

Satisfaction with Quality and Access to Al-Masjid Al-Haram Services Among Persons with Disabilities During Umrah Season, 1441 H (2019-2020): Cross-sectional Study

Hicri 1441 (2019-2020) Umre Sezonunda Engelli Kişilerde Mescid-i Haram'a Ulaşım ve Kaliteden Memnuniyet Durumu: Kesitsel Çalışma

Mohamed Osama NOUR^{a,b}

^aDepartment of Public Health and Community Medicine, Damietta Faculty of Medicine, Al-Azhar University, EGYPT

^bFaculty of Public Health & Health Informatics, Umm Al-Qura University, Makkah, KSA

ABSTRACT Objective: To assess satisfaction with quality and accessibility compliance to Al-Masjid Al-Haram services among wheelchair users, to determine how far the disability policy of Grand Mosque authorities has contributed to creation of accessible built environments. **Material and Methods:** A cross-sectional study was designed using a structured questionnaire to collect data from 377 wheelchair users visiting Al-Masjid Al-Haram in Makkah city during Umrah season 1441 H (2019-2020). We assessed socio-demographics, information on access to, use of and satisfaction with Al-Haram services which are essential for visitors to get in and out, moving around and using the services. **Results:** Services with highest satisfaction included accessibility, signboards, warning boards and pathways while parking space, enough lifts to easily reach toilets and cost of renting wheelchair were with the lowest level of satisfaction. Their satisfaction with overall provided services and overall experience in quality of provided services were above average (72.9% and 68.2%, respectively) and they were not statistically related with any socio-demographic variable ($p>0.05$). **Conclusion:** Our results may help authorities to drive future services in a meaningful direction to consider the needs of persons with disabilities and to improve usability and functionality of services provided at Al-Masjid Al-Haram to ensure a barrier-free environment for all.

Keywords: Satisfaction; accessibility; persons with disabilities; Al-Masjid Al-Haram

ÖZET Amaç: Tekerlekli sandalye kullananlarda Mescid-i Haram'a ulaşma ve kalitesinden memnuniyeti değerlendirmek, Büyük Cami yetkililerinin engellilik politikalarının ulaşılabilir yapıyı çevrelerin yaratılmasına ne ölçüde katkıda bulunduğunu belirlemek. **Gereç ve Yöntemler:** Hicri 1441 (2019-2020) Umre sezonunda Mekke'de bulunan Mescid-i Haram'ı ziyaret eden 377 tekerlekli sandalye kullanıcısının verileri yapılandırılmış bir anket formuyla toplanarak kesitsel bir çalışma yapıldı. Sosyo-demografik özellikleri, ziyaretçiler için içeri girip çıkmak, etrafta dolaşmak için ve hizmetlerden faydalanmak için önemli olan El-Haram hizmetlerine ulaşma ve kullanma ile ilgili bilgi düzeyleri değerlendirildi. **Bulgular:** En fazla memnuniyet ulaşılabilirlik, tabelalar, uyarı levhaları ve yollarla ilgiliyken, en düşük memnuniyet oranları park alanları, tuvaletlere kolayca ulaşmak için yeterli asansörler ve tekerlekli sandalye kira ücretleri ile ilgili bulunmuştur. Sağlanan tüm hizmetlerle ilgili ve sağlanan hizmetlerin kalitesi ile ilgili deneyimleri ortalamasının üzerindeydi (sırasıyla, %72.9 ve %68.2) ve hiçbir sosyo-demografik değişkenle istatistiksel olarak ilişkili değildi. **Sonuç:** Sonuçlarımız, yetkililerin engelleri olan kişilerin ihtiyaçlarını göz önünde bulundurarak anlamlı bir yönde geleceği yönlendirmesine ve sağlanan hizmetlerin kullanılabilirliğini ve işlevselliğini geliştirmek için Mescid-i Haram'da engelsiz bir ortam sağlamak için yardımcı olabilir.

