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Research Article

**COMMUNITY HEALTH NEEDS ASSESSMENT IN  
MEDINA CITY 2023****Nader Moneer Alqerafi<sup>1</sup>, Sami Saleem Alrehaili<sup>1</sup>, Jaber Suliman Alrehaili<sup>2</sup>, Abdullah Saleh Aljohani<sup>2</sup>, Ayman Naji Khallaf<sup>2</sup>**<sup>1</sup> General Directorate of Health Affairs – Medina – Saudi Arabia<sup>2</sup> Directorate of Health Affairs – Medina – Saudi Arabia**Abstract:**

**Background:** The healthcare assessment of the Saudi population serves as a foundational step in developing evidence-based policies and strategies. By examining the current health landscape and identifying areas for improvement, the research contributes to Saudi Arabia's overarching goal of providing high-quality healthcare services. This journey into exploring the healthcare needs, challenges, and opportunities reflects the nation's proactive approach to addressing the dynamic healthcare environment. The objectives set forth by this research align with the broader vision of enhancing the health and prosperity of all Saudi citizens.

**Objectives:** aim to provide a holistic assessment of the healthcare landscape in Al-Madina -Saudi Arabia, drawing from the valuable insights of academic study and contributing to developing evidence-based policies and strategies to enhance healthcare delivery and accessibility. By focusing on this critical aspect, we align with Saudi Arabia's vision to ensure the well-being and prosperity of all its citizens.

**Methods:** A cross-sectional study in Al-Madina, November 2023, using a self-administered questionnaire, with a sample size of 663, investigated healthcare-related aspects among the general population.

**Conclusion:** This research provided valuable insights into various aspects of health, encompassing epidemiological profiles, disease prevalence, healthcare infrastructure, and access to healthcare services. The study revealed notable demographic characteristics, including a high prevalence of obesity and a considerable percentage of individuals with chronic diseases, predominantly diabetes and hypertension. Despite a generally active population, the study highlighted a lack of interest and participation in pre-diagnosis examinations, emphasizing the need for increased awareness and education regarding the importance of regular check-ups.

**Keywords:** Body mass index - chronic diseases – walking – pre-diagnostic examination – healthcare facility – satisfaction.

validate these findings in larger and more diverse populations.

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## INTRODUCTION:

The healthcare assessment of the Saudi population is a critical endeavor, seeking to evaluate the health status, needs, and challenges faced by the citizens of the Kingdom of Saudi Arabia. As a country experiencing rapid socio-economic and demographic transformations, Saudi Arabia's healthcare system has witnessed significant advancements and expansions in recent years [1]. This assessment aims to comprehensively analyze various facets of healthcare within the Saudi population, encompassing epidemiological profiles, access to healthcare services, disease prevalence, healthcare infrastructure, and the cultural and societal factors that impact health outcomes. Recent studies have shed light on the changing disease prevalence and patterns in Saudi Arabia [2-4]. Furthermore, the assessment encompasses access to healthcare services, considering geographic disparities and variations in healthcare utilization [5].

Saudi Arabia's commitment to enhancing its healthcare system is evident through the implementation of ambitious Vision 2030 reforms; a comprehensive analysis of healthcare indicators, accessibility, and quality is imperative to facilitate informed policy-making and resource allocation, which prioritize the well-being and health of its citizens [6,7]. These reforms aim to promote a more efficient, accessible, patient-centered healthcare system, aligning with global healthcare standards. Nevertheless, to tailor healthcare services effectively and address the unique needs of the Saudi population, it is essential to conduct a thorough assessment that considers cultural, geographic, and demographic diversity within the country.

This assessment will be foundational in developing evidence-based policies and strategies to enhance healthcare delivery and accessibility. Examining the current health landscape and identifying areas that require attention and improvement will contribute to the country's overarching goal of providing high-quality healthcare services that ensure the well-being and prosperity of all Saudi citizens. In this pursuit, we embark on a journey to explore the healthcare needs, challenges, and opportunities inherent in Saudi Arabia's diverse and dynamic healthcare environment. This research is not merely a scholarly endeavor but a crucial step in the nation's commitment to enhancing the well-being of its citizens. Academic works have emphasized the need to tailor healthcare services to meet the unique needs of the diverse Saudi population, considering cultural competence and the challenges

posed by an increasingly urbanized society [8,9]. Such considerations align with the global patient-centered care trend and promote a healthier, more equitable society. The objectives of this research are to provide an up-to-date and comprehensive health profile that can inform healthcare policies and resource allocation, analyze the accessibility of healthcare services across Al Madina-Saudi Arabia, evaluate healthcare utilization patterns among various demographic groups, and provide actionable insights for policymakers and healthcare authorities to improve the delivery, quality, and accessibility of healthcare services for all Saudi citizens and residents.

## METHODOLOGY:

This research is a cross-sectional study using a self-administered questionnaire. The study took place in November 2023 among the general population of Al-Madina. A 99% confidence level calculator was used to calculate the sample size with a population size of 2,100,000 and a margin of error of 5% = 663. The exclusion criteria were prisoners, those with mental disabilities, and non-Arabic/English speakers.

Data entry was performed using Microsoft Excel 2021, and statistical analysis was done using a statistical package for the social sciences (SPSS V26) for statistical analysis based on an independent t-test and chi-square test. Frequencies and percentages were calculated for categorical variables, and measures of central tendency were calculated for continuous variables. All P-values < 0.05 were considered statistically significant.

