

Perceived Accessibility and Quality of Neighborhood Services: Evidence from Residents' Perspectives in Jeddah, Saudi Arabia

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Abstract: Cities are increasingly reconsidering car-dependent growth as they seek to improve everyday accessibility and neighborhood livability. This study examines how respondents in this survey perceive access to routine neighborhood services and what this suggests for advancing people-friendly communities. In this paper, “neighborhood services” refers to destination based everyday facilities and activities (schools, parks/public spaces, grocery stores, health centers, and mosques), not transport services. An exploratory online questionnaire (11–25 May 2023) collected responses from a convenience sample of 72 respondents across five broad city areas. Respondents reported perceived travel time categories, usual travel mode, and perceived service quality (1–5 Likert scale), complemented by open-ended improvement priorities. Perceived quality varied by destination type: mosques were rated highest and parks/public spaces were rated lowest in most areas. Mode choice differed markedly by destination: car use dominated trips to schools and health centers, while mosque trips were more often walked; grocery trips were split between walking and car. Exploratory area comparisons were mostly non-significant. Reported priorities included more parks, continuous sidewalks and safer crossings, cycling paths, improved drainage, and better lighting. Findings provide a service focused perception snapshot to support prioritization and future monitoring alongside objective measures.

Keywords: perceived accessibility; service quality; mode choice; neighborhood services; people-friendly communities; walking, cycling, Jeddah; Saudi Arabia.

1. INTRODUCTION

This study applies the concept of people-friendly communities (PFC) to everyday neighborhood usability in Jeddah city. In this paper, “neighborhood services” refers to destination based everyday facilities and activities (e.g., schools, parks/public spaces, grocery stores, health centers, and mosques), not transport services. The PFC concept is operationalized here using four measured components reported by respondents: (1) perceived proximity to services (travel-time category), (2) usual travel mode, (3) perceived service quality (Likert rating), and (4) respondent-identified improvement priorities (open-ended responses). These measures are collected for five destination types: schools, parks/public spaces, grocery stores, health centers, and mosques. Figure 1 presents the conceptual linkage between the PFC lens, the selected services, and the survey items used in the analysis.

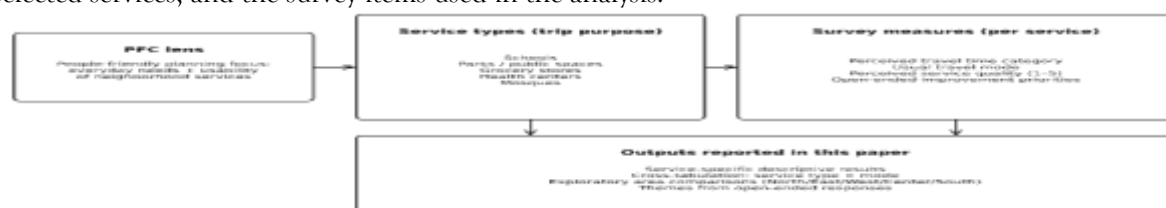


Figure 1 Conceptual linkage between PFC, neighborhood services, and survey measures

1.1 Background and context

Jeddah is Saudi Arabia's second-largest city with a population exceeds 3.75 million [1]. recent decades, the city has experienced spatial growth causing urban sprawl which is associated with transport infrastructure extension and road-led development patterns. This trajectory has reinforced high reliance on private vehicles and limited the relative role of public transport and active modes. Climate further shapes mobility feasibility because of the high temperature and humidity can constrain walking and cycling for substantial parts of the year, making thermal comfort and shading essential considerations when interpreting reported travel behaviors and mode choice [2].

Neighborhood service access is a core practical dimension of people-friendly planning because it reflects whether daily needs can be met through short, safe, and comfortable trips supported by an inclusive public realm. Jeddah also exhibits socio-spatial variation across districts in density, block structure, and service distribution, ranging broadly from older, more centrally located areas with finer street networks to newer peripheral areas characterized by larger blocks and more car-oriented layouts. These contrasts influence the practicality of short trips and help frame how proximity and mode choice are experienced. In this study, respondents reported their broad area of residence (North, East, West, Center, South), which is used only for exploratory comparisons given the small, non-representative sample.

Saudi Arabia's Vision 2030 frames quality of life as a national priority, emphasizing physical, psychological, and social wellbeing and aiming to create an attractive living environment that supports healthy lifestyles for citizens and residents. In urban terms, this direction supports initiatives that improve neighborhood livability, public realm quality, and everyday access to services and amenities, making residents' perceptions of proximity, travel mode, and service quality a relevant input for identifying priorities for local improvement [3]. In parallel, the Ministry of Municipalities and Housing (MoMAH) has advanced a "Humanizing Cities" initiative that explicitly targets improvements in the public realm through municipal squares, parks, green spaces, and pedestrian paths, aiming to create healthier and more comfortable urban environments. Within this policy context, residents' perceptions of proximity to services, usual travel mode, and perceived service quality offer a practical snapshot of lived experience that can help identify which service types and neighborhood conditions most need attention, while also highlighting where climate-responsive measures (e.g., shade and pedestrian comfort) are essential for supporting active mobility [4].

1.2 Focus and contribution

This paper reports perceived accessibility and perceived service quality rather than objective accessibility, network performance, emissions, or performance benchmarking. It provides an exploratory, perception based snapshot of access to five essential neighborhood services in Jeddah, reported by destination type (including usual mode by destination type). The study does not model objective accessibility (e.g., GIS network measures) and does not benchmark network performance; it reports respondents' perceived accessibility and perceived quality as an exploratory snapshot. The contribution is service specific rather than citywide: by reporting perceived travel time, usual mode, and perceived service quality for the same set of destinations, the study highlights how destination type structures everyday mobility choices and where respondents perceive the clearest gaps (notably parks and public spaces) in a hot-humid, car dependent city. By combining perceived travel time categories, mode profiles by destination type, and perceived quality ratings in one service focused framework, the paper provides a practical baseline that can be paired with objective measures in future monitoring.

Recent work distinguishes perceived accessibility from objective accessibility and shows that perceptions can capture lived experience that is not explained by distance alone. However, evidence remains limited on how perceived travel time, destination-specific mode choice, and perceived quality align across essential neighborhood destinations within hot-humid, car-dependent Gulf cities. This study addresses that gap by providing an exploratory synthesis for Jeddah that combines perceived travel time categories, usual mode by destination type, perceived quality ratings, and open-ended improvement priorities. The results are intended to complement future GIS-based diagnostics and support prioritization and monitoring.

1.3 Research questions

This study addresses the following research questions:

1.3.1 RQ1. What are survey respondents' perceived travel times and usual modes for reaching key neighborhood services (schools, parks/public spaces, grocery stores, health centers, and mosques) in Jeddah?

1.3.2 RQ2. How do perceived service quality ratings differ across service types?

1.3.3 RQ3. Are there exploratory differences in perceived accessibility and service quality across broad areas of residence within Jeddah (North, East, West, Center, South)?

This study uses an exploratory convenience sample and broad self-reported area categories, area-based comparisons are presented as preliminary insights rather than definitive citywide spatial patterns

1.4 Analytical expectations (exploratory)

First, perceived service quality differs by service type, with parks/public spaces expected to be rated lowest on average. Second, mode choice differs by service type; private car use is expected to dominate trips to schools and health centers, while walking is expected to be more common for trips to mosques. Third, perceived service quality may differ by broad area of residence for at least one service type; these comparisons are treated as exploratory given small and unequal group sizes.

2 LITERATURE REVIEW

2.1 Perceived accessibility versus objective accessibility

Accessibility is often assessed using objective indicators such as distance, travel time, or modeled catchments. However, objective accessibility does not necessarily reflect how residents experience access in daily life [5]. Perceived accessibility captures the individual's appraisal of how easy it is to reach and participate in desired activities using available transport and land-use conditions. It is shaped by personal constraints and expectations (e.g., schedule, safety concerns, comfort, and perceived reliability) and therefore can differ from objective measures even within the same neighborhood [6].