Anahtar Kelimeler: Memnuniyet; ulaşılabilirlik; engelli kişiler; Mescid-i Haram

Quality of life is a significant aspect of health that is influenced by various factors. Among which, type and degree of disability which is not just a health problem or attribute of individuals, but it reflects difficulties persons may experience in interaction and effective participation in society on an equal basis with others and with

physical movements.¹ Persons with disabilities (PWDs) have generally poorer life opportunities due to lack of services available to them and the many barriers they face in their everyday lives. When these barriers are removed and PWDs are empowered to participate fully in societal life, their entire community benefits.²

Correspondence: Mohamed Osama NOUR

Department of Public Health Community Medicine, Al-Azhar University Faculty of Medicine, Damietta, EGYPT

E-mail: drmun78@yahoo.com



Peer review under responsibility of Türkiye Klinikleri Journal of Medical Sciences.

Received: 17 Feb 2021

Received in revised form: 23 Apr 2021

Accepted: 11 May 2021

Available online: 26 May 2021

2146-9040 / Copyright © 2021 by Türkiye Klinikleri. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Accessibility refers to how easily the person can physically reach the provider's location. Lack of accessibility of physical and built environment prevents PWDs from participating effectively in all aspects of life. However, between the need for services and satisfaction of PWDs, there is the question of accessibility to a barrier-free environment and quality of services. Therefore, governments should take appropriate measures to identify and eliminate obstacles to accessibility.³

In Middle East Arab countries, despite the existence of many laws and legislations that call for accessible environment, PWDs are facing problems of access to public places and facilities that should be designed not merely for disabled but also to include common people with "unseen" disability. Saudi Arabia is based on the Islamic Sharia, which emphasizes human rights and the government is working hard to ensure full participation of PWDs to social life.⁴

The increase in numbers of PWDs in Muslim societies, along with their desire to visit the holy places in Makkah, will result in a much higher influx of PWDs seeking professional services. Each year, Makkah hosts over 10 million Muslim pilgrims from over 185 nations to perform the year-round Umrah or Hajj and this number is expected to reach 30 million for Umrah visitors alone in accordance with Saudi Vision 2030. Efforts are continuous to challenge inaccessibility problem and provide PWDs with equal rights to their peers during various expansions and development of holy Haram Makkah and surrounding areas to be built in accordance to standards for accessibility and disability policy that matched international code council.⁵

Creating built environment is a key variable in enabling PWDs to access to any public building. Grand Mosque authorities is considering wider socio-cultural, socio-economic and socio-political context surrounding Al-Masjid Al-Haram as built environment. They take a multifaceted approach to protect the civil rights of PWDs visiting Al-Masjed Al-Haram for pray or Umrah from all over the world, with a goal of assuring that PWDs have the same opportunities that other people enjoy in their religious activities. For people with physical disabilities, au-

thorities prepared designated prayer areas around the clock throughout the week, golf cars to facilitate movements, pathways, special gates with ramps, elevators, standard toilets and other services. Special services are also available for people with other types of disabilities as hearing and visual impairments. The Grand Mosque authorities print and distribute hundreds of thousands of cards with signs and symbols for non-Arabic speakers to help people with physical challenges to get to any gate or any spot inside the Grand Mosque. An electronic copy is available on the presidency's website as well.⁶

Reporting satisfaction offers a unique opportunity, not only to add to the limited baseline knowledge on PWDs visiting Al-Masjid Al-Haram for authorities, but also to stimulate quality improvement efforts in services provided. We aimed to assess satisfaction with quality and accessibility compliance to Al-Masjid Al-Haram services among PWDs (wheelchair users) to determine how far the disability policy of Grand Mosque authorities has contributed to the creation of accessible built environments in which wheelchair users can experience their religious rites smoothly.