An ethical clearance was obtained from the Ministry of Health's Ethical Committee for this research.

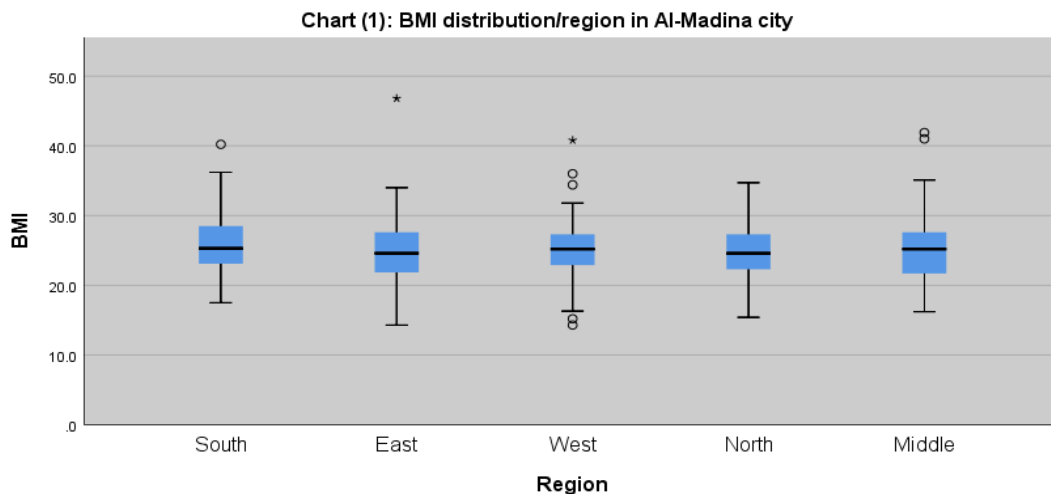
## RESULT:

The demographic variable represented in [Table 1], show that most participants were between the age of 30 and 44 (49.3%), followed by 18 to 29 years old (30%), and the rest of the participants were above the age of 45 years old (20.7%). Most sample sizes were male (67.7%) and Saudi (89.1%). (65.3%) of the sample were married, (31.4%) were single, and (3.3%) were divorced and widows/er. The average family member/region was 5 members and 2 children/family. 38 families (5.7%) have at least one member with a particular need. A total of 532 (80.2%) of the respondents have no medical insurance.

		South	East	Region West	North	Middle	Total
Age	18-29 years old	34	42	41	36	46	199 (30%)
	30-44 years old	66	69	64	68	60	327 (49.3%)
	45-59 years old	29	17	21	23	22	112 (16.9%)
	60+ years old	3	4	6	5	7	25 (3.8%)
Gender	Male	98	79	107	76	89	449 (67.7%)
	Female	34	53	25	56	46	214 (32.2%)
Nationality	Saudi	126	124	111	117	113	591 (89.1%)
	Non-Saudi	6	8	21	15	22	72 (10.9%)
Status	Married	100	80	87	87	79	433 (65.3%)
	Single	30	47	40	40	51	208 (31.4%)
	Divorced	0	0	2	0	2	4 (0.6%)
	Widow/er	2	5	3	5	3	18 (2.7%)
Monthly income	Less than 5k SR	46	51	49	45	60	251 (37.9%)
	5k to 10k SR	31	32	33	32	36	164 (24.7%)
	More than 10k SR	55	49	50	55	39	248 (37.4%)
Mean family member		5.3	5.5	4.9	5	5.3	5.2
Mean number of children/family		2.7	2.2	2.0	2.2	2	2.2

Table (1): Demographic variable of the sample in Al-Madina city.

Body mass index (BMI) is elected by [chart 1] across the region of Al-Madina city. The mean BMI of the southern region is  $26.0 \pm 5.4$ , the eastern region is  $25.0 \pm 5.8$ , the western region is  $25.3 \pm 4.4$ , the northern region is  $25.3 \pm 5.3$ , and the middle region  $25.3 \pm 6$ . Overall, the most frequent BMI is normal, followed by overweight, obesity I, underweight, obesity II, and Extreme obesity with (44%), (36%), (12%), (5%), (2%), and (1%) consequently. The highest BMI was 46.8, and the lowest was 14.3.



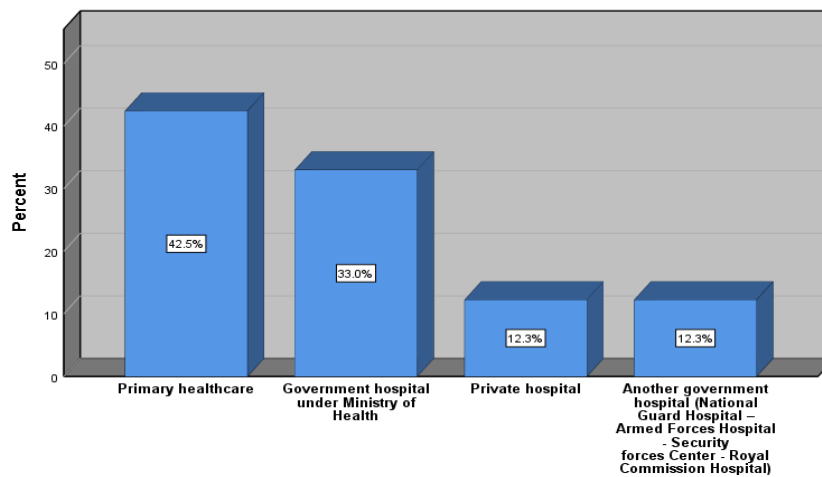
Of the sample size (12.5%) have a chronic disease; the most frequent among them was diabetes (69.9%), followed by hypertension (45.8%). Chronic disease prevalence across different age groups is represented in [Table 2]. Of the selected group (42.5%) Preferred to follow up in Primary healthcare, (33%) in a government hospital under the Ministry of Health, while (12.3%) preferred a Private hospital and Another government hospital (National Guard Hospital – Armed Forces Hospital - Security Forces Center – Royal Commission Hospital) equally chart (2). The most frequent cause for going to a healthcare facility was due to suffering from respiratory symptoms (27.6%), followed by