Recent reviews emphasize that perceived accessibility is valuable for policy because it directly captures lived experience, but it cannot substitute for objective measures when the research goal is to benchmark performance or estimate network efficiency. Instead, perception-based measures are best positioned as complementary evidence, particularly in exploratory studies where objective GIS accessibility is not available [7].

In this study, perceived accessibility is operationalized using respondents' reported travel time categories to reach common neighborhood services. This approach provides a practical, service-specific indicator of perceived access that can be compared across destinations and interpreted alongside reported travel modes and perceived service quality.

Accordingly, this study treats perceived travel time categories as an indicator of perceived access and interprets them alongside mode choice rather than as a proxy for objective network performance.

2.2 Perceived service quality as a user-evaluated neighborhood outcome

Alongside access, residents' evaluations of service quality represent an important dimension of neighborhood experience. Perceived quality reflects how residents judge the adequacy and usability of a service (e.g., whether it meets needs, feels well-maintained, or is convenient), and it is often sensitive to factors not captured in physical proximity alone. For example, two residents may report similar travel times to a park but differ in quality ratings due to safety perceptions, maintenance, shade availability, or suitability for children and families.

In the context of neighborhood planning, perceived service quality can therefore help identify "weak links" in everyday services that matter to residents, even when services exist. This is particularly relevant for public spaces (parks and plazas), where user satisfaction depends on design, comfort, safety, and maintenance [8]. Recent Saudi studies assessing public space performance and user experiences reinforce that quality and usability considerations strongly shape how residents value parks and public spaces [9]. This supports using perceived quality ratings as a complementary outcome to perceive access, particularly for destinations where comfort, maintenance, and safety shape use.

2.3 Trip purpose, service type, and mode choice

Mode choice is not determined by transport supply alone. It is also shaped by why a trip is made (trip purpose), the destination type, and the social expectations attached to that destination. In neighborhood-scale studies, trip purpose is often operationalized through the destination or service category (e.g., school, health care, grocery shopping, worship, recreation). This matters because different services generate

different travel constraints: school and health trips may be time-sensitive, involve accompanying others, or require carrying items, while trips to nearby worship places or grocery stores may be shorter and more routine. Systematic review evidence also shows that trip-related characteristics (including purpose, destination, and distance) consistently feature among the strongest determinants of mode choice across contexts [10].

For this reason, analyzing service type together with usual travel mode helps interpret perceived accessibility patterns more accurately than reporting each variable separately. In an exploratory setting, a service-by-mode cross-tabulation is particularly informative because it provides a direct picture of the mode profile associated with each essential service.

Accordingly, mode is analyzed by destination type (trip purpose), rather than treated as a single citywide behavior.

2.4 Local urban context and everyday travel behavior

Urban development patterns in Saudi and Arabian Gulf cities have historically supported car-oriented travel through dispersed land uses, wide road networks, and limited continuity of comfortable pedestrian infrastructure in many areas. As a result, even short trips that could be walkable in distance may still occur by car if sidewalks, crossings, shade, or perceived safety are insufficient, or if social norms favor driving for certain destinations. These contextual conditions are important for interpreting any observed dominance of private vehicle use for essential services, particularly schools and health care, where time constraints and accompaniment are common.

Jeddah provides a clear example of long-term car dependence. Evidence reported for the city indicates a substantial shift in travel patterns over recent decades: non-car mode share declined from about 50% (1970) to ~7% (2007), while car trips rose to ~93% (2007); over the same period, public transport mode share decreased from ~19% (1970) to ~2.3% (2007), and non-motorized trips (walking and cycling) became negligible in the reported period [11]. These patterns are consistent with broader assessments noting that private vehicles remain the dominant travel option for most residents, while public transport use is limited and often concentrated in inner areas and among lower-income groups.

Recent operational statistics also reflect the intensity of vehicular movement. For example, traffic monitoring reports for August 2019 recorded 5.2 million vehicles passing through Jeddah city entrances (reported as an average of 167,000 daily) [12]. Alongside long-term plans to expand public transport provision, the Jeddah Public Transport Project (JPTP) aims to provide an integrated network (metro and other modes) as part of the city's public transport development agenda [13].

Evidence from Saudi transport research indicates that mode choice and willingness to shift modes are closely linked to the perceived quality and comfort of alternatives, including safety and reliability [14]. This supports treating perceptions as meaningful outcomes for planning, while still recognizing the need for future studies that combine perception-based measures with objective evidence (e.g., GIS accessibility, transit supply, and walking-environment audits).

This context supports interpreting reported travel time and destination-specific mode patterns as indicators of everyday constraints and opportunities, in addition, future GIS-based measures can complement these perceptions by quantifying network performance and spatial coverage.

2.5 Climate, thermal comfort, and feasibility of walking

In hot and humid climates like Jeddah, the feasibility of walking and other forms of active mobility depends strongly on thermal comfort and microclimatic protection (shade, tree canopy, surface materials, and route exposure). Research on pedestrian comfort in Saudi Arabia shows that heat stress can substantially constrain walkability across seasons and times of day, which has implications for interpreting reported walking behavior [15].

Middle East research also demonstrates that shade availability can meaningfully change the effective attractiveness of walking routes, sometimes making the "shortest path" less desirable than a shaded alternative [16]. This highlights why residents' perceptions of accessibility and route comfort are important complements to purely distance-based accessibility indicators.

In practical terms, these findings suggest that reported walking to nearby services may be context-dependent (seasonal or time-of-day specific) and that improvements to shade, crossings, and pedestrian continuity can influence both perceived accessibility and the quality of service experiences, especially for parks and other outdoor destinations. The mixed-use development, which integrates residential and

commercial uses, is essential for creating people-friendly communities. This shortens distances and makes cities more walkable and safer streets. People are more likely to walk or bike instead of drive when they can live, work, and shop in the same area. This can help to reduce traffic congestion and improve air quality [17].

Accordingly, walking-related findings are interpreted as context dependent, with thermal comfort treated as a key constraint on active mobility.

2.6 People-friendly communities as a framing lens and link to study measures

People-friendly communities (PFC) planning emphasizes designing neighborhoods around residents' everyday needs and lived experience, including access to essential services and the quality of public realms. Within this framing, the focus is not solely whether services exist, but whether residents can reach them conveniently and whether the services meet expectations for usability, safety, and comfort. This aligns with people-centered neighborhood frameworks such as the WHO age-friendly cities approach, which highlights domains directly tied to daily living, including outdoor spaces and buildings, transportation, and community support and health services [18].

Consistent with this neighborhood-scale emphasis on daily needs, this study focuses on five services that commonly structure routine trips and shape perceived livability: schools (education), health centers (basic health access), grocery stores (daily needs), mosques (regular community-oriented trips), and parks/public spaces (recreation and social life). Proximity-based planning concepts, including the "15-minute city," similarly frame livable neighborhoods as places where residents can access key daily needs—such as education, healthcare, food shopping, and leisure—within a short walking or cycling time window [17]. In practice, these frameworks often imply that at least some daily trips particularly to nearby worship places, local shops, and parks should be feasible on foot under supportive street and comfort conditions.

Accordingly, the study measures four linked, perception based components: (1) service type as trip purpose (schools, parks/public spaces, grocery stores, health centers, mosques), (2) perceived accessibility (reported travel time category to each service), (3) mode choice (usual travel mode to each service), and (4) perceived service quality (respondents' rating of each service). By aligning the literature on perceived accessibility and service quality with context constraints (Saudi/Gulf urban form and climate), the review supports an exploratory analysis that is explicitly perception-based and service specific while recognizing the need for future work combining perceptions with objective GIS and built-environment evidence.

3 METHODOLOGY

3.1 Study design and setting

This study used an exploratory, cross sectional, perception based online survey to examine how respondents in this survey report (a) perceived accessibility to basic neighborhood services, (b) usual travel mode to reach these services, and (c) perceived service quality. The study does not model objective accessibility (e.g., GIS network measures) and does not benchmark network performance; instead, it provides an indicative snapshot of respondents' reported experiences at the time of data collection (Figure 2).