MATERIAL AND METHODS

STUDY DESIGN

A cross-sectional study was designed to assess satisfaction with quality and access to services among PWDs (wheelchair users) visiting Al-Masjid Al-Haram in Makkah city during Umrah season, 1441 H (2019-2020).

SAMPLING AND SAMPLE SIZE

The sample size was calculated by Raosoft sample size calculator; based on 95% confidence level, 5% margin of error and anticipated response of 50%, the minimum sample size required was 377. Convenience sampling was used in finding respondents; all available wheelchair users at time of visits who agreed to participate in the study that conducted in prayer areas, yards and nearby hotels of Al-Haram in Makkah city.

With beginning of Umrah season (September, 2019) till Saudi authorities suspend entry for Umrah

over coronavirus disease-2019 fears (February, 2020), we were able to complete 338 (89.7%) of sample size and the remaining (10.3%) were recruited, before curfew was implemented (April, 2020), from various PWD associations and by personal communications from relatives, friends and neighbors with similar disability living in Makkah city provided that they had visited and utilized Al-Masjid Al-Haram services during the last 6 months.

INCLUSION CRITERIA

PWDs (permanent, partial or temporary difficulty walking) using manual and power wheelchairs, aged >18 years were selected who were present inside or near Al-Masjid Al-Haram in Makkah city regardless gender or nationality. The remaining subjects were reached at their homes or PWD associations.

EXCLUSION CRITERIA

1) Persons with other types of disabilities “severe vision impairment or blind; severe hearing impairment or deaf; manual dexterity difficulties with impaired fine motor skills as those suffering from Parkinson’s disease, muscular dystrophy, and/or a stroke, or traumatic brain injury; and other physical disabilities that affects a person’s mobility, physical capacity, stamina, or dexterity as those suffering from brain or spinal cord injuries, multiple sclerosis, respiratory disorders, and/or epilepsy.”

2) Those with mobility impairments using other devices such as crutches, canes or walkers.

3) Those using wheelchair without physical limitation such as for kids and pregnant women.

STUDY INSTRUMENT

A structured questionnaire was created in Arabic, English and Urdu using back translation technique to ensure content validity. It was completed through direct interview with participants by trained graduates from Umm Al-Qura University helped by translation, if needed, for some nationalities. Feedbacks from some participants were recorded by the investigators.

It included 1) Socio-demographics: Age, gender, residence, nationality, marital status, occupation, education, need for wheelchair, and need someone to accompany them; 2) Information on access to and use

of Al-Haram services which are essential for visitors to get in and out, moving around and using the services. We considered areas that modified from the abridged form of Americans with disabilities act accessibility guidelines like accessibility, parking area, signage, warning boards, toilets and ablution area, pathways, ramps, doorways, elevators, escalators, transportation, presence of barriers that prevent using the provided services, possible injury because of poor services, cost of renting wheelchair, emergency medical services, and people attitude towards their needs; 3) overall satisfaction with the provided services and overall experience with the quality of services.⁷

The initial draft was sent to a group of experts chosen according to their experience and expertise in the related fields to reflect on questions in terms of relativity, simplicity, and importance. The questionnaire was piloted prior to the study to identify issues like wording, question clarity, and timing and to test its validity or any needed modifications. The questionnaire was finalized after a series of group discussion and the data of pilot study was removed from final analysis. This step was followed by a reliability analysis to determine internal consistency of the items with each other. Item-total correlations for each domain were accepted (Pearson’s correlation coefficient $r > 0.330$). On the whole, the Cronbach alpha reliability coefficient was satisfactory ($= 0.72$).

SCORING SYSTEM

For satisfaction and experience with quality of services provided, we asked respondents to rate various aspects as; strongly agree/very satisfied/excellent “coded as 5”, agree/satisfied/good “coded as 4”, neutral/fair “coded as 3”, disagree/unsatisfied /poor “coded as 2” or strongly disagree/very unsatisfied/very poor “coded as 1”. Negative questions were coded in reverse manner.

