

Effect of Status of Laboratory Services Quality and Capacity in Primary Healthcare Facilities in Makkah City, Saudi Arabia 2022

Abdulrahman Jubran Alkhubrani¹, Abdulrahman Ali A Bashamkh², Wael Abdullah alghamdi³, Abdulelah Mohammad Alghamdi⁴, Awad Obaid Hezam Alotaibi⁵, Abdulrahman Hassan Otayn⁶, Naif Mohammed Hakami⁷, Hissah Mohammed Alhammadi⁸, Muteb Khaled Aldhwayan⁹, Sultan Reda Alenazy¹⁰, Mohamed Saud Ali Bin Shalaan¹¹

Abstract

Background: Accurate disease diagnosis relies on a well-organized and reliable laboratory system. This study assesses the quality of laboratory services in Saudi Arabia. In the past two decades (2000–2020), Saudi Arabia has made significant efforts to strengthen its health system as part of the then health sector reforms, coupled with interventions for health system strengthening following the World Health Organization (WHO) guidance. The efforts included the construction and rehabilitation of health infrastructure at all levels of health services delivery, procurement of equipment, and capacity building of health personnel. The efforts have enabled improvement in diagnostic availability in the primary health care (PHC) facilities. For example, a recent analysis has shown that diagnostic availability in dispensaries and health centres in Saudi Arabia, have increased by 6 percentage points. An integral part of this service is the laboratory services. While government Hospitals performances are focused its laboratory service has been neglected in developing countries. A routine checkup is a general physical evaluation and is not performed for a specific injury, illness or condition. Aim of the study: To assess the effect of Status of laboratory services quality and capacity in primary healthcare facilities in Makkah City, Saudi Arabia 2022. Methods: A cross-sectional descriptive study was conducted on laboratory services on primary healthcare in Makkah at Saudi Arabia. The study employed a self-administered questionnaire to collect data from patients attending to primary healthcare in Makkah city. Results: most of the participants (32.0%) were in the age group 50-60 years, majority of them were males (54.0%) also regarding Nationality the majority of participant are Saudi were (72.0%), regarding the Marital state the majority of participant married were (72.0%), regarding Employment status the majority of participant are Employed were (68.0%) . Conclusion The laboratory services quality and capacity in the PHC facilities is still low in Saudi Arabia, characterized by a

¹ Medical Laboratory, Regional Laboratory Mecca, Saudi Arabia.

² Laboratory technician, King Fahad General Hospital in Jeddah, Saudi Arabia.

³ Laboratory specialist, King Fahad Hospital at Albaha, Saudi Arabia.

⁴ Medical laboratory specialist, Prince Mishari bin Saud General Hospital, Saudi Arabia.

⁵ Lab technician, Rawida General Hospital, Saudi Arabia.

⁶ Laboratory specialists, Riyadh First Health Cluster- AlQuwayyah General Hospital, Saudi Arabia.

⁷ Medical Laboratory Specialist, King Khalid Hospital in Al Kharj, Saudi Arabia.

⁸ Lab specialist, Dawadmi general Hospital, Saudi Arabia.

⁹ Laboratory, Ministry of health, Saudi Arabia.

¹⁰ Laboratory specialist, Central Blood bank - northern border region, Saudi Arabia.

¹¹ Medical laboratory specialist, Prince Sultan Military Medical City In Riyadh, Saudi Arabia.

critical shortage of qualified laboratory personnel especially in public facilities that are based in rural areas. There is a need to further strengthen laboratory services in PHC facilities to ensure quality of laboratory test results generated since even in the laboratories that were found to be working, more than half did not conduct Internal Quality control and or participating in External Quality Assessment.

