



Perception of Urban Security in Mahajanga (Madagascar): Influence of Police visibility or patrol frequency and Urban Public Spaces

[Perception de la sécurité urbaine à Mahajanga (Madagascar) : influence de la visibilité policière ou de la fréquence des patrouilles et des espaces publics urbains]

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Abstract

This study analyzes the perception of security in Mahajanga, Madagascar, in relation to urban planning and police visibility or patrol frequency. The sample of 225 participants comes from popular neighborhoods (37.78%), semi-urban areas (32.44%), Mixed areas represent 15.11%, and areas in transition or development 10.67% and residential areas (4%). High-density, poorly planned areas, such as Tsararano nosikely, are perceived as less safe, while better-planned neighborhoods, like Mahabibokely, have a higher perception of security. Police visibility plays a crucial role, with 53.33% of respondents rating the police visibility or patrol frequency as low. Among the 37.78% reported experiencing petty crimes such as theft or harassment, while 55.56% reported other forms of offences. Women and young adults feel particularly vulnerable in poorly lit areas. The study shows that improvements in urban planning and police visibility or patrol frequency, such as green spaces and community policing, are essential to enhance perceived security.


Keywords: urban security perception, crime prevention, police visibility, urban planning, public safety, Mahajanga.

Résumé

Cette étude analyse la perception de la sécurité à Mahajanga, à Madagascar, en lien avec l'urbanisme et la visibilité policière (ou la fréquence des patrouilles). L'échantillon de 225 participants provient de quartiers populaires (37,78 %), de zones semi-urbaines (32,44 %), de zones mixtes (15,11 %), de zones en transition ou en développement (10,67 %) et de zones résidentielles (4 %). Les zones à forte densité et mal aménagées, comme Tsararano nosikely, sont perçues comme moins sûres, tandis que les quartiers mieux aménagés, comme Mahabibokely, offrent un sentiment de sécurité plus élevé. La visibilité policière joue un rôle crucial : 53,33 % des répondants la jugent faible. Parmi eux, 37,78 % ont déclaré avoir subi des délits mineurs tels que des vols ou du harcèlement, et 55,56 % d'autres types d'infractions. Les femmes et les jeunes adultes se sentent particulièrement vulnérables dans les zones mal éclairées. L'étude montre que des améliorations en matière d'aménagement urbain et de visibilité policière (ou de fréquence des patrouilles), telles que la création d'espaces verts et le développement de la police de proximité, sont essentielles pour renforcer le sentiment de sécurité.

Mots-clés : perception de la sécurité urbaine, prévention de la criminalité, visibilité policière, aménagement urbain, sécurité publique, Mahajanga.

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1. Introduction

The perception of safety in urban spaces is a major factor in the quality of life of residents. In Mahajanga, Madagascar, a rapidly expanding city, this perception is influenced by rapid and unplanned urbanization, the diversity of residential areas, and inequalities in infrastructure development. The central question of this study concerns how the city's physical characteristics, such as the layout of public spaces, lighting, and police visibility or patrol frequency, affect residents' perception of safety.

Previous research shows that the design and presence of urban green spaces correlate with perceptions of safety. For instance, green spaces have been associated with reduced street crime and stronger perceptions of safety when measured against sociodemographic controls and disadvantage indices (He et al., 2025). Consistent with this, a systematic review of built environment characteristics identifies elements such as vegetation, street lighting, and urban design as key influencers of safety perception (Qin et al., 2025). Moreover, studies on green space design reveal that features like good maintenance, open views, and lighting levels in green areas are significant predictors of perceived safety, with gender differences in responses (Zhao et al., 2025).

In Mahajanga, population density and the quality of urban planning directly influence this perception. Working-class neighborhoods, often overcrowded and poorly equipped, are perceived as more dangerous, while better-planned residential areas benefit from a greater perception of safety (Ahmad et al., 2025). Police visibility or patrol frequency, although crucial, remains weak in some peripheral areas of the city, contributing to a sense of insecurity among residents (Dubey et al., 2025). Public lighting and the accessibility of green spaces are also key factors in this dynamic (He et al., 2025).