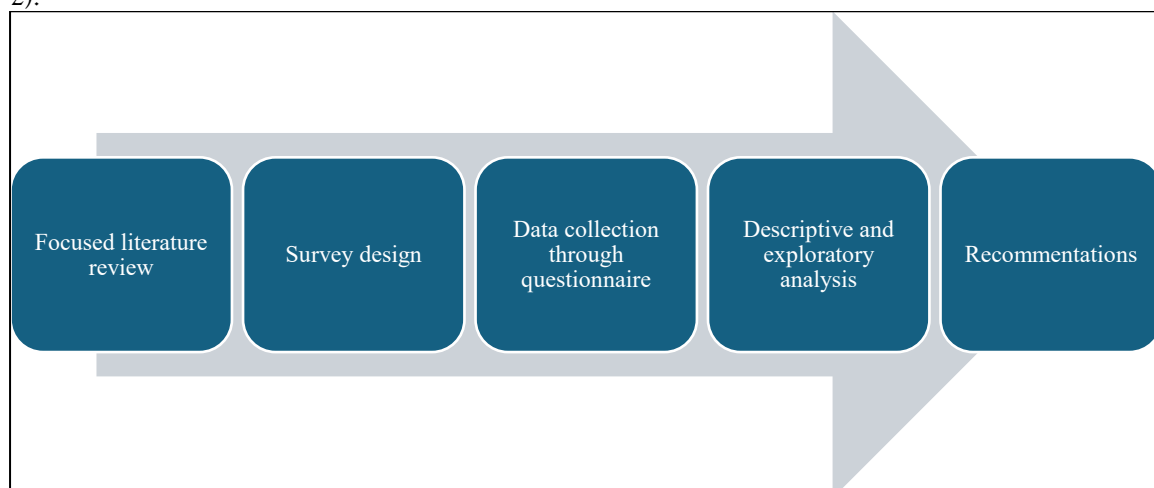


Figure 2 Research process (illustration by author)

3.2 Survey instrument and data collection

The questionnaire was developed in Google Forms and administered in Arabic (and/or English, if applicable) between 11 and 25 May 2023. The survey link was distributed online through social media platforms such as WhatsApp and Twitter/X. Before accessing survey items, participants viewed an information/consent page and provided electronic consent to proceed. Participation was voluntary, respondents could exit at any time, and no personally identifying data were collected.

3.3 Sampling and recruitment

Participants were recruited through social media sharing, resulting in a convenience sample. A total of 72 valid responses were obtained. Because recruitment was non probabilistic and online, the sample is not representative of the broader Jeddah population. Therefore, findings are interpreted as exploratory and are not generalized to the broader Jeddah population. The sample was predominantly male: 54/72 (75%) male and 18/72 (25%) female. This gender imbalance was not an intended sampling criterion and likely reflects voluntary participation and the recruitment channels used.

3.4 Measures

The survey collected basic demographics and respondents' broad area of residence within city Jeddah as shown in (Figure 3) (North, East, West, Center, South). The core survey module covered five everyday service types that reflect routine neighborhood needs in the local context: schools, parks/public spaces, grocery stores, health centers, and mosques. The survey did not collect driver's license status, household vehicle ownership, or parking availability, therefore, these potential determinants of mode choice could not be examined in this dataset. Likewise, proximity to public transport (e.g., distance to bus stops or current service availability) was not measured, so the analysis cannot assess whether transit access is associated with reported travel time or mode.

For each service type, respondents reported:

1. Perceived travel time from home to the nearest facility using ordered time categories (minutes).
2. Usual travel mode (car, walking, bicycle, school bus where relevant, and an "Other" option). Mode options were intentionally kept simple to capture the main low speed personal mobility choices; walking and cycling were treated as the primary forms of active micro mobility in this survey. Dedicated categories for device based micro mobility (e.g., e scooters and e bikes) were not included to minimize respondent burden, and the "Other" option may include occasional ride hailing or informal modes.
3. Perceived service quality using a five-point Likert scale (1 = Poor to 5 = Excellent).

In addition, two open-ended questions captured respondents' priorities and suggestions for improving neighborhood livability, access, and service conditions.



Figure 3 Jeddah city by area (illustration by author)

3.5 Data handling and cleaning

Responses were screened for completeness and internal consistency. Item non-response was handled using pairwise deletion, meaning the sample size varies by service item. Non-evaluative responses (e.g., "I don't know" or "service not available," if included in your form) were treated as missing for that service and excluded from calculations for that item. The handling rule is reported consistently in table footnotes.

3.6 Statistical analysis

Analysis focused on descriptive and exploratory comparisons aligned with the research questions. Because service quality ratings are ordinal, results are reported primarily using medians and interquartile ranges (IQR), with means and standard deviations (SD) reported secondarily for comparability with related studies. To describe the relationship between destination type (trip purpose) and mode choice, a cross tabulation of destination type and travel mode was produced (Table 2). This table provides the service specific mode profile (e.g., car versus walking) and supports interpretation of perceived accessibility patterns by destination type.

Area-level differences in perceived service quality were assessed as exploratory using Kruskal–Wallis tests, given the ordinal measurement level and unequal group sizes. Results are interpreted cautiously and are not treated as confirmatory evidence of spatial differences.

3.7 Ethics

The study involved an anonymous, minimal-risk online questionnaire. Participation was voluntary, no personally identifying information was collected, and informed consent was obtained electronically from all participants before the survey began.

4. RESULTS

This section summarizes findings from an exploratory convenience sample of 72 respondents collected between 11 and 25 May 2023. The results are descriptive and interpreted as an indicative snapshot rather than population-level estimates. Respondent characteristics are reported first, followed by service-specific findings on perceived travel time, usual mode choice, and perceived service quality for schools, parks/public spaces, grocery stores, health centers, and mosques.

4.1 General Information

Of the 72 participants, 54 (75%) were male and 18 (25%) were female. As the questionnaire was shared through social media, it resulted in a variety of age groups: 26% being in the 46-55 age range, 22% in the 26-35 category, 21% in the 56-65 age group, followed by the 36-45 years of age at 19%, and finally the lowest groups at 4% older than 65 years of age and 7% between 16-25 years old.

The educational level (Figure 4) of participants reflected the highest percentage of 62.5% who obtained a bachelor's degree, followed by 19% were those that had a master's degree, and 4% who had their Ph.D. In contrast, the lowest number of participants were those that completed middle school at 1.4% and those that obtained a diploma at 2.8%.

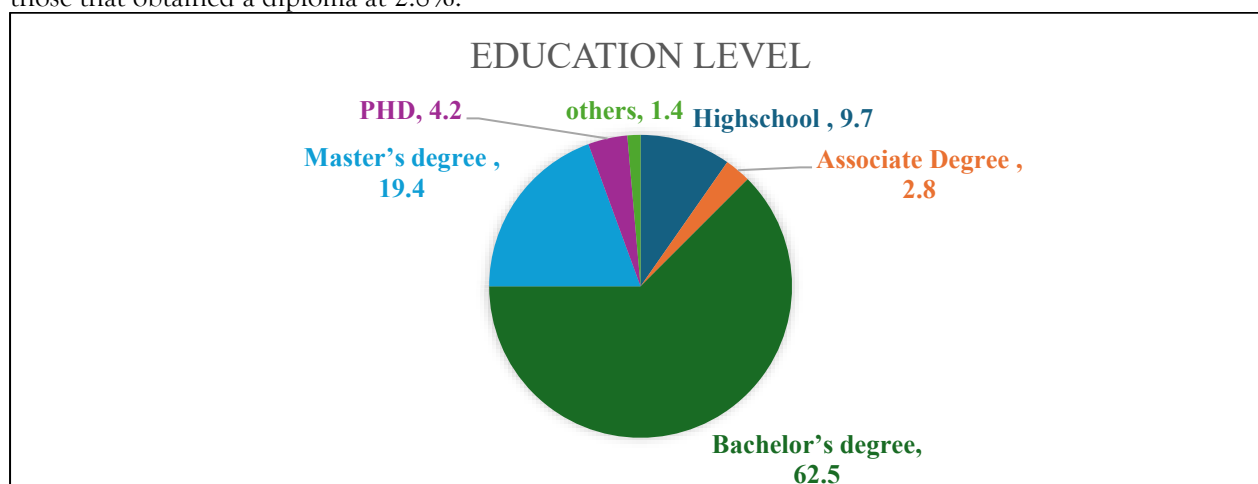


Figure 4 Education levels

In addition, it is seen that the highest functional status of participants is employed at a government job (42%), followed by those who are employed in the private sector (21%). In addition, the third highest percentage were those that were retired (14%) and this was followed by those that run their own business (10%).