Key words: *Effect of, effected, laboratory, quality, capacity, primary healthcare, facilities, Makah, Saudi Arabia.*

Introduction

Access to laboratory services at the district level in Saudi Arabia has been shown to be inequitable in the sense that in some areas, people have longer travel time to access a nearby facility for the services (1). An analysis of data from 10 countries including Saudi Arabia, has shown that only 199 (2%) of the facilities investigated in those countries had all of the diagnostics services (2). Also, laboratories in PHC facilities have been reported to face a number of challenges in supporting care and treatment services for HIV services which include “number of qualified personnel, staff training on the national guidelines, laboratory diagnostic tools and coordination” (3). In a study conducted in 2014, basic diagnostic equipment for HIV and diabetes were observed more frequently in hospitals than in health centres and dispensaries (4). Strengthening laboratory services in PHC facilities will help to capacitate Tanzanian PHC system to tackle the challenge of Non-Communicable Diseases (NCDs) (5). In Ghana, improvement of POCT diagnostic services in PHC facilities have been recommended as part of improving maternal health services (6)

Importance of a strong PHC system has been further demonstrated by the ongoing coronavirus disease of 2019 (COVID-19) pandemic in which its effects have shown clearly the need for a strong PHC as a means to uphold equity and strengthen capacity to respond to emergencies (7). Laboratory services in PHC facilities have been shown to enhance performance of PHC facilities (8). Also, the framework produced by the Lancet Global Health Commission for High Quality Health Systems in Sustainable Development Goals Era, shows that improving laboratory services in PHC facilities is an essential element for ensuring “competent care and systems” which is one of the components of processes of care in the framework (7,8). Answers to the aforementioned questions are consequential to the patient’s expectations (demand) and on the services provided (supply) in the global health industry, regardless of a country’s level of income (9). The Saudi Ministry of Health (MOH) provides around over 60% of the Laboratory Medicine Services on government hospitals Care Services HealthCare services while the rest are shared among other government agencies (for example, hospitals operated by other ministries including the ministry of education, defense, national guard and security forces) as well as the private sector medical institutes(10). Around 80% of the Laboratory Medicine healthcare services provided by MOH and other governmental sectors is provided free of charge to the eligible service beneficiaries (11). The Kingdom has made huge positive developments in the infrastructure and organization of its Laboratory Medicine Services , which was positively reflected on the life of its residents, for example; the strategic step of the national children immunization program against infectious diseases, another example is the national newborn screening program for inborn errors of metabolism.(12)The country also introduced the Primary Health Care (PHC) concept as a basic healthcare delivery system in 1978. All of these developments in the Laboratory Medicine services has positively changed the health map of KSA (13)

Quality laboratory testing is crucial to confirm clinical diagnoses, conduct accurate disease surveillance, and direct public health care policy. But, in this time of crisis, the current laboratory and health care infrastructures are insufficient to meet these needs and

perhaps have been ignored. To date, the vast majority of financial resources from funding organizations have been focused on disease prevention and provision of care, whereas relatively little funding has been allocated to build laboratory capability (14,15).

Literature Review

With the increasing global aging population (16) and the move toward urbanization (17), the Kingdom of Saudi Arabia launched the NTP with the aim of improving the quality and efficacy of the Utilization of Laboratory Medicine Services on Government Hospitals Care Services(18). One of the major initiatives of the NTP was improving the primary healthcare services. Previously, the majority of studies on PHCs within the KSA were cross-sectional studies that focused on patient satisfaction surveys, outbreak(19).

The study on US hospitals showed that clinical technology inclusive of laboratory technology drives the hospital clinical quality and financial performance (20). However, in government hospitals care was not found to be a significant predictor of overall government hospitals performance in multivariate analysis, which was unexpected. Further, the large confidence interval indicates that some precautions are needed in interpreting the absolute effect in government hospitals on hospitals performance.(21) These findings suggest in government hospitals could be a strong trigger to improve the PHC performance, but alone it is not an enough condition to improve the PHC performance. In the Saudi Arabia context, patient could access public laboratory facility only on referral from medical doctor (22). Thus, the laboratory can help the physician in better decision-making, which could lead to better PHC performance. The literature had suggested that laboratory results could contribute up to two-third of medical decision-making (23). Further, the literature had identified various reasons that could disrupt physician role in PHC like lack of resources and medical doctor motivation (24).

Studies in Saudi Arabia majority of clinicians were satisfied with the laboratory services. This finding is not far from the studies conducted in eastern Saudi Arabia (25) and southwest Ethiopia (26), Tanzania, the finding appeared higher than studies conducted in southern Ethiopia, public hospitals of Ethiopia (27), Gondar, Addis Ababa and Nekemte, Ethiopia, and a maternity hospital in Saudi Arabia (28). However, those studies covered only hospitals, not primary health centres, or only physicians, not all clinicians. On the other hand, the finding is lower than the findings of the Q-Probes studies performed in the USA (29). The discrepancy with these studies reflects the better service quality and user experiences in such resource-rich settings with more advanced diagnostic facilities.