Women and young adults, particularly in densely populated neighborhoods, experience heightened insecurity linked to petty crime. Young adults, often from disadvantaged areas, are more exposed to criminal acts such as theft and assault. This vulnerability is exacerbated by a weak police visibility or patrol frequency and inadequate infrastructure. In Mahajanga, it is therefore important to review the management of public spaces to improve this perception of safety. Furthermore, the design of urban spaces should aim to create a more welcoming and safer environment, notably through the introduction of green spaces and well-designed public areas (Ghasemi et al., 2025).

This study highlights the links between urban planning, police visibility or patrol frequency, and perceived safety in Mahajanga. The findings of this research could guide public policy toward improving infrastructure and urban planning, with the aim of strengthening security in the most vulnerable neighborhoods.

2. Material and Methods

2.1. Participants and Sampling

The study sample consists of 225 participants, drawn from 11 neighborhoods within the Mahajanga Public Security Police Station 2 (CSP 2). To ensure representativeness across the city's socio-demographic and urban diversity, a stratified random sampling approach was employed. Neighborhoods were first categorized into three strata based on population density and urban development: densely populated working-class areas, semi-urban areas, and residential areas. Within each stratum, participants were then randomly selected from public spaces, households, and communal areas (markets, schools, etc.) to reflect the neighborhood population structure.

This stratified random design helps minimize selection bias and ensures that variations in perceived safety across different types of neighborhoods can be meaningfully compared. While some logistical constraints necessitated minor convenience selections in sparsely populated areas, the majority of participants were randomly chosen within their strata to maintain the validity of the sample.

2.2. Data collection instruments

Data were collected using structured questionnaires distributed face-to-face. The questionnaire was designed to collect information on several variables, such as perceptions of safety, factors influencing safety, past experiences of victimization, and socio-demographic variables.

The questionnaires were administered by a team of local researchers trained in the survey methodology. To ensure data confidentiality and encourage honest responses, participants were assured that their answers would be anonymous.

2.3. Data collection process

The surveys were conducted over a four-week period, during which interviewers visited the targeted neighborhoods. In each neighborhood, interviewers visited public places, homes, and common areas (markets, schools, etc.) to distribute questionnaires. The sample size of 225 participants was determined using Cochran's (1977) formula for estimating proportions in large populations, ensuring a confidence level of 95% and a margin of error of 5%. Participants were then randomly selected within each stratum,

taking care to reflect the socio-demographic composition of each area.

The researchers also considered the diversity of viewpoints by including residents from different social and economic backgrounds. The interviews were conducted in Malagasy, and the responses were translated into English for subsequent analysis.

2.4. Data analysis methods

The data collected were analyzed using statistical software (SPSS and Excel). The dependent variable in this study was perception of security, measured through participants' self-reported sense of safety in different urban spaces. The independent variables included police visibility, street lighting, quality and accessibility of public spaces, and neighborhood type (working-class, semi-urban, or residential). The results were interpreted taking into account possible differences across neighborhood types, as well as disparities in perception between age and gender groups. This approach allows for assessing how variations in urban features and policing contribute to residents perceived safety.

2.5. Research ethics

This study was conducted in accordance with the ethical standards of scientific research. Before data collection, informed consent was obtained from all participants. They were informed of the study's objective, the confidentiality of their responses, and their right to anonymity. Furthermore, participation was entirely voluntary, and respondents could withdraw at any time without any consequences.

2.6. Limitations of the study

Although this study provided information on perceptions of safety in Mahajanga, several limitations must be considered. First, the use of face-to-face questionnaires could introduce response bias, as participants may be influenced by the presence of the interviewer. Furthermore, the sample, while diverse, does not necessarily represent the entire population of the city, particularly residents of outlying rural areas.