According to the questionnaire, the top three areas people live (Figure 5) within the Jeddah Governate are as follows: North of the King Abdulaziz International Airport (40%), East of Haramain Road (15%), and West of Madinah Road (14%).

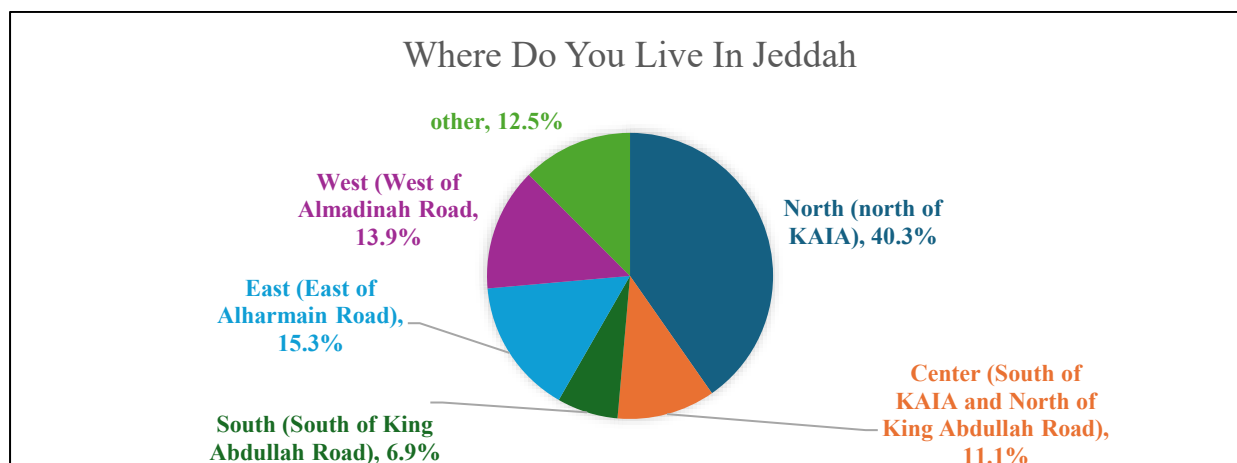


Figure 5 Living in Jeddah

4.2 Perceived accessibility, mode choice, and perceived quality by service type

4.2.1 Educational facilities (School):

In this section, the questions focused primarily on the nearest schools in reference to the respondents' home location.

The first question reflected that the nearest school (figure 6) location (in minutes) to the person's home was less than 5 minutes away (26.4%), followed by 10 minutes (25%). In contrast, the least response was more than 20 minutes away (5.6%).

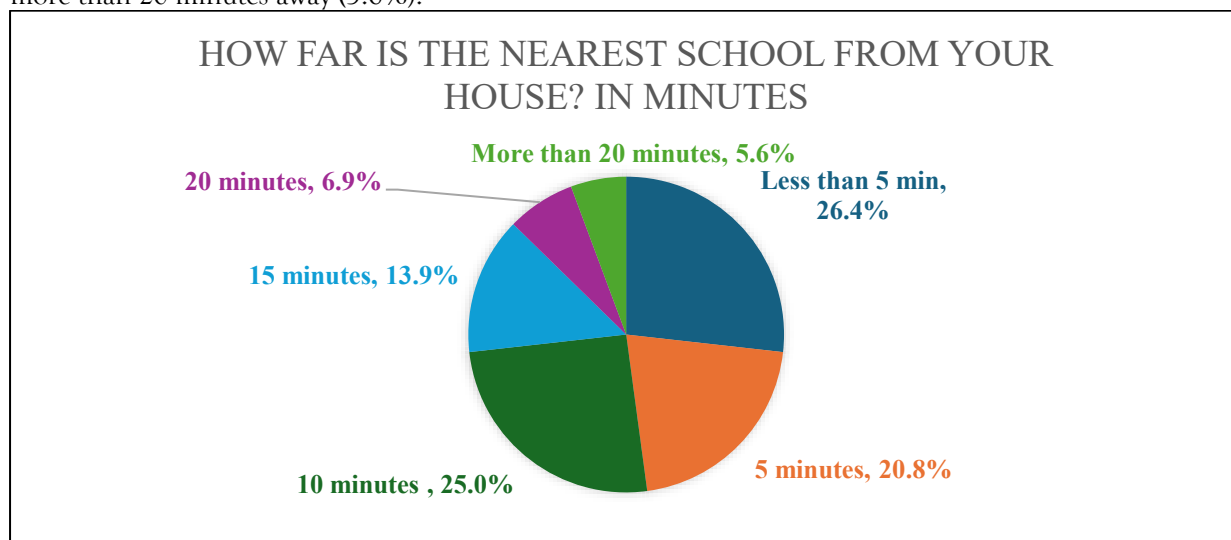


Figure 6 Nearest School From Your House

In the second question, it has been shown that the participants go to the nearest school location by car (79%), or by walking (18%). In comparison, the lowest response was by taking the private school bus (1.5%).

The last question shows that the quality of the school near the home was good (39%), acceptable (24%), and excellent (17%).

4.2.2 Parks and Public Spaces:

In this section, the questions focused primarily on the nearest parks/public spaces in reference to the responders' home location.

The nearest park /public space from a person's home was less than 5 minutes away (24%) and around 10 minutes (21%). In contrast, the lowest result was that more than 20 minutes to get to the nearest park/public space (12.9%).

Participants reflected that their preferred method of reaching the nearest park/public space (figure 7) was by car (54%) and walking (36%). However, 1.5% reflected they had no available park/public space in their neighborhood.

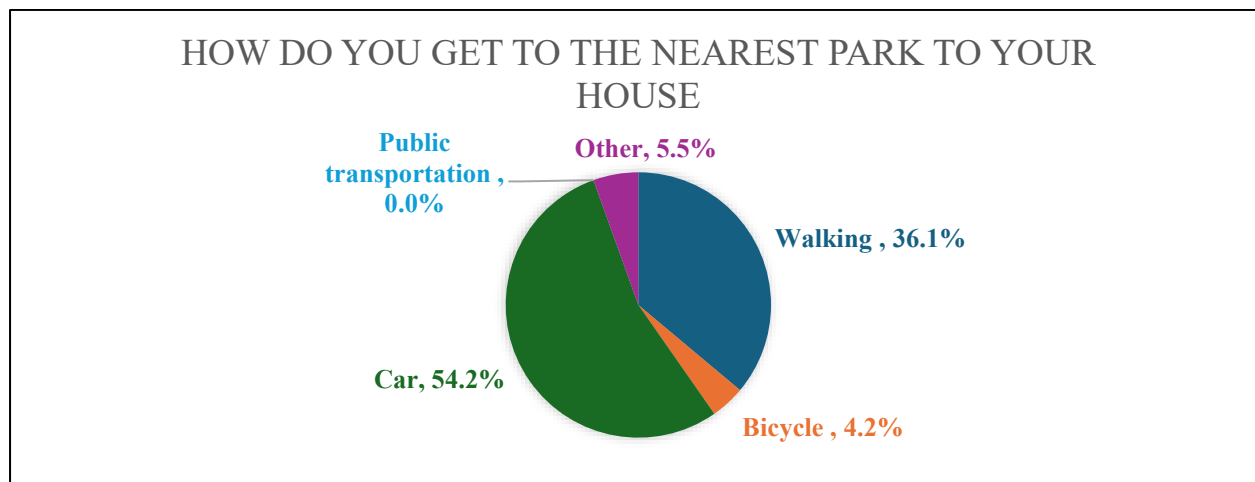


Figure 7 Nearest park

With regards to the quality of the park/public space, 28% reflected that the quality was very good, 24% agreed that it was an acceptable quality, while 4% responded that it was excellent.