In the study, the strong positive correlation was obtained between laboratory service-related parameters and overall hospital performance (composite of patient results, staff and work system result, hospital efficiency and effectiveness result and flexibility performance) for Jordanian Hospitals(27). The study on US hospitals showed that clinical technology inclusive of laboratory technology drives the hospital clinical quality and financial performance (22).

WHO Guide Laboratory users' guidebook is important to communicate relevant information and instructions to users . In the study, the helpfulness of the handbook was the lowest-rated aspect (3.3), and most clinicians lacked a handbook (75.1%). This finding is consistent with studies where most physicians were dissatisfied with the availability or ease of understanding the handbook (30).

Rationale

Previous studies have rarely explored health care works in Laboratory Medicine Services on government hospitals Care' satisfaction in relation to objective measures of laboratory practice according to the researcher's knowledge there was no much research about Factors Influencing the Utilization of laboratory services on government hospitals

Care Services in Makkah al-mokarramah City, the laboratory services could be investigated from the government hospitals perspective, such as the availability of ordered tests, courier services, availability of a helpful user guidebook, courtesy and respect, laboratory report format, turnaround time of results, notification of critical results, and reliability of results. Further, the study is not performed temporally but only longitudinally. Another possible weakness is have missed other laboratory-related important parameters that may play an important role in government hospitals Care Services performance, also previous studies in Saudi Arabia have shown that health care worker and physicians were most dissatisfied with the provision of timely results, advisory services and notification of panic values, including the behavioral manners of providers. However, many argue the validity of user satisfaction as a measure of quality, particularly technical aspects, as users could be more sensitive to behavioral aspects.

Aim of the study:

To assess the effect of Status of laboratory services quality and capacity in primary healthcare facilities in Makkah City, Saudi Arabia 2022.

Methodology:

Study design:

This study is descriptive cross-sectional study was conducted among 300 participants of the was conducted on laboratory services on government hospitals in Makkah al-mokarramah 2022 Saudi Arabia, was conducted from December to January 2022 in Makkah in primary healthcare under supervision of Directorate of in primary healthcare of Makkah Al-Mokarramah in Saudi Arabia..

Study Area

The study has been carried out in the city of Makkah Al-Mokarramah Makkah is the holiest spot on Earth. It is the birthplace of the Prophet Mohammad and the principal place of the pilgrims to perform Umrah and Hajj. It is located in the western area in Kingdom of Saudi Arabia and called the Holy Capital. Contains a population around 2 million. This study was conducted in primary healthcare in Makkah, Saudi Arabia. During the December to January 2022, participants were primary healthcare in Makkah, and it reflects a diversified demographic profile with a considerable portion of the population comes from rural descent, while others come from an urban one. This difference translates into biological, socioeconomic and lifestyle differences in the Makkah population.

Study Population

The study has been conducted regarding evaluate factors effecting the Utilization of Laboratory Medicine Services in primary healthcare Care Services in Makkah City, Saudi Arabia in 2022 among patients attending both Laboratory Medicine Services in primary healthcare 2022.

Selection criteria:

Inclusion criteria

- Clinicians and nursing of the randomly selected primary health care.
- Using laboratory services during the study period were the study population.
- Attending in primary healthcare.
- Resident in Makkah province.
- Sound cognitive abilities
- All nationalities
- Both males and females.

Exclusion criteria :

- Clinicians and nurses who did not voluntarily participate were excluded
- Patients with severe cognitive impairment such as dementia or delirium.
- Patients unwilling to give written consent to participate.

Sample size

The sample size has been calculated by applying Raosoft sample size calculator based on (The margin of error: 5%, Confidence level: 95%, and the response distribution was considered to be 20%) accordingly the Sample size is 300 of Saudi Population attending in PHC and adding 10 more to decrease margin of error. After adding 5% oversampling, the minimum calculated sample has been 300. Computer generated simple random sampling technique was used to select the study participants.