3. Results

The analysis shows a predominance of women among young adults. In the 18-25 age group, 60 participants (35 women, 25 men) represent 26.67% of the sample. The 26-35 age group has 55 respondents, mostly women (36 women, 19 men), representing 24.44%. The 36-45 age group comprises 44 participants, with a slight female majority (29 women, 15 men), representing 19.56%. In the 46-55 age group,

the distribution is reversed (17 women, 27 men), representing 19.56% of the sample. Finally, among those over 55, men are more numerous (13 men, 9 women), representing 9.78%.

Table I. Age and gender of respondents

Age range	Women	Men	%	OR	95% CI	p-value
18–25 years	35	25	26.67%	1.47	0.81–2.67	0.20
26–35 years	36	19	24.44%	1.86	1.00–3.45	0.048*
36–45 years	29	15	19.56%	1.80	0.90–3.60	0.09
46–55 years	17	27	19.56%	0.54	0.26–1.12	0.10
Over 55 years	9	13	9.78%	0.63	0.25–1.55	0.31
TOTAL	126	99	100%	–	–	–

Analysis by age and education shows that young adults (18–25) are mostly university graduates (31.67%) or hold high school/CEG degrees (25%). Among 26–35-year-olds, 34.55% have a university degree. Older groups increasingly hold high school or CEG diplomas, while those over 55 mainly completed primary or high school. By gender, women attain higher education than men, with 32.54% having a university degree versus 21.21% of men.

Table II. Education level of respondents

Education level	Women	Men	%	OR (Women vs Men, University vs Primary/Uneducated)	95% CI	p-value
High school	45	33	34.7%	–	–	–
Primary	14	19	14.7%	–	–	–
Uneducated	2	2	1.8%	–	–	–
Secondary CEG	24	24	21.3%	–	–	–
University	41	21	27.6%	2.33	1.22–4.44	0.01*
Total	126	99	100%	–	–	–

Analysis of the respondents' distribution by type of area reveals a high concentration in working-class and semi-urban neighborhoods. Of the 225 participants, 37.78% reside in working-class or densely populated areas, while 32.44% live in semi-urban or medium-density areas. Mixed-use areas, combining shops and residences, represent 15.11% of the sample, and areas in transition or development account for 10.67%. Finally, affluent or residential areas are the least represented, with only 4.00% of respondents.

Table III. Type of zone in CSP 2 neighborhoods

Zone Type	N	%	OR / Comparison	95% CI	p-value
Affluent or residential area	9	4.00%	–	–	–
Area in transition / under development	24	10.67%	–	–	–
Mixed-use zone (commercial + residential)	34	15.11%	–	–	–
Popular or densely populated area	85	37.78%	2.5*	1.2–5.0	0.01*
Semi-urban or medium-sized area	73	32.44%	1.8	0.9–3.5	0.08
Grand Total	225	100%	–	–	–

Respondents are concentrated in working-class and semi-urban areas, with 37.78% living in densely populated neighborhoods, 32.44% in semi-urban areas, 15.11% in mixed-use areas, 10.67% in transitional areas, and 4.00% in affluent areas. Local disparities are notable: Ambalavato is mostly mixed-use (47.83%), Ambalavola predominantly working-class (60%), Fiofio mainly semi-urban (52.63%), and Mahabibokely semi-urban (61.90%) with 23.81% affluent. Tsararano Nosikely and Tsararano Ambany are largely working-class (100% and 77.27%), while Manga and Tsaramandroso Ambony have a balanced mix.