Then, two points were given for “codes 5 & 4” as satisfied, one point for “code 3” as neutral/fair, and no points for “codes 2 & 1” as unsatisfied. The total score was 40 (ranged from 0-40). Participants with scores ≥ 30 were considered to have good satisfaction and participants with scores < 30 were considered to have fair/poor satisfaction based on 75% cutoff point out of the total expected score.

ETHICAL APPROVAL

The study was carried out in accordance with the Helsinki Declaration Principles. Ethical approval was obtained from the Research Ethics Committee at Umm Al-Qura University (IRB # 10061441, date: 10/6/1441H) and relevant authorities at Al-Masjid Al-Haram (No#11/131, date: 25/6/1441H) in Makkah city to ensure proper participation of participants without interruption of prayer areas, yards or times for prayers. Furthermore, prior oral consent was obtained from participants with brief explanation on objectives and benefits of the study with emphasis that personal data would be confidential and used for scientific work only.

STATISTICAL ANALYSIS

It was carried out using SPSS version 25.0 (IBM SPSS Statistics for Windows, Armonk, NY: IBM Corp., USA). For descriptive statistics, number and percentage were used for qualitative variables while mean±standard deviation was used for quantitative variables. For analytic statistics, chi-square or Fisher’s exact tests were used to assess differences in frequency of qualitative variables where their overall satisfaction with provided services (as dependent variable) was related with different socio-demographic variables (as independent variables). The statistical methods were verified, assuming a significant level of $p < 0.05$.

RESULTS

The study included 377 participants with mean age of 60.9 ± 8.3 years ranged from 36–81 years. The socio-demographic characteristics are summarized in Table 1.

Average level and percentage of satisfaction among participants were calculated and shown in Table 2. Services with highest satisfaction included accessibility, warning boards, signboards and pathways while PWD parking space, enough lifts to easily reach toilets and cost of renting wheelchair were revealed as the services with the lowest level of satisfaction.

Their satisfaction with overall provided services and overall experience in quality of provided serv-

TABLE 1: Socio-demographic characteristics of the studied sample.

	Variables	n=377 (%)
Age (years)	< 60	153 (40.6)
	> 60	224 (59.4)
Gender	Male	278 (73.7)
	Female	99 (26.3)
Residence	Inside the Kingdom*	246 (65.3)
	Outside the Kingdom	131 (34.7)
Nationality	Arab	212 (56.2)
	Non-Arab	165 (43.8)
Marital status	Married	277 (73.5)
	Non-married	100 (26.5)
Occupation	Working	69 (18.3)
	Not-working	308 (81.7)
Education	Illiterate/read & write	181 (48.0)
	Pre-university	158 (41.9)
	University/higher	38 (10.1)
Need for wheelchair	Permanent	45 (11.9)
	Partial/temporary	332 (88.1)
Need someone to accompany them	Yes	352 (93.4)
	No	25 (6.6)

*Either Saudi citizen 75/246 (30.5%) or resident from different nationalities 171/246 (69.5%).

ices were above average (72.9% and 68.2%, respectively) (Figure 1).

Overall satisfaction with provided services was not statistically related with any socio-demographic variable (Table 3).

DISCUSSION

The intention of our study was to capture multiple perspectives from PWDs (wheelchair users) about satisfaction with quality and accessibility to Al-Masjid Al-Haram services. It is important for authorities to be aware of level of accessibility to Al-Haram. Barriers faced by PWDs magnify the importance of providing accessible and disability-friendly services. Feedback form participants about accessibility to Al-Haram from their residence was satisfactory (78.2%). Although Makkah area is uneven within a rough terrain mountainous sloped area, Al-Haram is surrounded by very close hotels and residence homes with paved ways and pathways that facilitate movement of wheelchairs.

TABLE 2: Mean level of satisfaction with Al-Masjid Al Haram services among the studied sample.