Sampling technique:

Systematic random sampling technique is adopted. After that, by using random number generator, then simple random sampling technique has been applied to select the participant. Also, convenience sampling technique will be utilized to select the participants in the study. By using systematic sampling random as dividing the total clinicians and nurse on work at clinical units by the required sample size; (300).

Data collection tool

The study employed a self-administered questionnaire to collect data from patients attending in primary healthcare (or outpatient of the in primary healthcare) in Makah city. The questionnaire was designed to collect data on a number of variables related both to health services users and providers. Descriptive statistics socio-demographic and medical data were used to determine the significant variables which may influence the utilization of this service.

Data collection technique:

Researcher has been visiting the Outpatient Clinics in primary healthcare Makah City, Saudi Arabia in 2022 after getting the approval from the ministries of health . The researcher has been obtained permission from participants. After the arrival of the participants has been explained the purpose of the study to all participants attending .

Data entry and analysis:

The data were coded and introduced to the Statistical Package of Social Sciences (SPSS, version 24). The data were analyzed to present the findings in descriptive and inferential statistics. The descriptive statistics include frequencies and percentages for categorical variables, while means, median and standard deviations were used to summarize numerical data. The significant associations between demographic and background variables were detected at < 0.05 significance level.

Pilot study:

A pilot study has been conducted in the same sector due to the similarity to the target group using the same questionnaire to test the methodology of the study. As a feedback, the questionnaire has been clear and no defect has been detected in the methodology.

Ethical considerations:

Permission from the Directorate of health , verbal consents from all participants in the questionnaire were obtained. All information was kept confidential, and results will be submitted to the department as feedback. The researcher described the aim and objectives of the study for the residents. No names were required to assure confidentiality of data, and all information was kept confidential only for this study's purposes.

Budget: Self-funded

Results

Table 1 Table 1 Distribution of socio-demographic data in our study in Makah City, Saudi Arabia. (n=300)

| | N | % |
|--------------------------|-----|----|
| Age | | |
| 30-40 | 96 | 32 |
| 40-50 | 45 | 15 |
| 50-60 | 96 | 32 |
| <60 | 63 | 21 |
| Gender | | |
| Female | 138 | 46 |
| Male | 162 | 54 |
| Nationality | | |
| Non-Saudi | 63 | 21 |
| Saudi | 237 | 79 |
| Marital state | | |
| Married | 216 | 72 |
| Unmarried | 84 | 28 |
| Employment status | | |
| Employed | 204 | 68 |
| Unemployed | 96 | 32 |
| Monthly income | | |
| Less than 5000 | 93 | 31 |
| 5,000-10,000 | 84 | 28 |
| 10,000-15,000 | 72 | 24 |
| More than 15,000 | 51 | 17 |

Table 1 shows that most of the participants (32.0%) were in the age group 50-60 years follow by the (32.0%) were the age group 30-40 years, the majority of them were males (54.0%) while female(46.0%), also regarding Nationality the majority of participant are Saudi were(72.0%) while Non- Saudi were(21.0%). Regarding the Marital state the majority of participant married were (72.0%). While unmarried were(28.0%), regarding Employment status the majority of participant are Employed were(68.0%) while Unemployed were(32.0%). Regarding the Monthly income the majority of participant less than 5,000 were (31.0%) while from(5,000-10,000) were(24.0%) .

Table 2 Distribution of socio-demographic data factor effected to Utilization of Laboratory Services on Government Hospitals Care our participant .

| | N | % |
|------------------------------------|-----|----|
| Registration with Hospitals (HC) | | |
| Yes | 228 | 76 |
| No | 72 | 24 |
| Health status | | |
| Good | 138 | 46 |
| Poor | 162 | 54 |
| Clinical unit | | |
| Maternal | 102 | 34 |
| Chronic | 111 | 37 |
| Outpatient | 66 | 22 |
| Emergency | 21 | 7 |
| Profession category | | |
| Nurse | 243 | 81 |
| Specialist | 57 | 19 |
| Laboratory technician availability | | |
| Yes | 255 | 85 |
| No | 45 | 15 |
| Work experience | | |
| Less than 5 years | 111 | 37 |
| 5–10 years | 117 | 39 |
| More than 10 years | 72 | 24 |