follow-up of a chronic disease (18.8%). The age group between 30-44 had the most cases of visiting a healthcare facility (46.7%), followed by 18-29 (29.9%), 45-56 (20.3%), and above 60 years old (4.2%), which was statistically significant (p-value=.00). The result shows that male was more frequently visiting the healthcare facility than women (p-value=.00). The visiting frequency was not statistically significant across Al-Madina region.

Chronic disease		Age Group				Total
		18-29 years old	30-44 years old	45-59 years old	60+ years old	
Diabetes	Count	3	13	34	8	58
	% of Total	0.5%	2.0%	5.1%	1.2%	8.7%
Hypertension	Count	1	8	17	12	38
	% of Total	0.2%	1.2%	2.6%	1.8%	5.7%
High cholesterol	Count	1	7	3	1	12
	% of Total	0.2%	1.1%	0.5%	0.2%	1.8%
Hypo/Hyperthyroidism	Count	1	0	0	0	1
	% of Total	0.2%	0.0%	0.0%	0.0%	0.2%
Asthma	Count	3	4	1	0	8
	% of Total	0.5%	0.6%	0.2%	0.0%	1.2%
migraine	Count	0	0	0	1	1
	% of Total	0.0%	0.0%	0.0%	0.2%	0.2%
Cardiac disease	Count	1	1	2	7	11
	% of Total	0.2%	0.2%	0.3%	1.1%	1.7%
Inflammatory disease	Count	1	2	0	0	3
	% of Total	0.2%	0.3%	0.0%	0.0%	0.5%
Psoriasis	Count	1	0	0	0	1
	% of Total	0.2%	0.0%	0.0%	0.0%	0.2%
None	Count	190	304	74	12	580
	% of Total	28.7%	45.9%	11.2%	1.8%	87.5%

Table (2): Prevalence of chronic disease across different age groups.

Chart (2): Preferred healthcare facility to follow up a chronic disease

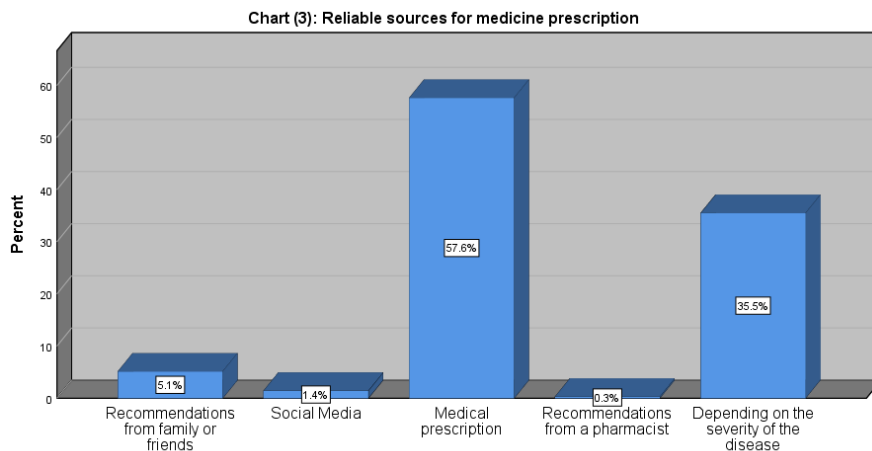


All the participants of this study were constantly walking, but male respondents tended more to outdoor walking than women (p-value=.001). The walking duration across different variables is shown in [Table 3]. Among those who did not find the surroundings suitable for walking, the most frequent cause was the unavailability of walkways around (81.1%), followed by the instability of the weather (13.1%) and (5.8%) due to the loss of desire to walk. This result was statistically significant to the respondents' status (p-value = .051). Furthermore, (27.5%) of all participants practice other sports activities; (77.4%) of them are male (p-value=.001).

		Duration of walking			P Value
		Less than 30 min	30 to 60 min	More than an hour	
Age Group	18-29 years old	64	92	43	.061
	30-44 years old	82	183	62	
	45-59 years old	41	54	17	
	60+ years old	11	12	2	
Gender	Male	121	247	81	.021
	Female	77	94	43	
Nationality	Saudi	179	303	109	.759
	Non-Saudi	19	38	15	
Status	Married	125	243	65	.000
	Single	66	92	50	
	Divorced	2	2	0	
	Wido/er	5	4	9	
Region	South	41	69	22	.962
	East	42	62	28	
	West	41	67	24	
	North	35	71	26	
	Middle	39	72	24	

Table (3): crosstab between the duration of walking and different independent variables.