4.2.3 Grocery Stores:

In this section, the questions focused primarily on the nearest grocery stores in reference to the responders' home location.

The nearest grocery store from a person's home was indicated to be less than 5 minutes away (46%), and 5 minutes away (33%), while 21% indicated that the nearest store was 10 minutes away.

Participants reflected that their preferred method of reaching the nearest grocery store (figure 8) was by car (50%) or walking (49%), while 1.5% preferred to go on a bicycle.

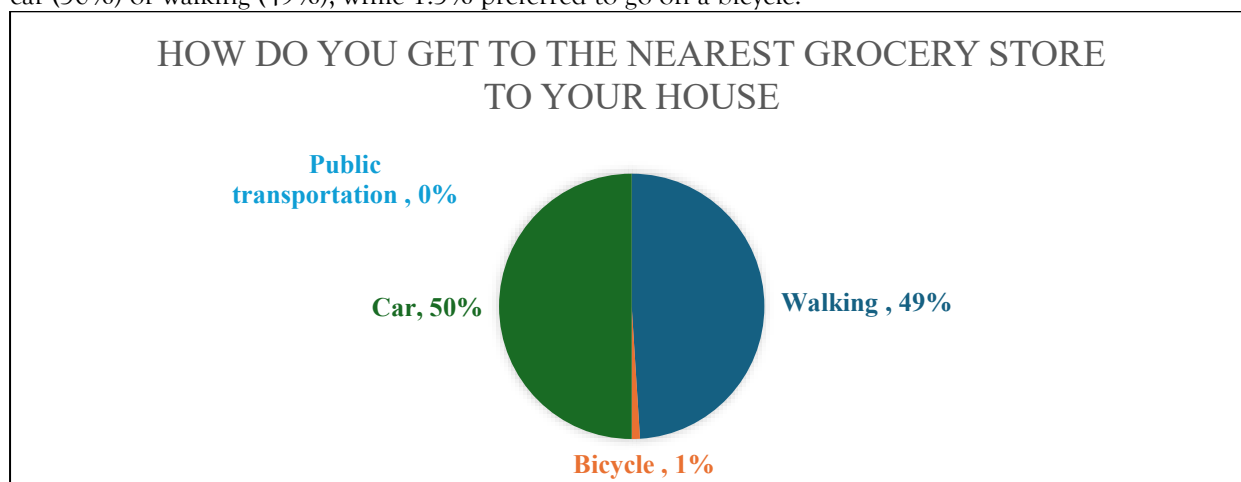


Figure 8 nearest grocery store

In regard to the quality of the nearest grocery store, 43% responded it was good, 32% considered it to be acceptable, while 3% stated it was bad.

4.2.4 Health Service facilities:

In this section, the questions focused primarily on the nearest health service centers in reference to the responders' home location.

The nearest health service centers located from a person's home were shown to be 10 minutes away (32%), 5 minutes away (21%), and 15 minutes away (20%), while 3% responded to be more than thirty minutes away.

Participants reflected that their preferred method of reaching the nearest health center was by car (90%), while in contrast, 8% favored going walking.

In regard to the quality of the nearest health service center (figure 9), 42% stated that it was good, 33% agreed to be acceptable, whereas 8% voted it to be very bad.

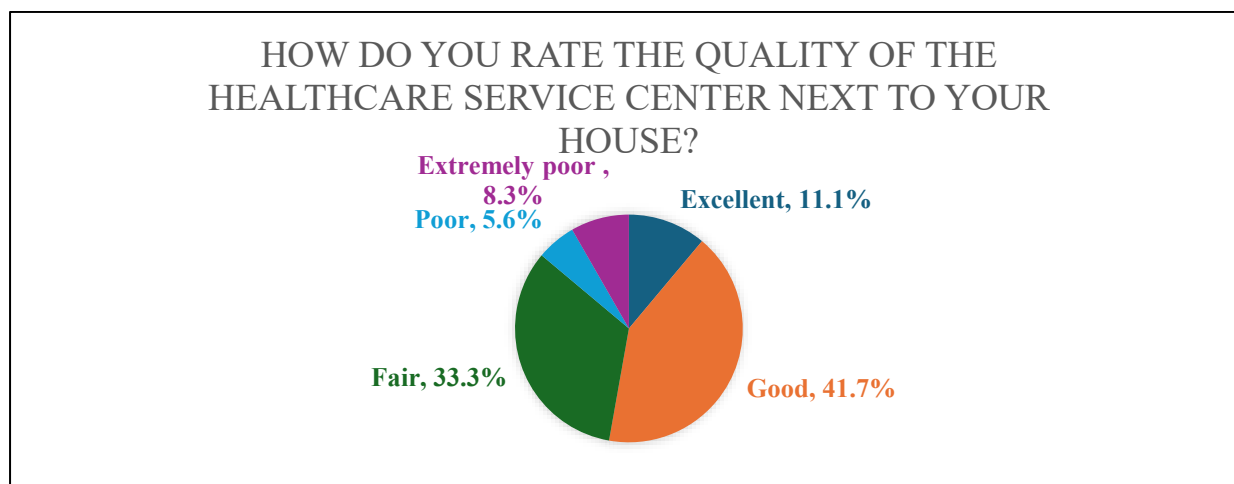


Figure 9 Quality of the healthcare service center

4.2.5 Religious facility (mosque):

In this section, the questions focused primarily on the nearest mosque in reference to the responders' home location.

The nearest mosque located from a person's home was shown to have the greatest response of being less than 5 minutes away (47%), 5 minutes away at 31%, and 15 minutes away at 15 minutes.

It is shown in (figure 10) that 64% of participants favored going walking, while 36% preferred by car.

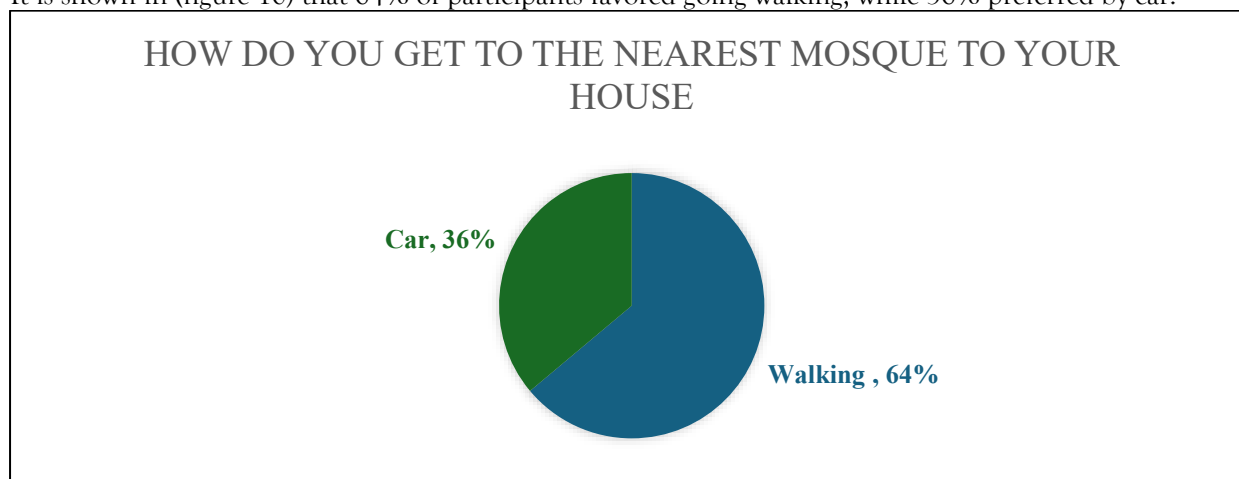


Figure 10 Nearest mosque

In regard to the quality of the nearest mosque, 47% reflected it to be excellent, 32% ensured it is good, and 13% considered it acceptable.