Table 2 shows that most of the participants were (76.0%) registration with Hospitals Health Care follow by the not registration in Hospitals Health Care were(24.0%), also regarding Health status the majority of participant are poor health stat were(54.0%) while good were(46.0%). Regarding the Clinical unit the majority of participants Chronic were (37.0%). While Maternal were(43.0%), regarding Profession category the majority of participant are nurse were(81.0%) while Specialist were(19.0%), regarding the Laboratory technician availability the majority of participant answer Yes than were (85.0%) while No were(15.0%), regarding the Work experience the majority of participant 5-10 years were (39.0%) while less than 5 years were(37.0%) .

Table (3): distribution of the overall satisfaction level with laboratory services according to laboratories performance in our study on Government Hospitals .

| Satisfaction items | Very/Dissatisfied | | Neutral | | Very Satisfied | | % Of satisfaction | Chi square | |
|-------------------------------------------------------|-------------------|----|---------|----|----------------|----|-------------------|----------------|---------|
| | N | % | N | % | N | % | | X ² | P-value |
| Location of the laboratory in the hospitals | 54 | 18 | 21 | 7 | 225 | 75 | 85.67 | 239.820 | 0.000 |
| Staff in laboratory feeling courtesy and friendliness | 36 | 12 | 27 | 9 | 237 | 79 | 89.00 | 281.940 | 0.000 |
| Internal organization and procedures | 27 | 9 | 30 | 10 | 243 | 81 | 90.67 | 306.780 | 0.000 |
| Availability of health information | 30 | 10 | 24 | 8 | 246 | 82 | 90.67 | 319.920 | 0.000 |
| Working hours | 39 | 13 | 18 | 6 | 243 | 81 | 89.33 | 308.940 | 0.000 |
| Cleanliness and tidiness of the facility | 21 | 7 | 33 | 11 | 246 | 82 | 91.67 | 320.460 | 0.000 |
| Reputation of the health facility | 36 | 12 | 39 | 13 | 225 | 75 | 87.67 | 234.420 | 0.000 |
| Availability of specialized doctors | 57 | 19 | 36 | 12 | 207 | 69 | 83.33 | 173.940 | 0.000 |
| Waiting time | 39 | 13 | 33 | 11 | 228 | 76 | 87.67 | 245.940 | 0.000 |
| Availability of ancillary services | 81 | 27 | 39 | 13 | 180 | 60 | 77.67 | 104.820 | 0.000 |

Table (3) Shows the overall satisfaction level with laboratory services according to laboratories performance in our study in Government Hospitals patients. Regarding the satisfaction with location of the health facility, were significantly associated with the very satisfied were(75.0%) also % of satisfaction were(85.67%) were $P < 0.000$ and X^2 (239.820) followed by Very/Dissatisfied were(18.0%) , regarding the satisfaction with Staff in laboratory feeling courtesy and friendliness were significantly associated with the very satisfied were(79.0%) also% of satisfaction were(89.00%) were $P < 0.000$ and X^2 (281.940) followed by Very/Dissatisfied were(12.0%), Regarding the satisfaction with Internal organization and procedures were significantly associated with the very satisfied were(81.0%) also % of satisfaction were(90.67%) were $P < 0.000$ and X^2 (306.780) but neutral were (10.0%), regarding the satisfaction with Availability of health information, were significantly associated with the very satisfied were(82.0%) followed by Very/Dissatisfied were(10.0%) also % of satisfaction were(90.67%) were $P < 0.001$ and X^2 (319.67), regarding the satisfaction with Working hours were significantly associated with the very satisfied were(81.0%) also % of satisfaction were(89.00%) were $P < 0.000$ and X^2 (308.940). Regarding the satisfaction with Cleanliness and tidiness of the facility were significantly associated with the very satisfied were(82.0%) also % of satisfaction were(91.67%) were $P < 0.000$ and X^2 (320.460), regarding the satisfaction with Reputation of the health facility, were significantly associated with the very satisfied were(75.0%) also % of satisfaction were(87.67%) were $P < 0.001$ and X^2 (234.420), regarding the satisfaction with Availability of specialized doctors were significantly associated with the very satisfied were(69.0%) also % of satisfaction were(83.33%) were $P < 0.000$ and X^2 (173.940), regarding the satisfaction with Waiting time were significantly associated with the very satisfied were(76.0%) also % of satisfaction were(87.67%) were $P < 0.000$ and X^2 (245.940), regarding the satisfaction with Availability of ancillary services were significantly associated with the very satisfied were(60.0%) also % of satisfaction were(77.67%) were $P < 0.001$ and X^2 (104.820).