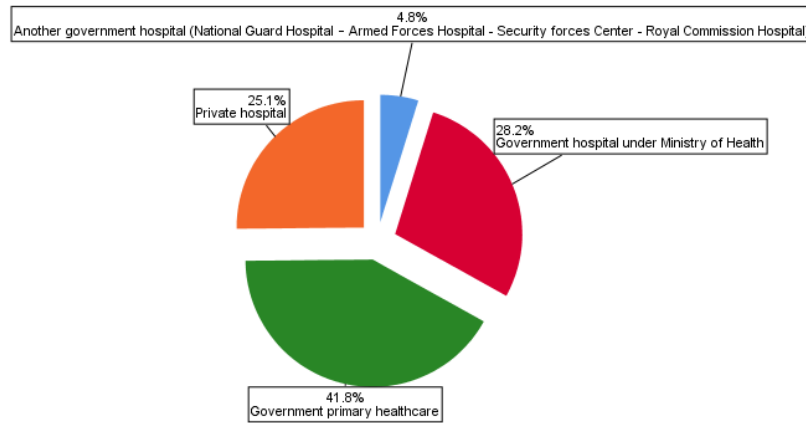
The outcome of the survey shows that (57.6%) of the Al-Madina population seek medication by medical prescription by a certified doctor, and (35.5%) mentioned that it depends on the severity of the disease and the symptoms, as they may consider other ways, such as herbal therapy at home or use over-the-counter medications, the rest (6.8%) may consider medication recommended by a family member or friend, or pharmacist, or social media [ chart 3].



Overall (41.8%) of all participants visited primary healthcare in the past year, (28.3%) visited a governmental hospital under MOH, (25.1%) visited a private hospital, and (4.8%) visited other government hospitals (National Guard Hospital – Armed Forces Hospital - Security Forces Center - Royal Commission Hospital) [Chart 4]. Besides that, [Table 4] shows the selected population's interest in pre-diagnosed examination across different independent variables. In general, (67.4%) of all participants did not perform any pre-diagnosed examination previously, (28.2%) did screening for diabetes, and (24.4%) did screening for hypertension. Participants between 30 and 44 were the most interested in the pre-diagnosed examination, while those above 60 were the least willing to do it. Additionally, male

participants were more interested in doing the pre-diagnosed examination than female participants. The distribution of the participants across Al-Madina was not statistically significant.

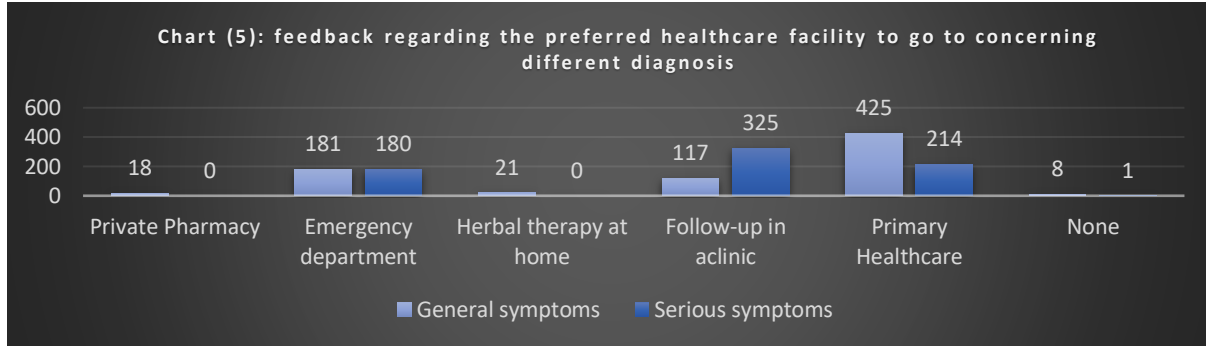
Chart (4): The Healthcare facility visited for the past year among Al-Madina population.



		Pre-diagnosed Examination							
		Diabetes	Hypertension	Depression	Colon cancer	Breast cancer	Cervical cancer	None	
Age Group	18-29 years old	Count	21	22	3	5	5	0	168
		% of Total	3.2%	3.3%	0.5%	0.8%	0.8%	0.0%	25.3%
	30-44 years old	Count	90	75	4	3	2	0	228
		% of Total	13.6%	11.3%	0.6%	0.5%	0.3%	0.0%	34.4%
	45-59 years old	Count	63	48	1	2	1	1	43
		% of Total	9.5%	7.2%	0.2%	0.3%	0.2%	0.2%	6.5%
60+ years old	Count	13	17	0	0	2	0	8	
	% of Total	2.0%	2.6%	0.0%	0.0%	0.3%	0.0%	1.2%	
Gender	Male	Count	137	117	5	7	4	0	294
		% of Total	20.7%	17.6%	0.8%	1.1%	0.6%	0.0%	44.3%
	Female	Count	50	45	3	3	6	1	153
		% of Total	7.5%	6.8%	0.5%	0.5%	0.9%	0.2%	23.1%
Region	South	Count	38	36	4	1	1	0	88
		% of Total	5.7%	5.4%	0.6%	0.2%	0.2%	0.0%	13.3%
	East	Count	32	29	0	3	1	0	92
		% of Total	4.8%	4.4%	0.0%	0.5%	0.2%	0.0%	13.9%
	West	Count	40	31	1	4	3	0	87
		% of Total	6.0%	4.7%	0.2%	0.6%	0.5%	0.0%	13.1%
	North	Count	37	32	0	1	2	0	92
		% of Total	5.6%	4.8%	0.0%	0.2%	0.3%	0.0%	13.9%
	Middle	Count	40	34	3	1	3	1	88
		% of Total	6.0%	5.1%	0.5%	0.2%	0.5%	0.2%	13.3%
Total	Count	187	162	8	10	10	1	447	
	%	28.2%	24.4%	1.2%	1.5%	1.5%	0.2%	67.4%	

Table (4): The interest of the selected population to do pre-diagnosed examination across different independent variables.