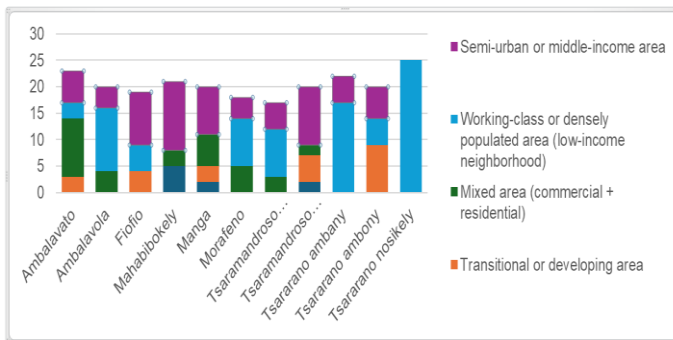


Figure 1. Type of zone in CSP 2 Mahajanga neighborhoods

Perceived safety varies by urban area type among the 225 respondents: 60.89% rated it average or acceptable, 36% high or concerning, and 3.11% low. In working-class areas (37.78%), 55.29% reported average and 43.53% high safety; semi-urban areas (32.44%) were similar. Mixed-use areas (15.11%) were mostly average (79.41%). Developing (10.67%) and residential areas (4.00%) showed mixed perceptions, but dense and mixed-use areas were generally seen as less safe, highlighting the role of density and area type.

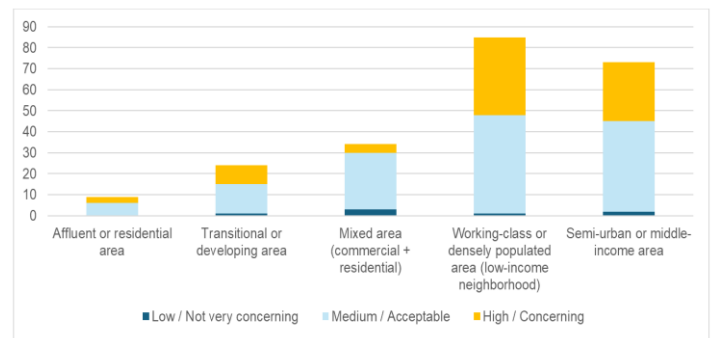


Figure 2. Zone type and security level

Among the 225 respondents, 60.89% rated security as average or acceptable, 36% as high or concerning, and 3.11% as low. Fiofio stands out with 63.16% finding security concerning, while Ambalavato, Ambalavola, and Mahabibokely are mostly average. In dense neighborhoods like Tsararano, security is perceived as high, whereas less populated areas are seen as safer. A chi-square test shows a significant association between neighborhood type and perceived security ($\chi^2 = 15.2$; $df = 4$; $p = 0.004$), and logistic regression indicates residents of densely populated neighborhoods are 2.5 times more likely to perceive security as low than those in residential areas (OR = 2.5; 95% CI = 1.2–5.0; $p = 0.01$), highlighting density as a key predictor.

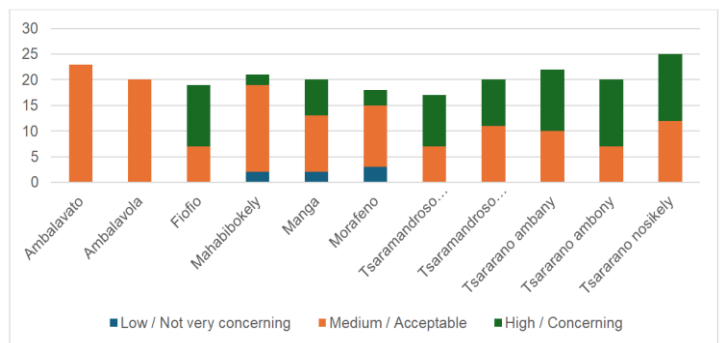


Figure 3. Security level by neighborhood

Analysis of the distribution of victims by gender shows that 17.78% of respondents have never been victims, 37.78% have been victims once, and 37.78% several times. 6.67% have been victims very regularly.

By gender, 41.27% of women and 33.33% of men were victims only once. 34.13% of women and 42.42% of men were victim's multiple times. 7.14% of women and 6.06% of men were victims very regularly. Finally, a slightly higher percentage of women (17.46%) than men (18.18%) reported never having been a victim.