4.3 Service type, travel time and mode choice

Table 1 summarizes perceived travel time to the nearest by destination type. Grocery stores and mosques were reported as the closest services, with most respondents indicating travel times of ≤ 10 minutes (grocery: 45.8% < 5 min and 33.3% at 5 min; mosque: 47.2% < 5 min and 30.6% at 5 min). Health centers were comparatively farther, most commonly reported at 10 minutes (31.9%) and 15 minutes (19.4%), with a small proportion reporting > 20 minutes (2.8%). Parks and public spaces showed the widest spread in perceived travel times, including a notable share reporting > 20 minutes (12.9%), and a small number of respondents indicated that parks and public spaces were not available in their neighborhood (excluded from the valid denominator).

Table 2 shows that usual mode choice differed markedly by service type. Car use dominated trips to schools (79.2%) and health centers (90.3%), while walking was most common for mosques (63.9%). Grocery store trips were nearly evenly split between cars (50.0%) and walking (48.6%), suggesting a mixed access pattern for daily shopping. Cycling and other non-walking micro-mobility were rarely reported across services ($\leq 4.3\%$), indicating limited use of these modes in this sample.

Table 1 Perceived travel time to the nearest neighborhood by destination type (n, %)

Service type	n	<5 min	5 min	10 min	15 min	20 min	>20 min
School	72	19 (26.4)	15 (20.8)	18 (25.0)	10 (13.9)	5 (6.9)	5 (6.9)
Parks and public spaces	70	17 (24.3)	11 (15.7)	15 (21.4)	12 (17.1)	6 (8.6)	9 (12.9)
Grocery store	72	33 (45.8)	24 (33.3)	15 (20.8)	0 (0.0)	0 (0.0)	0 (0.0)
Health center	72	9 (12.5)	15 (20.8)	23 (31.9)	14 (19.4)	9 (12.5)	2 (2.8)
Mosque	72	34 (47.2)	22 (30.6)	12 (16.7)	3 (4.2)	1 (1.4)	0 (0.0)

Note: Values are n (%). Percentages are calculated within each service using valid responses. For Parks and public spaces, responses indicating “service not available” were excluded from the denominator (valid n = 70). The >20 min category aggregates responses indicating travel times greater than 20 minutes.

Table 2 Travel mode to the nearest neighborhood by destination type (n, %)

Service type	n	Car	Walking	Bicycle	School bus	Other
School	72	57 (79.2)	13 (18.1)	0 (0.0)	1 (1.4)	1 (1.4)
Parks and public spaces	69	39 (56.5)	27 (39.1)	3 (4.3)	0 (0.0)	0 (0.0)
Grocery store	72	36 (50.0)	35 (48.6)	1 (1.4)	0 (0.0)	0 (0.0)
Health center	72	65 (90.3)	6 (8.3)	1 (1.4)	0 (0.0)	0 (0.0)
Mosque	72	26 (36.1)	46 (63.9)	0 (0.0)	0 (0.0)	0 (0.0)

Note: Values are n (%). Percentages are calculated within each service using valid responses. For Parks and public spaces, responses indicating “service not available” were excluded from the denominator (valid n = 69).

4.4 Area patterns in perceived quality

Tables 3 and 4 summarize respondents’ evaluations of neighborhood service quality across five areas of Jeddah (North, East, West, Center, and South). Responses were coded on a five-point scale where 1 indicates poor quality and 5 indicates excellent quality, such that higher values reflect better perceived service quality. Descriptive statistics are presented using both mean and standard deviation (Table 3) and median and interquartile range (IQR) (Table 4) to capture central tendency and dispersion for Likert-type responses. Non-numeric responses (e.g., “I don’t know” or “service not available”) were treated as missing and excluded from the corresponding service calculations.

Table 3 Respondents’ ratings of neighborhood service quality by area (Mean, SD)

Service	North	East	West	Center	South
School	3.71 ± 0.98 (n=28)	3.60 ± 1.07 (n=10)	3.00 ± 1.05 (n=10)	3.30 ± 0.95 (n=10)	3.00 ± 1.00 (n=5)
Park and Public space	2.48 ± 1.27 (n=29)	2.64 ± 1.50 (n=11)	3.20 ± 1.03 (n=10)	2.44 ± 1.13 (n=9)	2.60 ± 1.14 (n=5)
Grocery store	3.76 ± 0.87 (n=29)	3.82 ± 0.75 (n=11)	3.80 ± 0.79 (n=10)	3.70 ± 0.95 (n=10)	3.40 ± 0.55 (n=5)
Health center	3.69 ± 0.93 (n=29)	3.36 ± 0.67 (n=11)	2.50 ± 1.43 (n=10)	3.20 ± 1.03 (n=10)	3.40 ± 0.89 (n=5)
Mosque	4.14 ± 1.06 (n=29)	4.27 ± 0.90 (n=11)	3.70 ± 1.16 (n=10)	4.10 ± 1.10 (n=10)	4.40 ± 0.89 (n=5)

Note: (n) Varies due to item non-response; non-evaluative responses were treated as missing.

Table 4 Respondents’ ratings of neighborhood service quality by area (Median, IQR)

Service	North	East	West	Center	South
School	4.00 (IQR 1.00, n=28)	4.00 (IQR 1.00, n=10)	3.00 (IQR 1.75, n=10)	3.00 (IQR 1.00, n=10)	3.00 (IQR 2.00, n=5)
Park and Public space	3.00 (IQR 3.00, n=29)	3.00 (IQR 3.00, n=11)	3.50 (IQR 1.00, n=10)	2.00 (IQR 1.00, n=9)	3.00 (IQR 1.00, n=5)
Grocery stores	4.00 (IQR 1.00, n=29)	4.00 (IQR 1.00, n=11)	4.00 (IQR 1.00, n=10)	4.00 (IQR 1.00, n=10)	3.00 (IQR 1.00, n=5)

Health center	4.00 (IQR 1.00, n=29)	3.00 (IQR 1.00, n=11)	2.50 (IQR 3.00, n=10)	3.50 (IQR 1.00, n=10)	3.00 (IQR 0.00, n=5)
Mosque	4.00 (IQR 1.00, n=29)	5.00 (IQR 1.50, n=11)	4.00 (IQR 0.75, n=10)	4.50 (IQR 1.75, n=10)	5.00 (IQR 1.00, n=5)

Note. Values are Median (IQR), where $IQR = Q3 - Q1$. (n) Varies due to item non-response; non-evaluative responses were treated as missing.