Most respondents preferred to follow up in primary healthcare for general symptoms but were more willing to follow up in the clinic when they had severe symptoms [chart 5]. Moreover, (52%) of the respondents believe that MOH media outlets are the most reliable source of health information, and (30.4%) for healthcare doctors. The rest voted for social media, the recommendation for family or friends, calling 937 with (12.1%), (5.2%), (0.4%), (0.3%) consequently [chart 6].



Overall, (48%) of the participants are satisfied with health services in general, (30%) are extremely satisfied while (and 21%) have less-than-average satisfaction levels. In Addition to that (42%) have a good satisfaction level with health services in the primary healthcare center, (30%) are extremely satisfied, and (28%) have less than-average satisfaction levels [Chart 7].

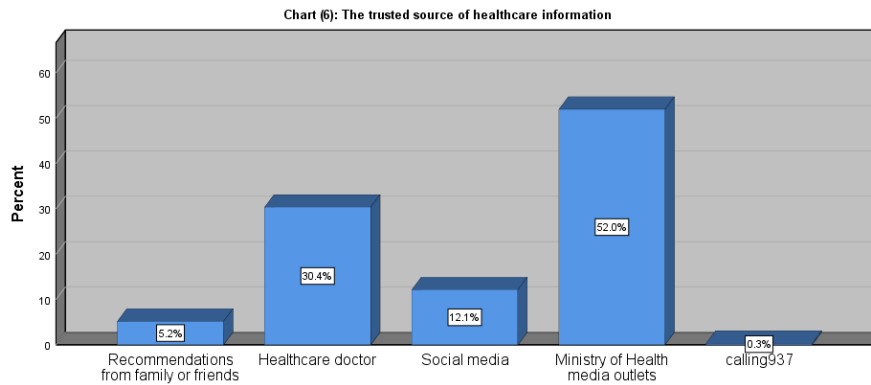
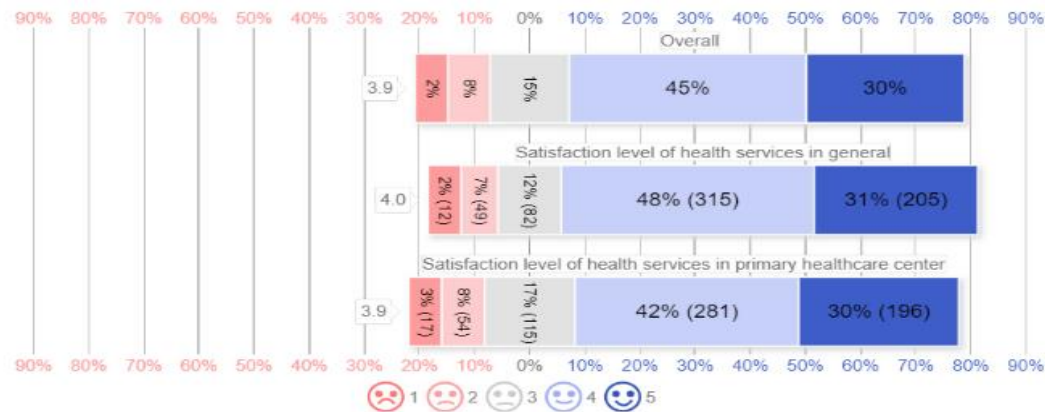


Chart (7): satisfaction levels of healthcare.



## DISCUSSION:

Improving healthcare performance and enhancing primary healthcare facilities are vital steps to address the top health needs of the community in Medina City [10]. Integrating accessibility and location-allocation models into GIS can help improve spatial planning and environmental sustainability of health services in the city [11]. Additionally, engaging with community advisory boards (CABs) can help align research efforts with community priorities and address local health needs [12]. Improving the healthcare system in Medina City in Saudi Arabia is not an easy challenge; it includes a shortage of healthcare professionals [8], a lack of preventive care [13], and health disparities between urban and rural areas [14]. Additionally, the healthcare system in Saudi Arabia is also dealing with an aging population and an increase in chronic diseases [15]. Adopting artificial intelligence (AI) solutions to enhance the healthcare system comes with challenges, such as needing high-quality data and developing regulations and guidelines. Implementing the new Model of Care, which aims to achieve better health, care, and value, also faces difficulties in the Saudi Arabian health system. Addressing these challenges is crucial for achieving a more equitable and sustainable healthcare system in Medina City.