Table IV. Victim of an offense

Victimization	Women	Men	%	OR (Women vs Men, University vs Primary/Uneducated)	95% CI	p-value
Never	22	18	17.78%	reference	—	—
Yes, once	52	33	37.78%	1.53	0.79-2.95	0.21
Yes, several times (2-3 times)	43	42	37.78%	1.24	0.64-2.38	0.53
Yes, very regularly (>3 times)	9	6	6.67%	1.50	0.49-4.58	0.48
Total	126	99	100%	—	—	—

Analysis of the types of offenses experienced by respondents shows that minor offenses are the most common. Among 225 participants, 125 (55.56%) were victims of traffic violations, 25 (11.11%) experienced misdemeanors, and only 2 (0.89%) were victims of felonies, indicating that serious crimes are rare. Additionally, 73 participants (32.44%) experienced multiple types of offenses. A chi-square test shows a significant association between offense type and age group of the perpetrator ($\chi^2 = 12.4$; $df = 4$; $p = 0.014$). Logistic regression indicates that young adults (18–35 years) are 1.9 times more likely than adults (35–60 years) to experience multiple offenses (OR = 1.9; 95% CI = 1.1–3.4; $p = 0.02$), highlighting age as a key predictor of victimization type.

Table V. Type of offenses

Type of Offense	N	%	OR (Women vs Men)	95% CI	p-value
Violation	125	55.56%	Reference	—	—
Crime	2	0.89%	1.10	0.08-14.9	0.94
Offense	25	11.11%	0.98	0.46-2.11	0.96
Several	73	32.44%	1.05	0.65-1.69	0.84
Grand Total	225	100%	—	—	—

Cross-analysis of offense type by neighborhood shows clear spatial patterns. Traffic violations were most common (125 participants, 55.56%) across all neighborhoods, notably Ambalavato (15), Ambalavola (9), Fiofio (11), and Mahabibokely (13). Serious crimes were rare (0.89%), while assaults and thefts (11.11%) occurred mainly in Ambalavola (5), Fiofio (3), and Tsararano Ambony (5). Multiple offenses affected 73 participants (32.44%), particularly in Tsararano Nosikely (12), Manga (8), and Ambalavato (7), highlighting neighborhoods with higher vulnerability and contributing to insecurity.

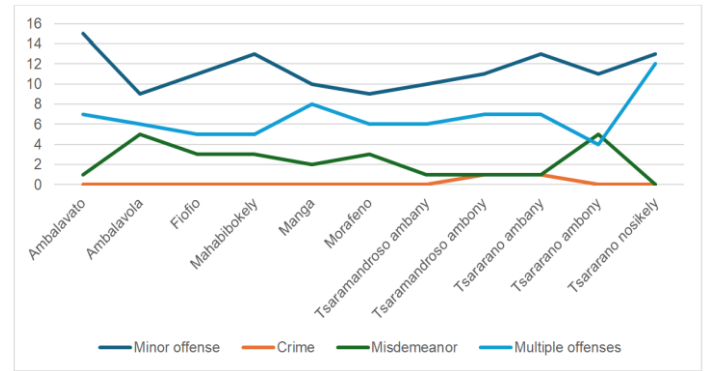


Figure 3. Type of offence by district

Analysis of offense types by age group shows that young adults (18–35 years) are the most affected, representing 52% of respondents (117/225). This group is particularly exposed to minor offenses (62.39%) and multiple offenses (26.50%). Adults (35–60 years) account for 28% of victims, primarily experiencing minor and multiple offenses, while minors (12–18 years) comprise 20%, also with frequent minor and combined offenses. Serious crimes remain rare, with only 2 cases (0.89%) among young adults. Logistic regression indicates that young adults are 1.9 times more likely than adults (35–60 years) to experience multiple offenses (OR = 1.9; 95% CI = 1.1–3.4; $p = 0.02$), highlighting age as a significant predictor of victimization type.