Table 4 Distribution of the Frequency of the patient's with Satisfaction .

| | | Total Satisfaction | | Score | |
|------------------|----------------|--------------------|-----|--------|--------------|
| | | N | % | Range | Mean+SD |
| Satisfactory | | 246 | 82 | 18-30. | 22.157+5.170 |
| Non satisfactory | | 54 | 18 | | |
| Total | | 300 | 100 | | |
| Chi-square | X ² | 121.603 | | | |
| | P-value | <0.001* | | | |

Table 4 Regarding distribution of the patient's with satisfaction and have a significant relation between the satisfaction and frequency show the majority of participant had Satisfied were(82.0%) while Non satisfied were(18.0%) but total (100%), while Range were(18-30) while Mean + SD(22.157+5.170), while P-value <0.001 and X² 121.603, participant toward Satisfaction study results

Figure 1 distribution of the Frequency of the patient's with total Satisfaction

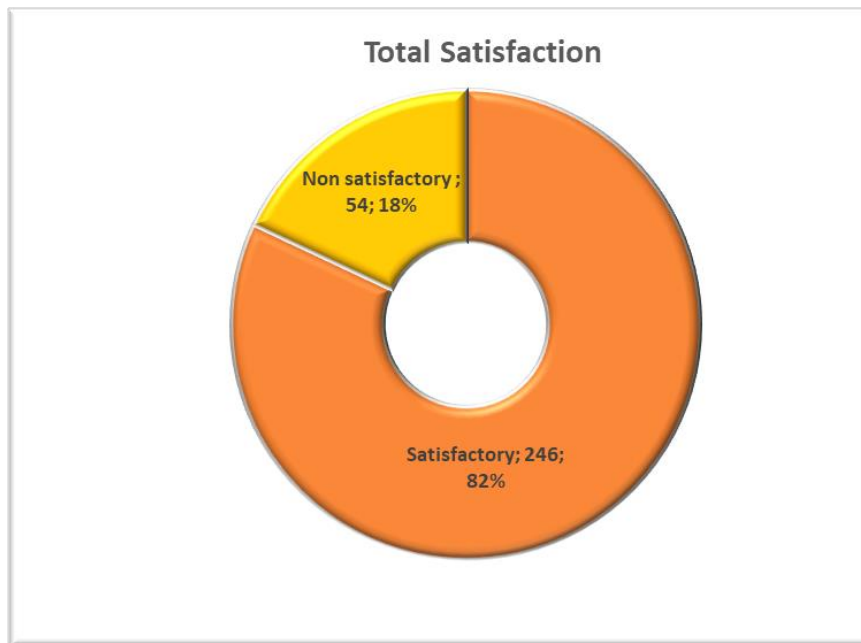


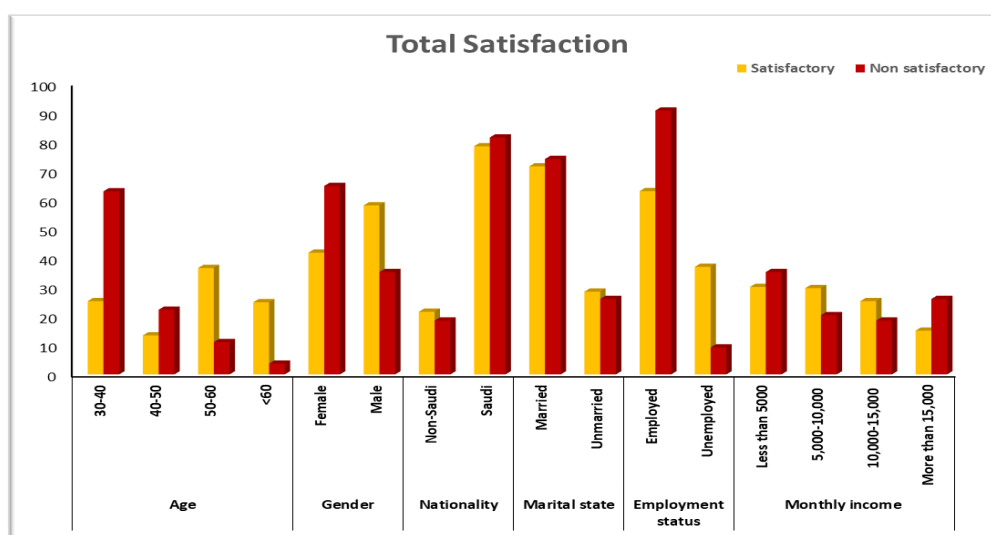
Table 5 Distribution of the relationship of the Satisfaction level and non-satisfactory with laboratory services in Government Hospitals Care patients and the demographic data .

| | | Total | | Satisfactory | | Non satisfactory | | Chi-square | |
|-------------|-----------|-------|----|--------------|-------|------------------|-------|----------------|---------|
| | | N | % | N | % | N | % | X ² | P-value |
| Age | 30-40 | 96 | 32 | 62 | 25.20 | 34 | 62.96 | 40.380 | <0.001* |
| | 40-50 | 45 | 15 | 33 | 13.41 | 12 | 22.22 | | |
| | 50-60 | 96 | 32 | 90 | 36.59 | 6 | 11.11 | | |
| | <60 | 63 | 21 | 61 | 24.80 | 2 | 3.70 | | |
| Gender | Female | 138 | 46 | 103 | 41.87 | 35 | 64.81 | 9.385 | 0.002* |
| | Male | 162 | 54 | 143 | 58.13 | 19 | 35.19 | | |
| Nationality | Non-Saudi | 63 | 21 | 53 | 21.54 | 10 | 18.52 | 0.244 | 0.621 |

| | | | | | | | | | |
|-------------------|------------------|-----|----|-----|-------|----|-------|--------|---------|
| | Saudi | 237 | 79 | 193 | 78.46 | 44 | 81.48 | | |