Although the prevalence of obesity, specifically in Medina city in Saudi Arabia, is not well known, our study revealed that 50% of Medina's population is within the overweight range and 25% have reached the obesity range, which is compatible with several studies that highlighted the high prevalence of obesity in the Saudi Arabia ranges from 21.7% to 35.6% [16-18]. Several factors influence the high prevalence of obesity. These include the consumption of Western diets and sugary beverages, high levels of inactivity, lack of physical activity, and unhealthy dietary practices [17-19]. The shift towards a sedentary lifestyle, including increased consumption of fast food and soft drinks, contributes to the problem [18]. Additionally, sociodemographic factors such as age, gender, and income level are associated with obesity in the region [16]. Lack of awareness about obesity risks and the need for healthier lifestyles is also a contributing factor [19]. Increased obesity is consequent with increased risk of other chronic diseases such as hypertension, stroke, diabetes mellitus, cardiovascular diseases, osteoarthritis, obstructive sleep apnea, liver diseases, and certain types of cancer [16,20].

Nevertheless, our study found that physical activity was common among the Medina population, crucial in decreasing obesity and chronic disease. Several studies have pointed out the benefits of physical activity in minimizing the risk of chronic illnesses and promoting overall health and well-being [21,22]. However, there is a need for more intensified efforts to reduce sedentary behaviors and encourage physical activity among the Saudi population [23]. The Saudi government has recognized the importance of physical activity and has implemented various policies and initiatives to promote physical activity across different sectors [24,25]. These initiatives have shown some progress, particularly regarding cultural change and increasing physical activity levels among Saudis. However, challenges, such as low female participation in sports, still need to be addressed. It is essential to focus on providing more physical activity opportunities for specific subgroups, such as individuals with physical disabilities, and improving the environmental factors influencing physical activity levels. By implementing comprehensive and coordinated strategies, Medina City can effectively decrease obesity and chronic disease through increased physical activity.

The Saudi Arabian government has prioritized healthcare services and invested heavily in the healthcare sector and facilities to improve health services and population health [8]. Technological advancement has led to digital innovations in the healthcare industry, resulting in better healthcare facilities and client satisfaction [26]. Access to healthcare is considered a challenge, and the Saudi government is continuously working to enhance healthcare access, especially in urban and rural areas, while addressing gender differences in access to healthcare services [27]. The current status of primary healthcare in Saudi Arabia has been examined, highlighting the need for investment in resources and training of a Saudi national workforce to support primary care providers, considering the increasing demand for healthcare due to a growing population and unhealthy lifestyle changes [28].

Even though prescribing medication in Saudi Arabia is subject to legal requirements [29], nearly 42.4% of Medina community uses medication not prescribed by healthcare providers. The national medicines policy in Saudi Arabia aims to shape procurement and prescribing habits [29]. In December 2017, the Saudi Ministry of Health introduced a national clinical review process for nonformulary medications, which



standardized the review and approval process under the governance of the Pharmacy and Therapeutics Committee [30]. These measures are part of ongoing efforts to improve medication safety and rational medication use in Saudi Arabia [31]. To enhance the understanding of prescribing medication in Saudi Arabia, physicians should raise awareness about medication safety culture and practices and the importance of medication adherence among patients, especially with chronic diseases [32,33]. Health practitioners, especially doctors, were also entirely trusted by the majority of the population [34] and more often are the most trusted source for health information in Saudi Arabia, chosen by 87.6% of the population as their first source of information [35], followed by the pharmacist with 57.7%. However, our research revealed that MOH media outlets are the most trusted health information source.

Our study revealed a lack of interest and turnout in the pre-diagnosis examination among Medina population, which shows a lack of awareness of the importance of exploratory check-ups. However, scheduled pre-diagnosis examinations with healthcare professionals have several benefits as they allow early detection of chronic diseases, better management, prevention of complications, and positive impacts on mental health [36]. Besides that, regular exploratory check-ups can help detect severe health conditions such as hypertension, diabetes, cancer, and heart disease, which lead to better treatment outcomes and improved quality of life [37]. Additionally, health check-ups provide relevant information that leads individuals to construct behavioral changes to improve their health [38]. In order to increase awareness of the importance of exploratory check-ups, it is crucial to conduct exploratory data analysis before implementing complex statistical procedures [39]. A holistic assessment can significantly improve outcomes for individuals with continence problems, emphasizing the need for assessment and treatment to regain continence [40]. Furthermore, effective message channels, such as health information from hospital and pharmacy papers, can raise awareness about exploratory check-ups and health guidance [41]. A combination of exploratory data analysis, holistic assessments, educational interventions, and compelling message channels can help increase awareness of the importance of exploratory check-ups, which are essential in disease prevention, risk assessment, behavior change, and promoting evidence-based healthcare practices.

Moreover, our study reports a good satisfaction level across Medina population that is consonant with other studies [26,42]. The highest satisfaction ratings were

for the financial component (81%) and general satisfaction (77%), while the lowest rating was for the time spent with the doctor (68%) [26]. Another study identified that 35.6% of long-term healthcare beneficiaries reported low satisfaction with access to healthcare services. Factors such as being non-Saudi, retired males living in big cities, and paying for healthcare services in cash were associated with lower satisfaction levels [42]. These findings suggest that while there is some level of satisfaction with the healthcare system in Saudi Arabia, there are also areas for improvement, particularly regarding access to care and the time spent with healthcare providers.

#### Recomendaciones:

- Addressing obesity requires a comprehensive approach that includes promoting healthier dietary habits, increasing physical activity levels, and raising awareness about the importance of maintaining a healthy weight to combat this health issue.
- Conducting qualitative studies to explore factors influencing prescribing practices can provide valuable insights for improving medication understanding and adherence in Saudi Arabia.
- Expanding healthcare infrastructure, promoting preventive healthcare, and investing in healthcare technology and artificial intelligence solutions
- Explore the satisfactory level of Medina's population from a different and deeper perspective.