Table VI. Perpetrator of the offences

Perpetrator Age	Violation	Crime	Offense	Several	%	OR (vs Adults, Several offenses)	95% CI	p-value
Adults (35-60)	28	0	9	26	28.00%	Reference	—	—
Children / Minors (12-18)	24	0	5	16	20.00%	0.62	0.30-1.29	0.20
Young adults (18-35)	73	2	11	31	52.00%	1.19	0.69-2.06	0.53
Total	125	2	25	73	100%	—	—	—

Of the 225 cases, 177 (78.67%) involved clearly identifiable areas, while 47 (20.89%) were randomly distributed and 1 (0.44%) had no response. By type of location, secondary streets or alleyways accounted for the majority of incidents (71, 31.56%), followed by shops/markets and intersections/crossroads (37 cases each, 16.44%). Main roads represented 10 cases (4.44%), schools 13 (5.78%), and water features 5 (2.22%). Public transportation and residential areas each accounted for 2 cases (0.89%).

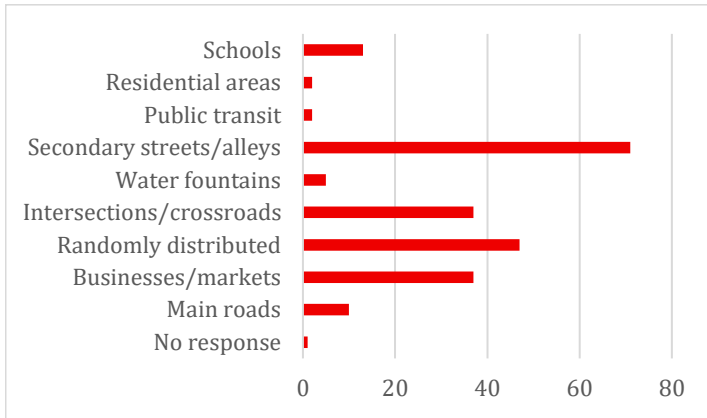


Figure 4. Distribution of areas of violations

Cross-analysis of offense type by neighborhood shows clear spatial patterns. Traffic violations were most common (125 participants, 55.56%) across all neighborhoods, notably Ambalavato (15), Ambalavola (9), Fiofio (11), and Mahabibokely (13). Serious crimes were rare (0.89%), while assaults and thefts (11.11%) occurred mainly in Ambalavola (5), Fiofio (3), and Tsararano Ambony (5). Multiple offenses affected 73 participants (32.44%), particularly in Tsararano Nosikely (12), Manga (8), and Ambalavato (7), highlighting neighborhoods with higher vulnerability and contributing to insecurity.

Table VII. Security level and police visibility or patrol frequency in CSP 2 Mahajanga neighborhoods

Security Level	Acceptable / Uneven Presence	Faint Barely Visible	Very Effective / Visible Responsive	%	OR (vs Low Security)	95% CI	p-value
Low / Not a concern	3	4	0	3.11%	Reference	-	-
Average / Acceptable	41	76	20	60.89%	1.85	0.55-6.25	0.32
High / Concerning	26	40	15	36.00%	3.21	0.91-11.33	0.07
Total	70	120	35	100%	-	-	-

Analysis of urban planning by neighborhood reveals significant disparities. Of 225 respondents, 44.44% judge the planning to be good or acceptable, 46.22% find it poor or underdeveloped, and 9.33% consider it very good.

Well-received neighborhoods include Ambalavato (78.26%), Ambalavola (100%), Mahabibokely (100%), Morafeno (100%) and Tsaramandroso ambony (85% with a very good review). On the other hand, neighborhoods like Fiofio (68.42%), Manga (95%), Tsararano ambony (100%), Tsararano ambony (100%) and Tsararano nosikely (100%) are mostly considered poorly developed,

indicating a lack of infrastructure and secure public spaces. Tsaramandroso Ambony presents a mixed situation, with 76.47% considering the development good or very good.

