[10.3390/ijerph19063429](https://doi.org/10.3390/ijerph19063429)
- Pickard, O., Burton, P., Yamada, H., Schram, B., Canetti, E. F., & Orr, R. (2022). Musculoskeletal disorders associated with occupational driving: A systematic review spanning 2006–2021. *International Journal of Environmental Research and Public Health*, 19(11), Article 6837. <https://www.mdpi.com/1660-4601/19/11/6837>
- Ramukumba, T. S., & Mathikhi, M. S. (2016). Health assessment of taxi drivers in the City of Tshwane. *Curationis*, 39(1), Article e1–e7. doi: [10.4102/curationis.v39i1.1671](https://doi.org/10.4102/curationis.v39i1.1671)
- Research and Markets. (2026). *Ride hailing market report* (Report No. 5735322). researchandmarkets.com
- Rezaei, E., Shahmahmoudi, F., Makki, F., Salehinejad, F., Marzban, H., & Zangiabadi, Z. (2024). Musculoskeletal disorders among taxi drivers: A systematic review and meta-analysis. *BMC Musculoskeletal Disorders*, 25(1), Article 663. doi:10.1186/s12891-024-07771-w [[1](#)]
- Sanoff, H. (2022). Participatory design. *DEPARCH Journal of Design Planning and Aesthetics Research*, 1(2), 1–12. DOI:[10.55755/DepArch.2022.8](https://doi.org/10.55755/DepArch.2022.8)
- Saunders, T. J., Travis, M., Douillette, K., Ijaz, M., McIsaac, M., & Ross, R. (2020). Sedentary behaviour and health in adults: An overview of systematic reviews. *Applied Physiology, Nutrition, and Metabolism*, 45(10 Suppl 2), S197–S217. doi.org/[10.1139/apnm-2020-0272](https://doi.org/10.1139/apnm-2020-0272)
- Sekgala, M. D., Opperman, M., Mphahleni, B., & Mchiza, Z. J. (2023). Sociodemographic and lifestyle factors and risk of metabolic syndrome in taxi drivers: A focus on street food. *Frontiers in Nutrition*, 10, Article 1112975. <https://doi.org/10.3389/fnut.2023.1112975>
- South Africa. (2017). *Basic Conditions of Employment Act, 1997 (Act No. 75 of 1997): Sectoral Determination 11: Taxi Sector, South Africa* (Government Gazette No. 41218, Notice 1153). Government Printer.

- Spherical Insights. (2026). *Global taxi market size, share, and COVID-19 impact analysis, by service type, vehicle type, booking type, and region: Forecast 2023-2033*. <https://www.sphericalinsights.com>
- Statistics South Africa. (2022). *Census 2022*. Republic of South Africa.
- Tang, W., Chen, J., Wang, S., Jiang, X., Lu, Y., Wu, S., ... & Sun, Z. (2024). Debt, sleep deprivation and psychological distress among online ride-hailing drivers: Evidence from China. *General Psychiatry*, 37(2), Article e101332. DOI:10.1136/gpsych-2023-101332
- Wust, J., Bekker, J., & Booysen, M. J. (2025). Investigating scheduling of minibus taxis in South Africa's eventual electric paratransit. *Journal of Transport Geography*, 123, Article 104093. <https://doi.org/10.1016/j.transgeo.2024.104093>
- United Nations. (2015). *Transforming our world: The 2030 agenda for sustainable development* (Resolution A/RES/70/1). General Assembly. undocs.org