#### CONCLUSION:

This research provided valuable insights into various aspects of health, encompassing epidemiological profiles, disease prevalence, healthcare infrastructure, and access to healthcare services. The study revealed notable demographic characteristics, including a high prevalence of obesity and a considerable percentage of individuals with chronic diseases, predominantly diabetes and hypertension. Despite a generally active population, the study highlighted a lack of interest and participation in pre-diagnosis examinations, emphasizing the need for increased awareness and education regarding the importance of regular check-ups.

#### REFERENCES:

1. Al-Hanawi MK, Khan SA, Al-Borie HM: Healthcare human resource development in Saudi Arabia: emerging challenges and opportunities—

- a critical review. *Public Health Reviews*. 2019, 40:1. 10.1186/s40985-019-0112-4
2. Mansuri FA, Al-Zalabani AH, Zalat MM, Qabshawi RI: Road safety and road traffic accidents in Saudi Arabia. A systematic review of existing evidence. *Saudi Med J*. 2015, 36:418-424. 10.15537/smj.2015.4.10003
  3. Alqahtani WS, Almufareh NA, Domiaty DM, et al.: Epidemiology of cancer in Saudi Arabia thru 2010-2019: a systematic review with constrained meta-analysis. *AIMS Public Health*. 2020, 7:679-696. 10.3934/publichealth.2020053
  4. Alsahly MA, Al Otaibi RAF, Al Eissa AI, Owaidh Alilaj M: Chronic Disease Patterns and Their Relation With Age, Gender, and Number of Visits in Three Primary Care Centers of Riyadh, Saudi Arabia. *Cureus*. 2022, 14:e30283. 10.7759/cureus.30283
  5. Khoja T, Rawaf S, Qidwai W, Rawaf D, Nanji K, Hamad A: Health Care in Gulf Cooperation Council Countries: A Review of Challenges and Opportunities. *Cureus*. 2017, 9:e1586. 10.7759/cureus.1586
  6. Sebai ZA, Milaat WA, Al-Zulaibani AA: Health care services in Saudi Arabia: past, present and future. *J Family Community Med*. 2001, 8:19-23.
  7. Health Mo: National Transformation Program 2020. Saudi Arabia: Ministry of Health; 2016.
  8. Almalki M, Fitzgerald G, Clark M: Health care system in Saudi Arabia: an overview. *East Mediterr Health J*. 2011, 17:784-793. 10.26719/2011.17.10.784
  9. AlBuhairan FS, Tamim H, Al Dubayee M, et al.: Time for an Adolescent Health Surveillance System in Saudi Arabia: Findings From "Jeeluna". *J Adolesc Health*. 2015, 57:263-269. 10.1016/j.jadohealth.2015.06.009
  10. Patten CA, Albertie ML, Chamie CA, et al.: Addressing community health needs through community engagement research advisory boards. *Journal of Clinical and Translational Science*. 2019, 3:125-128. 10.1017/cts.2019.366
  11. Abdelkarim A: Integration of Location-Allocation and Accessibility Models in GIS to Improve Urban Planning for Health Services in Al-Madinah Al-Munawwarah, Saudi Arabia. *Journal of Geographic Information System*. 2019, 11:633-662. 10.4236/jgis.2019.116039
  12. Nordin MM: Keeping Communities Healthy: The Islamic Paradigm. *International Journal of Human and Health Sciences (IJHHS)*. 2018, 2:49. 10.31344/ijhhs.v2i2.26
  13. Gurajala S: Healthcare System in the Kingdom of Saudi Arabia: An Expat Doctor's Perspective. *Cureus*. 2023. 10.7759/cureus.38806
  14. Saeed A, Bin Saeed A, Alahmri FA: Saudi Arabia Health Systems Challenging and Future Transformation With Artificial Intelligence. *Cureus*. 2023. 10.7759/cureus.37826
  15. Alshammari AR, Alshammari R, Alshammari M: Improving Healthcare system in Saudi Arabia from Healthcare aspect using qualitative methods. *Research Square Platform LLC*; 2023.
  16. M Alqarni SS: A Review of Prevalence of Obesity in Saudi Arabia. *Journal of Obesity & Eating Disorders*. 2016, 02. 10.21767/2471-8203.100025
  17. Salem V, AlHusseini N, Abdul Razack HI, Naoum A, Sims OT, Alqahtani SA: Prevalence, risk factors, and interventions for obesity in Saudi Arabia: A systematic review. *Obes Rev*. 2022, 23:e13448. 10.1111/obr.13448
  18. Alsulami S, Baig M, Ahmad T, et al.: Obesity prevalence, physical activity, and dietary practices among adults in Saudi Arabia. *Front Public Health*. 2023, 11:1124051. 10.3389/fpubh.2023.1124051
  19. Althumiri NA, Basyouni MH, Almousa N, et al.: Obesity in Saudi Arabia in 2020: Prevalence, Distribution, and Its Current Association with Various Health Conditions. *Healthcare*. 2021, 9:311. 10.3390/healthcare9030311
  20. Al-Nbaheen MS: Impact of weight loss predictors in severe-morbid obesity patients in the Saudi population. *Saudi J Biol Sci*. 2020, 27:2509-2513. 10.1016/j.sjbs.2020.03.015
  21. Almarzooqi MA, Alsukait RF, Aljuraiban GS, et al.: Comprehensive assessment of physical activity policies and initiatives in Saudi Arabia 2016–2022. *Frontiers in Public Health*. 2023, 11. 10.3389/fpubh.2023.1236287
  22. Albuljulaya N, Stevinson C, Piggan J: Physical activity policy in Saudi Arabia: analysis of progress and challenges. *International Journal of Sport Policy and Politics*. 2023:1-16. 10.1080/19406940.2023.2228812
  23. Alahmed Z, Lobelo F: Physical activity promotion in Saudi Arabia: A critical role for clinicians and the health care system. *Journal of Epidemiology and Global Health*. 2017, 7:S7. 10.1016/j.jegh.2017.10.005
  24. Al-Hazzaa HM, Almarzooqi MA: Descriptive Analysis of Physical Activity Initiatives for Health Promotion in Saudi Arabia. *Frontiers in Public Health*. 2018, 6. 10.3389/fpubh.2018.00329
  25. Zahra A, Hassan MS, Park J-H, Hassan S-U-N, Parveen N: Role of Environmental Quality of Life in Physical Activity Status of Individuals with and without Physical Disabilities in Saudi Arabia.