Services	Mean±SD Maximum=5	Percentage of satisfaction ¹
Accessibility to Al-Haram	4.01±1.07	78.2
PWDs parking space	2.03±0.97	7.2
Signboards	4.12±1.01	75.6
Warning boards for a particular risk	4.18±1.02	76.1
Lifts to easily reach toilets	1.97±0.92	8.0
Toilets/use without help	3.46±1.25	64.2
Suitable ablution area	3.40±1.25	63.4
Pathways	4.16±1.02	74.5
Ramps	3.59±1.38	60.5
Doorways	4.04±1.03	70.6
Elevators	3.52±1.38	57.6
Escalators	3.62±1.36	59.9
Golf cars to facilitate movements	2.31±1.26	20.7
Barriers prevent using provided services	3.31±1.16	50.7
Possible injury because of poor services	4.00±1.04	72.4
Cost of renting wheelchair	1.81±1.02	8.2
Emergency medical services at Al-Haram	3.94±1.03	71.9
People awareness of your own needs	2.70±1.44	33.7
Satisfaction with overall provided services	3.97±1.01	72.9
Overall experience in quality of services	3.92±1.09	68.2 ²

SD: Standard deviation; PWDs: Persons with disabilities; ¹The sum percentage of participants with rated level of satisfaction as "very satisfied" and "satisfied";

²The sum percentage of participants with rated experience in quality as "excellent" and "good".

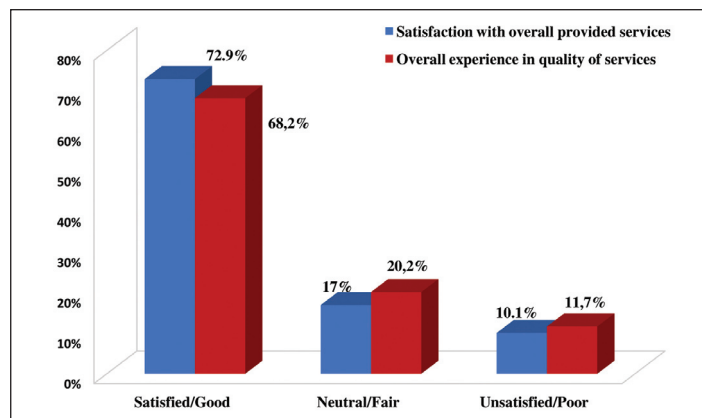


FIGURE 1: Overall satisfaction and experience in quality of services.

Those from far areas easily reach Al-Haram through well-constructed expanding road network and regional road infrastructure that is continuously maintained by authorities.⁸ Our finding was slightly higher than the compliance of wheelchair users in Al Ain city, UAE (73%) regarding accessibility to public buildings but was inconsistent with previous research demonstrating that PWDs report poorer access to needed services.^{9,10}

Parking system can affect the willingness of PWDs for utilizing services. It was reported as one of the main obstacles and difficulty faced by PWDs in accessibility to services.¹¹ Presence of suitable PWDs parking space was among the lowest rated services (7.2%) by our participants. In fact, free parking areas are available but away from Al-Haram by few kilometers. For traffic considerations, the zone surrounding Al-Haram are without parking and just

TABLE 3: Relation of overall satisfaction with different socio-demographic characteristics of the studied sample.

Variables		Good satisfaction n=191 (%)	Fair/poor satisfaction n=186 (%)	p value
Age (years)	<60	73 (38.2)	80 (43.0)	0.348
	>60	118 (61.8)	106 (57.0)	
Gender	Male	140 (73.3)	138 (74.2)	0.907
	Female	51 (26.7)	48 (25.8)	
Residence	Inside the Kingdom	126 (66.0)	120 (64.5)	0.829
	Outside the Kingdom	65 (34.0)	66 (35.5)	
Nationality	Arab	108 (56.5)	104 (55.9)	0.918
	Non-Arab	83 (43.5)	82 (44.1)	
Marital status	Married	141 (73.8)	136 (73.1)	0.907
	Non-married	50 (26.2)	50 (26.9)	
Occupation	Working	36 (18.8)	33 (17.7)	0.792
	Not working	155 (81.2)	153 (82.3)	
Education	Illiterate/read & write	90 (47.1)	91 (48.9)	0.930
	Pre-university	81 (42.4)	77 (41.4)	
	University/higher	20 (10.5)	18 (9.7)	