| Marital state | Married | 216 | 72 | 176 | 71.54 | 40 | 74.07 | 0.141 | 0.708 |
| | Unmarried | 84 | 28 | 70 | 28.46 | 14 | 25.93 | | |
| Employment status | Employed | 204 | 68 | 155 | 63.01 | 49 | 90.74 | 15.651 | <0.001* |
| | Unemployed | 96 | 32 | 91 | 36.99 | 5 | 9.26 | | |
| Monthly income | Less than 5000 | 93 | 31 | 74 | 30.08 | 19 | 35.19 | 5.652 | 0.130 |
| | 5,000-10,000 | 84 | 28 | 73 | 29.67 | 11 | 20.37 | | |
| | 10,000-15,000 | 72 | 24 | 62 | 25.20 | 10 | 18.52 | | |
| | More than 15,000 | 51 | 17 | 37 | 15.04 | 14 | 25.93 | | |

Table (5) show the relationship of the Satisfaction level and non-satisfactory with laboratory services in government Hospitals Care patients and the demographic data, regarding age a significant relation in the non-satisfactory increase in (30-40) years were (62.96), follow by 50-60 age in satisfactory were (36.0%) while P-value=0.001, $X^2= 40.380$, regarding gender a significant relation in the non-satisfactory increase in female were (64.81), follow by male in satisfactory were (58.13%) while P-value=0.002, $X^2= 9.385$, regarding Nationality no significant relation in the non-satisfactory increase in Saudi were (81.48%), follow by satisfactory were (78.46%) while P-value=0.621, $X^2= 0.244$, regarding Marital state no significant relation in the non-satisfactory increase in Married were (74.07%), follow by satisfactory were (71.54%) while P-value=0.708, $X^2= 0.141$. regarding Employment status a significant relation in the non-satisfactory increase in Employed were (90.74%), follow by satisfactory were (63.01%) while P-value=0.001, $X^2= 15.651$, regarding Monthly income no significant relation in the non-satisfactory increase in Less than 5000 were (35.19%), follow by satisfactory were (30.08%) while P-value=0.130, $X^2= 5.652$

Figure 2 Distribution of the relationship of the Satisfaction level and non-satisfactory with laboratory services in Government Hospitals Care patients and the demographic data .