- International Journal of Environmental Research and Public Health. 2022, 19:4228. 10.3390/ijerph19074228
26. Anazi LMA: Client Satisfaction in Healthcare Environment in Saudi Arabia – A Qualitative Review. Saudi Journal of Nursing and Health Care. 2023.
  27. Habib S, Khan MA, Hamadneh NN: Gender Sensitivity in Accessing Healthcare Services: Evidence from Saudi Arabia. Sustainability. 2022, 14:14690. 10.3390/su142214690
  28. Caswell A, Kenkre J: Primary Healthcare in Saudi Arabia: An Evaluation of Emergent Health Trends. Global Journal on Quality and Safety in Healthcare. 2021, 4:96-104. 10.36401/jqsh-20-33
  29. Yousef Ahmed A, Mohamed SI, Randa MA-S, Ghada MA, Aliyah SA: Safety Culture of Physicians' Medication in Saudi Arabia. Journal of Pharmaceutical Negative Results. 2022:1201-1210. 10.47750/pnr.2022.13.s06.158
  30. Al-Worafi YM: Chapter 30 - Drug safety in Saudi Arabia. Drug Safety in Developing Countries. Al-Worafi Y (ed): Academic Press; 2020. 407-417. <https://doi.org/10.1016/B978-0-12-819837-7.00030-3>
  31. Yousef Ahmed A, Mohamed SI, Randa MA-S, Ghada MA, Aliyah SA: Perception of Physician about Medication Safety in Saudi Arabia. Journal of Pharmaceutical Negative Results. 2022:1211-1223. 10.47750/pnr.2022.13.s06.159
  32. Alzahrani RO, Alqahtani RM, Alharbi SM: Evaluation of knowledge and practice of primary health care physicians regarding medication prescribing during pregnancy in Jeddah, Saudi Arabia 2021. World Family Medicine Journal /Middle East Journal of Family Medicine. 2022, 20. 10.5742/mewfm.2022.9525031
  33. Alosaimi K, Alwafi H, Alhindi Y, et al.: Medication Adherence among Patients with Chronic Diseases in Saudi Arabia. International Journal of Environmental Research and Public Health. 2022, 19:10053. 10.3390/ijerph191610053
  34. Al-Zalabani AH: Online sources of health statistics in Saudi Arabia. Saudi Med J. 2011, 32:9-14.
  35. Alduraywish SA, Altamimi LA, Aldhuwayhi RA, et al.: Sources of Health Information and Their Impacts on Medical Knowledge Perception Among the Saudi Arabian Population: Cross-Sectional Study. Journal of Medical Internet Research. 2020, 22:e14414. 10.2196/14414
  36. Diamandis DC, Shirazi A, Adams C, et al.: Why scheduled checkups put patients' health at risk. Authorea, Inc.; 2023.
  37. Dennis ML, Scott CK: Four-year outcomes from the Early Re-Intervention (ERI) experiment using Recovery Management Checkups (RMCs). Drug and Alcohol Dependence. 2012, 121:10-17. 10.1016/j.drugalcdep.2011.07.026
  38. Dennis M, Scott CK, Funk R: An experimental evaluation of recovery management checkups (RMC) for people with chronic substance use disorders. Evaluation and Program Planning. 2003, 26:339-352. 10.1016/s0149-7189(03)00037-5
  39. Jeffers JNR: The Importance of Exploratory Data Analysis before the Use of Sophisticated Procedures. Biometrics. 1994, 50:881-883. 10.2307/2532803
  40. Nazarko L: Continence series 4: the importance of assessment. British Journal of Healthcare Assistants. 2013, 7:118-124. 10.12968/bjha.2013.7.3.118
  41. Lee E, Harada K, Nakamura Y: Effective Message Channels for Awareness of Health Checkups and Health Guidance. Journal of Japan Society of Sports Industry. 2010, 20:65-72. 10.5997/sposun.20.65
  42. Aljarallah NA, Almuqbil M, Alshehri S, et al.: Satisfaction of patients with health care services in tertiary care facilities of Riyadh, Saudi Arabia: A cross-sectional approach. Frontiers in Public Health. 2023, 10. 10.3389/fpubh.2022.1077147