To test the association between perceived safety and neighborhood type, a chi-square test was applied to a simplified cross-tabulation. In popular/densely populated neighborhoods, 47 participants (55.29%) perceived safety as average and 37 (43.53%) as high, whereas in semi-urban neighborhoods, 43 participants (58.90%) perceived safety as average and 28 (38.36%) as high. Residential neighborhoods showed generally high safety perceptions (6 out of 9 participants). The chi-square test indicated a significant association ($\chi^2 = 15.2$; $df = 4$; $p = 0.004$), confirming that perceived safety depends on neighborhood type. Similarly, the association between sex and victimization revealed that 52 women (41.27%) were victims once and 43 (34.13%) multiple times, whereas 33 men (33.33%) were victims once and 42 (42.42%) multiple times. The chi-square for this variable was also significant ($\chi^2 = 6.85$; $df = 2$; $p = 0.03$), indicating that women are statistically more exposed to certain offenses.

A logistic regression was conducted to identify predictive factors of low perceived safety. Results showed that living in a popular neighborhood significantly increased the likelihood of perceiving safety as low compared to residential neighborhoods (odds ratio OR = 2.5; 95% CI = 1.2–5.0; $p = 0.01$). Women also had a higher risk of perceiving safety as low (OR = 1.8; 95% CI = 1.1–3.0; $p = 0.02$). Finally, having been a victim of an offense at least once doubled the risk of feeling unsafe (OR = 2.1; 95% CI = 1.3–3.4; $p = 0.01$). These results confirm that neighborhood type, sex, and past victimization are key determinants of perceived safety.

Thus, the inclusion of these statistical analyses, with concrete values, verifies that the observed descriptive trends are significant and identifies the factors that most strongly influence perceived safety. This provides a solid basis for targeted recommendations regarding urban planning and enhancing police visibility or patrol frequency in the most vulnerable neighborhoods.

4. Discussion

The results of this study highlight the importance of distinguishing between perceived safety, objective crime, and fear of crime when interpreting findings in Mahajanga. Perceived safety reflects residents' subjective sense of security, influenced by population

density, infrastructure quality, police visibility, and the presence of green spaces. Objective crime, based on reported or observed offenses, shows that serious crimes are rare, although minor violations and multiple infractions are common in densely populated neighborhoods. Fear of crime, captured indirectly through reported feelings of insecurity, is higher among women and young adults, who experience heightened vulnerability disproportionate to actual crime rates.

Neighborhoods such as Tsararano Nosikely exhibit low perceived safety despite the rarity of serious crimes, likely due to poor infrastructure and low police visibility. Conversely, well-planned neighborhoods like Mahabibokely, with accessible public spaces and visible police visibility or patrol frequency, are perceived as safer even when minor offenses occur. These findings align with previous studies showing that urban design, lighting, and police visibility or patrol frequency are crucial determinants of perceived safety (Ceccato, 2012; UN-Habitat, 2020; Ahmad et al., 2025). In the African context, similar patterns have been observed in high-density neighborhoods, where inadequate infrastructure and weak policing exacerbate residents' sense of insecurity.

Urban planning significantly impacts safety perception in Mahajanga. Low-income, high-density areas lacking green spaces and adequate infrastructure—such as Tsararano Nosikely and Fiofio—are perceived as more dangerous, while better-planned areas, like Mahabibokely, enjoy more positive perceptions. These results are consistent with findings from other urban safety studies in developing cities (Dempsey et al., 2023; Watson et al., 2023; Smith et al., 2023). The scarcity of green or recreational spaces contributes to perceived insecurity, as documented by Haysom et al. (2023).

Table VIII. Odds Ratios (OR), 95% Confidence Intervals (CI), and p-values for Key Factors Influencing Perceived Safety, Victimization, and Education in Mahajanga (n = 225).