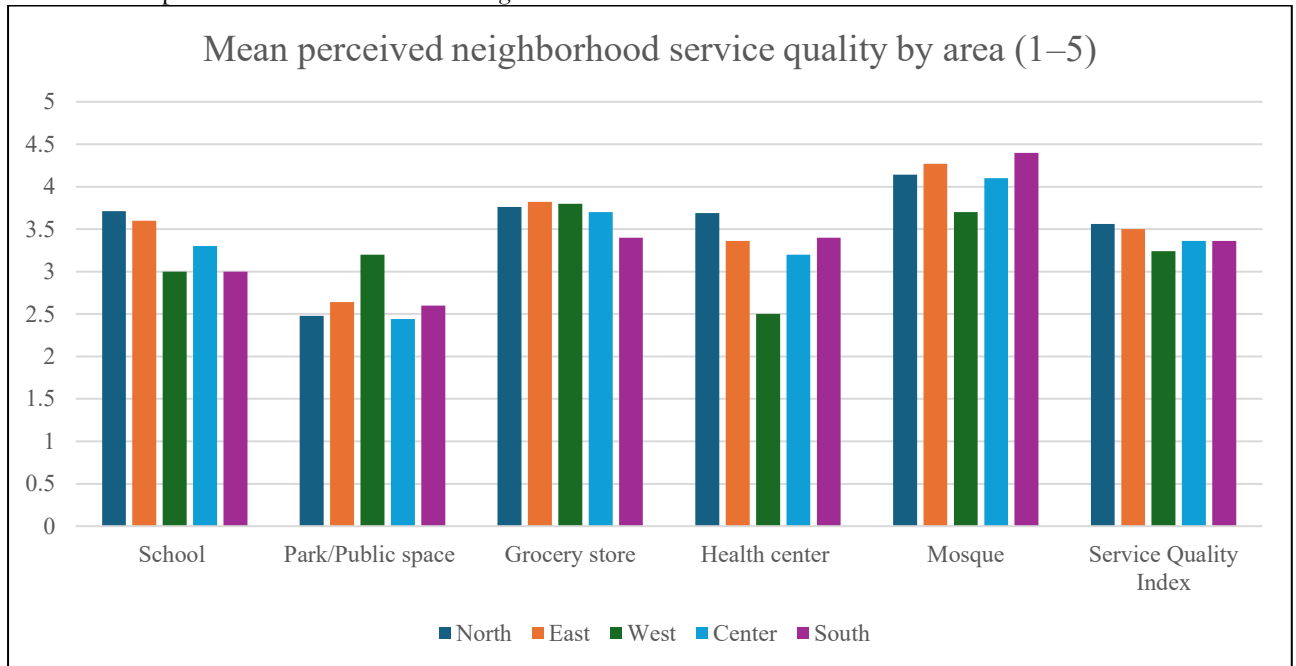


Figure 11 Mean perceived neighborhood service quality by area (1-5)

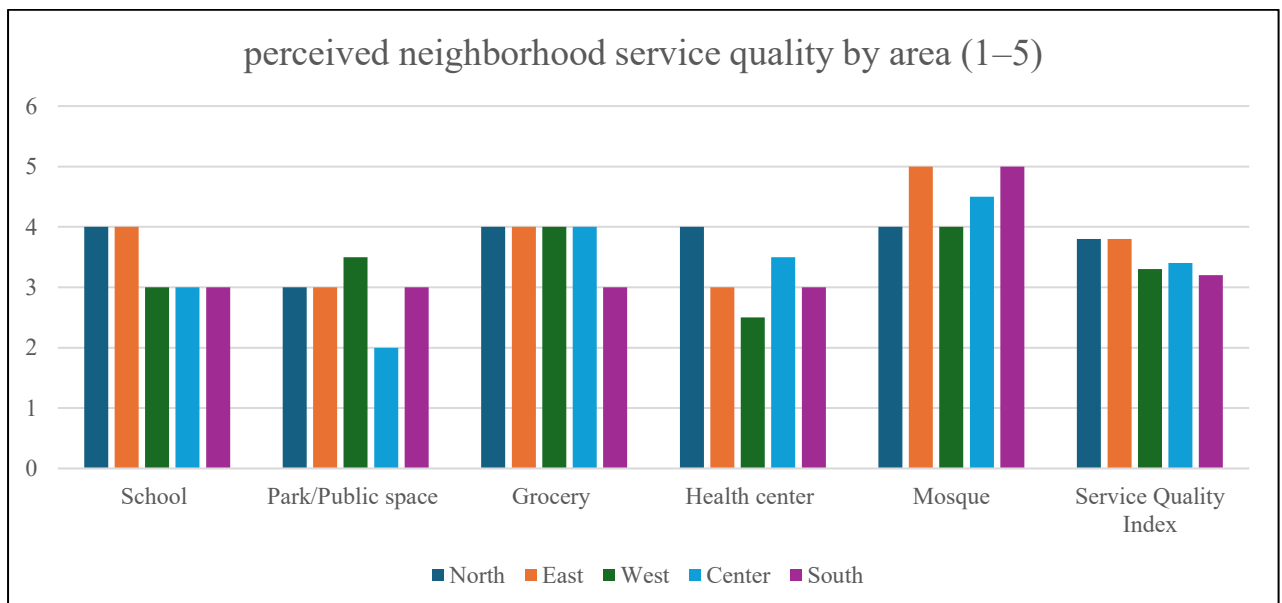


Figure 12 Perceived neighborhood service quality by area (1-5)

As shown in Figures 11 and 12, the overall pattern was consistent across areas. Figures 11 and 12 summarize descriptive patterns only; inferential interpretation of area differences is not supported in this small, unequal sample. Mosques received the most favorable ratings, with mean values ranging from 3.70 (West) to 4.40 (South) and medians reaching 5.00 in the East and South. Grocery services were also evaluated positively across most areas (means approximately 3.70–3.82 in North, East, West, and Center), while parks and public spaces were the weakest rated service in most areas (means around 2.44–2.64 in

North, East, Center, and South). Descriptively, health center ratings vary across areas, but these differences are not robust in ordinal based tests and are treated as preliminary.

Area group sizes were small and unequal, so area based comparisons were assessed using Kruskal–Wallis tests only. Kruskal–Wallis tests were non-significant across services (all $p > .05$). Therefore, any apparent area differences are interpreted with caution and treated as preliminary signals rather than confirmatory spatial patterns.

4.5 Open-ended responses

Participants provided open-ended comments on amenities and improvements they would like to see in their neighborhoods to support a more livable environment. Responses clustered around five recurring themes. First, many respondents emphasized the need for more parks and public spaces, particularly facilities that are usable for families, such as children’s playgrounds and better upkeep of public gardens. Second, respondents frequently requested improvements to the walking environment, including continuous sidewalks, walking tracks, and safer street conditions supported by better paving and traffic calming. Third, several comments highlighted basic infrastructure needs, especially rainwater drainage, sewage management, and broader sanitation services. Fourth, respondents noted the importance of lighting and perceived safety, and some also mentioned the need for designated cycling pathways. Finally, several participants suggested that neighborhoods would be easier to navigate if services were clustered rather than dispersed, and some comments pointed to wider mobility challenges such as traffic congestion during peak times and the limited availability of public transport. A smaller number of responses also mentioned practical concerns such as neighborhood parking management and pest control.

5 DISCUSSION

5.1 Key findings

This study provides an exploratory snapshot of perceived accessibility and perceived service quality for five neighborhood services in Jeddah, based on a convenience sample of $N = 72$ respondents (male 75%, female 25%). Across services, perceived travel time and mode choice varied systematically by service type (Tables 1–2), consistent with the idea that perceived accessibility captures lived experience rather than objective network performance [5,6]. The main contribution is a service focused synthesis of perceived travel time, destination specific mode profiles, perceived quality ratings, and respondents’ identified priorities, providing an exploratory baseline that can guide prioritization and future monitoring alongside objective accessibility measures.

5.2 Interpretation of Jeddah city context

The strong reliance on private cars for schools and health centers in this survey (Table 2: 79.2% car for schools; 90.3% car for health centers) aligns with the broader car-oriented mobility context documented for Jeddah, where private vehicles constitute a very large share of trips and non-car modes represent a small proportion [11]. Within such a context, time-sensitive trips and trips involving accompaniment (e.g., school drop-off/pick-up and health visits) are more likely to default to car use even when perceived travel times are not extreme. For schools, only 26.4% reported travel times < 5 minutes, while the largest shares fell in the 5–15-minute range, and car remained the dominant mode. For health centers, perceived travel time was commonly 10 minutes (31.9%) and 15 minutes (19.4%), yet car use remained extremely high, reinforcing that mode choice is not explained by distance alone but also by destination type and trip constraints [10].

In contrast, mosques show a different access profile: travel time is typically short (Table 1: 47.2% < 5 minutes and 30.6% at 5 minutes) and walking is the predominant mode (Table 2: 63.9% walking). This pattern is consistent with the idea that certain routine neighborhood destinations can support walking when proximity and daily practice align (Arslan & Laporte, 2025). Grocery shopping shows a mixed pattern: 79.1% reported groceries within ≤ 5 minutes (45.8% < 5 , 33.3% at 5), yet mode choice is split nearly evenly (50.0% car vs 48.6% walking). This suggests that proximity alone does not guarantee walking and points to likely mediators not measured here (e.g., heat exposure, sidewalk continuity, carrying loads, and perceived safety), which is consistent with perceived accessibility research emphasizing the role of comfort and constraints [5].