Values present as number and % & analyzed by Chi-square or Fisher's exact tests.

for loading or unloading of passengers. According to authorities at general presidency for Grand Mosque affairs, they provide parking spaces for PWDs in the presidential building near Al-Haram however, almost all visitors know nothing about that and no announcements to declare this service for the disabled.¹² Similarly, 81% of wheelchair users were unsatisfied with parking in Al Ain city, United Arab Emirates (UAE) and 52% in Riyadh.^{9,13} Parking issue was also reported by Castro et al. as one of the main accessibility obstacles however, it was not recognized by others to have as much influence on satisfaction with the service.^{14,15}

Warning and signboards were among services with the highest level of satisfaction. Ujang listed signage under the "accessibility" attribute as one of the important elements crucial for accessibility in a place and a key for people's attachment to a public place.¹⁶

Standard toilets usually do not meet the needs of elderly and PWDs as the fixed height of toilet seat represents a major problem during toilet use and limits autonomy by requiring personal support, thus the need for barrier-free toilets "wheelchair accessible WC" that confer more space and support, enhance usability of base assistive technology and provide safety for independent use. Our results revealed above average levels of satisfaction regrading enough toilets,

their use without help and suitable ablution area. Practically, presence of lower gradient, non-slippery floor material, wider door opening and ablution area without barriers in front of the faucet may provide easier facilities and ensure safer environment. These elements are crucial for even able-bodied persons' access to toilets in public buildings.¹⁷

In an access audit study on accessibility of public buildings in Malaysia, PWDs defined certain barriers as high gradients or level changes, barriers in front of ablution faucets, furniture layout in PWD restroom and slippery floor material.¹⁸ Another community-based study in Ethiopia found that 41.3% of PWDs had satisfactory latrine utilization.¹⁹ However, presence of steps at latrine entrance, absence of handrails, narrower latrine door, privacy issue, distant latrine, unclean floor, elevated footrests and use of toilets by non-disabled people were challenging.¹⁷

Move between floors are amongst the most challenging environmental barriers for wheelchair users. Solutions should address architectural barriers and allow users to safely enter and exit the building while maintaining as much independence as possible. Twenty doors, out of total 210, have been allocated by authorities at Al-Haram for entry of PWDs represented in gates with ramps, slope bridges and elevators.²⁰ Some persons may use escalators to

transfer disabled on wheelchair from one floor to another within Al-Haram. Our participants were fairly satisfied with ramps, doorways, elevators and escalators.

Elevators have been identified as effective solutions in terms of speed, capacity, rise and usability. Lifts specific to easily reach toilets presented challenges for majority of our participants as a significant proportion was unsatisfied (92%) and the condition is much worse in overcrowded Fridays because of “Gom’a prayer” and visitors may have to utilize toilets of nearby hotels. Ramps were preferred by wheelchair users with lower cost access solution however, some studies confirm that users perceive ramps as a visible symbol of disability. In addition, large footprint and safety concerns, such as grade of ramp, tight ramp corners and effects of weather on ramp slipperiness are challenging.^{21,22} Mulazadeh and Al-Harbi explored design of built environment in Riyadh, KSA and found that majority of observed public and private buildings do not comply with accessibility standards with no standard ramp or designated standard disabled parking.²³

The cost of renting wheelchair was also noted as a limitation particularly during Umrah practices and when needed to reach Al-Haram from far hotels. It is also notable that free wheelchairs are available but were not recognized by majority of participants neither their borrowing place.