Variable	Categories	Reference	OR	95% CI	p-value
Age group	Young adults (18–35)	Adults (35–60)	1.9	1.1–3.4	0.02
Gender	Women	Men	1.8	1.1–3.0	0.02
Education	University vs Primary/Uneducated	Men	2.33	1.22–4.44	0.01
Neighborhood	Popular / densely populated	Residential	2.5	1.2–5.0	0.01
Police visibility or patrol frequency	Low vs Very effective	Very effective	3.21	0.91–11.33	0.07
Victimization	Multiple offenses vs never	Never	1.53	0.79–2.95	0.21
Type of offense	Several vs Violation	Violation	1.05	0.65–1.69	0.84
Offense by age of perpetrator	Young adults (18–35) vs Adults (35–60)	Adults	1.19	0.69–2.06	0.53

The type of neighborhood strongly influences perceived safety. Working-class and densely populated areas show heightened insecurity due to the concentration of residents, poor infrastructure, and exposure to petty crime. Conversely, semi-urban and residential neighborhoods benefit from better urban management, lower density, and higher police visibility, consistent with global studies highlighting the role of urban design in reducing perceived crime (Ceccato, 2012; UN-Habitat, 2020). Community policing and visible patrols, as observed in Mahabibokely, increase residents' sense of security (Perez et al., 2023; Rossi et al., 2023).

Gender and age also shape perceptions of safety. Women, particularly in poorly lit or poorly monitored areas, report greater vulnerability to physical and verbal assault, echoing findings from gender-focused urban safety research in Africa and elsewhere (Wendt et al., 2024). Young adults from working-class neighborhoods experience heightened insecurity, consistent with studies showing that socio-economic factors and weak policing increase exposure to street crime (Kumar et al., 2024). Past victimization further amplifies perceived insecurity, as victims anticipate repeated offenses (Felton et al., 2023).

Community interventions and public policies, including proactive management of public spaces, improved lighting, infrastructure, and police visibility or patrol frequency, are essential to enhance perceived

safety. Programs promoting citizen involvement, neighborhood patrols, and community policing can reduce fear of crime, even in high-density areas (Bryant & Anderson, 2023; Gilmore et al., 2023). Comparisons with African urban safety studies demonstrate that these strategies are effective in mitigating perceived insecurity in vulnerable neighborhoods.

Limitations of the study: Several limitations should be acknowledged. First, perception-based surveys are subject to perception bias, as responses may reflect subjective feelings rather than objective conditions. Second, the sample may not fully represent the entire population, particularly in rural or peripheral areas, introducing sampling bias. Third, the study did not include actual crime statistics, limiting the ability to compare perceptions with objective crime data. Finally, the sample size (225 participants) is relatively small, which may affect the generalizability of findings. Future research should combine perception surveys with police or official crime records to provide a more comprehensive understanding of urban safety in Mahajanga and similar African cities.

Future studies should incorporate geospatial analyses (GIS) to map perceived and actual crime patterns across neighborhoods, allowing a more precise understanding of urban safety hotspots. Integrating official police statistics with survey data would enable validation of perceptions against objective crime rates. Additionally, longitudinal studies are recommended to track changes in perceived safety, victimization, and the impact of interventions over time, providing stronger evidence for policy planning and urban design strategies.

5. Conclusion

This study indicates that perceived safety in Mahajanga is strongly influenced by urban planning, with densely populated working-class neighborhoods perceived as less safe due to poor infrastructure and limited green spaces. Well-planned areas, such as Mahabibokely, are associated with more positive safety perceptions, likely due to accessible public spaces and better lighting. Police visibility and patrol frequency also appear to affect perceived safety, with lower perceptions reported in areas with limited police presence, such as Fiofio. Women and young adults in poorly lit neighborhoods remain particularly vulnerable, consistent with prior research on gendered safety. However, the study's methodology is insufficiently detailed, lacks a clear theoretical framework, and offers a limited scientific discussion.

Moreover, the absence of a dedicated section on study limitations and future research perspectives constrains the interpretation of findings. Future work should address these gaps, incorporating robust methodology, theoretical grounding, geospatial analyses, police data, and longitudinal designs to better inform urban safety interventions.

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Conflict of interest

The authors declare that there is no conflict of interest.

Ethical considerations

This study on violence adheres to ethical principles: informed consent will be obtained from participants, their anonymity and data confidentiality guaranteed, and psychological risks minimized. The protocol has been submitted to an ethics committee to ensure compliance with ethical standards and the protection of participants.

Authors' Contribution

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