Parks and public spaces represent the clearest perceived “gap” in this dataset. They show both the widest spread in travel time and the lowest perceived quality levels across most areas. Even where travel time is

short for some respondents (Table 1: 24.3% <5 minutes), a notable share reported >20 minutes (12.9%), and the usual mode was still predominantly car (Table 2: 56.5% car vs 39.1% walking). Perceived quality for parks/public spaces was also consistently lower than other services (Tables 3-4, Figures 11-12). This aligns with Saudi evidence that public space performance is strongly shaped by usability factors such as maintenance, comfort, and amenities not just presence or distance [8,9]. Together, these patterns suggest that parks/public spaces may be a service type where improvements in quality and comfort could have a particularly visible effect on respondents' reported experience.

Area comparisons should be interpreted cautiously and are treated as exploratory. Consistent with the small and unequal group sizes, Kruskal-Wallis tests indicated no statistically significant differences in perceived service quality across areas for any service (all $p > .05$). Descriptively, health center ratings vary across areas, with the West showing the lowest values and the North the highest (Tables 3, 4), but these differences are treated as preliminary signals rather than confirmatory spatial patterns.

5.3 Climate feasibility and walking comfort

Walking patterns in Jeddah should also be interpreted through thermal comfort constraints. Even when services are within short perceived travel times, walking feasibility depends on shade, exposure, and route continuity—factors that can reduce perceived accessibility despite proximity [15]. In this survey, walking is common for mosques (63.9%) and nearly half of grocery trips (48.6%), which may reflect short distances and flexible trip timing for some respondents. However, walking is much less common for schools (18.1%) and health centers (8.3%) despite many respondents reporting these services within 10-15 minutes. This contrast is consistent with climate and trip constraint explanations: school and health trips tend to be more time bound and less flexible, and they may involve accompanying others, which can amplify the perceived “cost” of walking in hot-humid conditions. These findings support interpreting walking access as context dependent and reinforce the relevance of comfort focused interventions (shade, safer crossings, continuous sidewalks), especially for routes to schools, health centers, and parks/public spaces [16].

5.4 Limitations and opportunities

This paper provides an exploratory, perception-based snapshot from a convenience online sample ($N = 72$) recruited via social media, which offers early insights into how respondents in this survey experience access and service quality across five everyday services in Jeddah. The demographic profile (e.g., 75% male) reflects the participation patterns typical of voluntary online surveys; therefore, results are presented as indicative rather than population-level estimates. Data were collected between 11 and 25 May 2023 and given the pace of ongoing infrastructure and public-realm projects in Jeddah, conditions in some districts may have changed since the survey period.

A strength of this approach is that it captures lived experience and highlights service-specific patterns that are directly relevant for prioritization (e.g., differences in mode choice by service type). At the same time, because driver's license status, household vehicle ownership, and proximity to public transport were not measured, the study cannot test how these factors shape the observed mode patterns or distinguish preference from constraint. Building on this foundation, future work can strengthen explanatory and spatial precision by incorporating additional variables (e.g., driver's license status, car ownership, household composition, transit proximity, and walking-environment conditions) and by pairing perception data with objective measures such as GIS-based accessibility indicators and streetscape audits. This mixed-evidence design is consistent with the literature emphasizing that perceived accessibility provides a valuable complement to objective accessibility assessment [5,7].

6 Recommendations

These recommendations are framed as planning implications consistent with the study's exploratory findings and should be interpreted as priorities for further investigation and action rather than population-level conclusions.

6.1 Prioritize parks and public spaces as the main service gap

Parks and public spaces emerged as the weakest service type in perceived quality across most areas (Tables 3-4; Figures 11-12) and showed the widest spread in perceived travel time, including 12.9% reporting >20 minutes (Table 1). In addition, most respondents reached parks and public spaces by car (56.5%) rather than walking (39.1%) (Table 2). Consistent with these findings and open-ended responses

emphasizing parks/playgrounds and maintenance, near-term priorities include improving park maintenance and cleanliness, adding family-oriented amenities (e.g., playgrounds), improving lighting and perceived safety, and increasing shade and thermal comfort features to enhance usability.

6.2 Improve safe, comfortable walking access to schools and health centers

Despite many respondents reporting schools and health centers within short travel times, usual mode was predominantly car-based (79.2% for schools; 90.3% for health centers) (Table 2). This suggests that proximity alone may not be sufficient to support walking for these destinations and points to the need for safer and more comfortable pedestrian access. Consistent with the results and open-ended themes (sidewalk continuity, crossings, safety, lighting), priorities include continuous sidewalks, safer crossings near schools and health facilities, traffic calming on key access streets, and shade interventions along common walking routes.

6.3 Preserve and learn from stronger service patterns (mosques and groceries)

Mosques showed the strongest walk-access pattern in the dataset (Table 2: 63.9% walking), with most respondents reporting short travel times (Table 1: 47.2% <5 minutes and 30.6% at 5 minutes) and high perceived quality (Tables 3–4). Grocery stores were also typically close to home (Table 1: 79.1% within ≤5 minutes) and showed a balanced mode pattern (Table 2: 50.0% car; 48.6% walking). These patterns can be treated as positive reference points for neighborhood planning, particularly in terms of local provision and convenient access.

6.4 Monitoring and evidence strengthening

To support decision-making and track progress, future studies can build on this work by pairing perception-based surveys with objective measures such as GIS-based accessibility indicators, public transport proximity, and audits of walking conditions (sidewalk continuity, safe crossings, shade, and lighting). Expanding data collection through a stratified sampling approach across Jeddah areas and districts would strengthen representativeness and enable clearer comparisons over time. Together, this mixed-evidence approach would enable triangulation of perceived accessibility and service quality with measured conditions, providing a practical baseline for monitoring and guiding neighborhood improvements while retaining the value of respondents' lived experience captured in this study.

7 CONCLUSION

This study provides an exploratory, perception-based snapshot of how respondents in this survey experience access to five everyday neighborhood services—schools, parks/public areas, grocery stores, health centers, and mosques—using three linked indicators: perceived travel time, usual travel mode, and perceived service quality. By reporting results service-by-service, the study offers a practical picture of “everyday usability” that a people-friendly communities lens aims to capture. The findings show clear and interpretable patterns that help distinguish where neighborhood access appears to function relatively well and where respondents perceive gaps. For example, grocery stores and mosques were most reported as close to home (79.1% and 77.8% within ≤5 minutes, respectively), and mosques also showed the strongest walking pattern (63.9%) and the highest perceived quality ratings across areas. In contrast, parks/public areas showed the widest spread in perceived travel time (including 12.9% reporting >20 minutes) and were consistently the lowest-rated service type in perceived quality, highlighting a clear priority area from the respondent perspective. Mode patterns further clarify service-specific needs: car reliance remained high for schools (79.2%) and health centers (90.3%), indicating that improving safe, comfortable access to these destinations is likely to require more than proximity alone.

Beyond the specific results, the main contribution of this study is that it translates respondents' perceptions into a simple, service-focused evidence base that can support prioritization and monitoring. The combination of (a) travel time categories, (b) mode by service type, (c) quality ratings, and (d) open-ended priorities provides a useful baseline for tracking future change and for aligning neighborhood interventions with lived experience, particularly in a context where climate and comfort influence walking feasibility. The study offers a clear starting point for more comprehensive follow-up work that integrates perception data with objective GIS accessibility and streetscape audits to strengthen diagnosis, target investments, and evaluate progress across Jeddah.

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Institutional Review Board Statement: The questionnaire was administered online, and participation was voluntary and anonymous. No personally identifiable information was collected. Informed consent was obtained from all participants at the start of the survey. The study involved minimal risk and collected perceptions about neighborhood services.

Data Availability Statement: The dataset generated and analyzed during the current study is not publicly available to protect participant privacy but is available from the corresponding author on reasonable request.

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