Negative attitudes towards PWDs limit their access to different services and stand as a barrier to achieve social equality. Only one-third of participants were satisfied with awareness of surrounding people with their own needs. This raises the issue of that general population is not highly respectful to those with physical disability as found in Riyadh.¹³ Being aware of societal attitudes toward PWDs may help explain discrimination against them and draw attention to the solutions needed to address these.²⁴

Satisfaction of our participants with overall provided services and experience with quality of provided services were above average. This might reflect that disability-related policies and regulations are implemented, to a considerable extent, on the ground by

the Grand Mosque authorities to facilitate the availability and accessibility to services for PWDs.

CONCLUSION

The results from this study point to some general concerns about satisfaction with quality and accessibility to Al-Masjid Al-Haram services among PWDs. Accessibility, signage, pathways, doorways, safety from injuries and emergency medical services were rated satisfactory however, parking space and lifts to easily reach toilets were rated unsatisfactory and the cost for renting wheelchair is relatively high that can't be afforded by them. These results may help authorities who need a clear understanding of end user feedback to drive future services in a meaningful direction and provide valuable insight into usability and functionality of services provided at Al-Haram. Therefore, Al-Haram - as built environment - need to provide a more inclusive design that consider the needs of PWDs to ensure a barrier-free environment for all.

LIMITATIONS

We acknowledge that our study has some limitations, and so results should be interpreted with caution. First, as a cross-sectional study, it describes the relationship between the predictor and dependent variables as general association and not to be taken as cause-effect relationship. Second, selection bias as we didn't include other forms of disabilities and correlate with percent satisfaction that provide more comprehensive results and opportunity to explore different preferences. Third, when dealing with human factors, some responses might be affected by unintended conditions such as participants' tiredness and out of focus. Forth, social desirability bias with a tendency to give positive responses as some participants rated “very satisfied” although they were struggling to get to ramps and sloping bridges. This might be explained by that they may become accustomed to challenges, have learned to lower their expectations over time and pride that may prevent them to admit challenges they faced. Lastly, participants may focus on a particular service, rather than the general category of service (i.e. they may provide feedback on particular ramp frequently used by them, rather than ramps in general).

Acknowledgement

We acknowledge graduates at Faculty of Public Health & Health Informatics, Umm Al-Qura University specially groups leaders; Ali Faisal Althagafi (437006628), Abdulahman Ibrahim Alshaikh (437031938), Saleh Salah Alhassani (437005398) and Abdullah Odis Alqurshi (4360299090) for their help, support and valuable participation. We are highly appreciated to PWDs who shared in the study and their caregivers.

Source of Finance

During this study, no financial or spiritual support was received neither from any pharmaceutical company that has a direct connection with the research subject, nor from a company that pro-

vides or produces medical instruments and materials which may negatively affect the evaluation process of this study.

Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

This study is entirely author's own work and no other author contribution.

REFERENCES

- United Nations, Department of Economic and Social Affairs. Disability and Development Report. Realizing the Sustainable Development Goals by, for and with persons with disabilities. New York, 2018. [\[Link\]](#) (Last accessed August 10, 2020)
- United Nations [Internet]. [Cited: 10.08.2020]. International Day of Persons with Disabilities 3 December. Background: Inclusive society and development. Available from: [\[Link\]](#)
- Al Ju'beh K. Disability inclusive development toolkit 2015. Bensheim: CBM. [\[Link\]](#)
- Al-Jadid MS. Disability in Saudi Arabia. Saudi Med J. 2013;34(5):453-60. [\[PubMed\]](#)
- Kingdom of Saudi Arabia vision 2030. [\[Link\]](#)
- Diplomatic News Agency [Internet]. © 2018 DNA News Agency. [Cited: 09.02.2018]. Special measures in holy mosque of Makkah for disabled people. Available from: [\[Link\]](#)
- American with Disability Act Accessibility Guidelines (ADAAG), 1990. [\[Link\]](#) (Last accessed March 5, 2021)
- Ministry of Municipal and Rural Affairs. Makkah City Profile, United Nations Human Settlements Programme (UN-Habitat). 2019. [\[Link\]](#)
- Rivano-Fischer D. Wheelchair accessibility of public buildings in Al Ain, United Arab Emirates (UAE). Disabil Rehabil. 2004;7:26(19):1150-7. [\[Crossref\]](#) [\[PubMed\]](#)
- Fouts BS, Andersen E, Hagglund K. Disability and satisfaction with access to health care. J Epidemiol Community Health. 2000;54(10): 770-1. [\[Crossref\]](#) [\[PubMed\]](#) [\[PMC\]](#)
- Lu W, Zhang C, Ni X, Liu H. Do the elderly need wider parking spaces? Evidence from experimental and questionnaire surveys. Sustainability. 2020;12(9):3800. [\[Crossref\]](#)
- The Grand Mosque in Mecca honors its visitors with special needs. Al Arabiya Net. (Translated from Arabic). [\[Link\]](#) (Last accessed May 20, 2020)
- Alkawai FM, Alowayyed AS. Barriers in accessing care services for physically disabled in a hospital setting in Riyadh, Saudi Arabia, cross-sectional study. J Community Hosp Intern Med Perspect. 2017;6:7(2):82-6. [\[Crossref\]](#) [\[PubMed\]](#) [\[PMC\]](#)
- Castro SS, Lefèvre F, Lefèvre AM, Cesar CL. Accessibility to health services by persons with disabilities. Rev Saude Publica. 2011;45(1):99-105. [\[Crossref\]](#) [\[PubMed\]](#)
- Mendonça KMPP, Guerra RO. Development and validation of an instrument to measuring patient satisfaction with physical therapy. Rev Bras Fisioter. 2007;11(5):369-76. [\[Link\]](#)
- Ujang N. Place attachment and continuity of urban place identity. Asian J Environ-Behav Stud. 2010;1(2):61-76. [\[Link\]](#)
- Mayer P, Guldenpfennig F, Panek P. Towards smart adaptive care toilets. Stud Health Technol Inform. 2019;260:9-16. [\[PubMed\]](#)
- Abdul Kadir S, Jamaludin M. Users' satisfaction and perception on accessibility of public buildings in Putrajaya: access audit study. Procedia Soc Behav Sci. 2012;50:429-41. [\[Crossref\]](#)
- Asfaw B, Azage M, Gebregers GB. Latrine access and utilization among people with limited mobility: a cross sectional study. Arch Public Health. 2016;1;74:9. [\[Crossref\]](#) [\[PubMed\]](#) [\[PMC\]](#)
- 210 doors in the Grand Mosque in Mecca serve pilgrims during Ramadan. Alwatan. (Translated from Arabic). [\[Link\]](#) (Last accessed March 20, 2020)
- Jung Y, Bridge C, Mills S. Cost-benefit analysis of ramps versus lifts. Sydney: Home Modification Information Clearinghouse. Evidence Based Research. 2010. [\[Link\]](#)
- Mattie JL, Borisoff JF, Wong AS, Miller WC. User perceptions of existing home access solutions and a novel home access device. Disabil Rehabil Assist Technol. 2016; 11(8):668-77. [\[Crossref\]](#) [\[PubMed\]](#) [\[PMC\]](#)
- Mulazadeh MA, Al-Harbi TS. Design of the built environment and the integration of wheelchair users in the Kingdom of Saudi Arabia: commentary and exploratory study. J Dev Disabil. 2016;22(2):121-37. [\[Link\]](#)
- Palad YY, Barquia RB, Domingo HC, Flores CK, Padilla LI, Ramel JM. Scoping review of instruments measuring attitudes toward disability. Disabil Health J. 2016;9(3):354-74. [\[Crossref\]](#) [\[PubMed\]](#)