Discussion

government hospitals Care Services is an important health care facility in all areas, but the approach to ignore laboratory in primary healthcare Services facility may not be

appropriate to maximize the government hospitals Care Services performance. total of (300) participated in the study, the researcher selected the participated from Public Primary Health Care center in Makah, the study has been conducted regarding Factors Effecting the Utilization of Laboratory Medicine Services on in primary healthcare Care Services in Makah al-mokarramah, among patients that attending in the public government hospitals in Makah City. One of the most important characteristics of Makah is its location, in our study showed that the most of the participants (32.0%) were in the age group 50-60 years follow by the (32.0%) were the age group 30-40 years, the majority of them were males (54.0%) while female(46.0%), also regarding Nationality the majority of participant are Saudi were(72.0%) while Non- Saudi were(21.0%). Regarding the Marital state the majority of participant married were (72.0%). While unmarried were (28.0%), regarding Employment status the majority of participant are Employed were (68.0%) while Unemployed were (32.0%). Regarding the Monthly income the majority of participant less than 5,000 were (31.0%) while from (5,000-10,000) were(24.0%) . .(see table 1)

In similar study the (2020) found The level of laboratory service in primary healthcare and number of OPD in government hospitals visits per day is positive, the strong positive correlation was obtained between laboratory service-related parameters and overall hospital performance (composite of patient results, staff and work system result, hospital efficiency and effectiveness result and flexibility performance) for Jordanian Hospitals' (22). In laboratory service, customers' perspective, including the clinicians' and nurses ones, has increasingly become an important tool to identify opportunities for quality improvement. Regarding relationship of the Satisfaction level and non-satisfactory with laboratory services in Government Hospitals Care patients and the demographic data . show the relationship of the Satisfaction level and non-satisfactory with laboratory services in primary healthcare Care patients and the demographic data, regarding age a significant relation in the non-satisfactory increase in (30-40) years were (62.96), follow by 50-60 age in satisfactory were (36.0%) while P-value=0.001, $\chi^2= 40.380$, regarding gender a significant relation in the non- satisfactory increase in female were (64.81), follow by male in satisfactory were (58.13%) while P-value=0.002, $\chi^2= 9.385$, regarding Nationality no significant relation in the non- satisfactory increase in Saudi were (81.48%), follow by satisfactory were (78.46%) while P-value=0.621, $\chi^2= 0.244$, regarding Marital state no significant relation in the non- satisfactory increase in Married were (74.07%), follow by satisfactory were (71.54%) while P-value=0.708, $\chi^2= 0.141$. regarding Employment status a significant relation in the non- satisfactory increase in Employed were (90.74%), follow by satisfactory were (63.01%) while P-value=0.001, $\chi^2= 15.651$, regarding Monthly income no significant relation in the non- satisfactory increase in Less than 5000 were (35.19%), follow by satisfactory were (30.08%) while P-value=0.130, $\chi^2= 5.652$ (See Table 4,5)

Almatrafi. et al (2018) the finding appeared higher than studies conducted in southern Ethiopia (52.9%), public hospitals of Ethiopia (55.0%).(28), Ethiopia (51.3%-62.8%) , and a maternity hospital in Saudi Arabia (2.7) (2) . However, those studies covered only hospitals, not primary health centres, or only physicians, not all clinicians. On the other hand, the finding is lower than the findings of the Q-Probes studies performed in the USA (4.1–4.2) (29). The discrepancy with these studies reflects the better service quality and user experiences in such resource-rich settings with more advanced diagnostic facilities.

Regarding the relationship of the total Satisfaction level with laboratory services in primary health care patients and the demographic data . The study on US hospitals showed that clinical technology inclusive of laboratory technology drives the in primary healthcare clinical quality and financial performance (30). However, the level of laboratory service in PHC was not found to be a significant predictor of overall PHC performance in multivariate analysis, which was unexpected. That some precautions are needed in interpreting the absolute effect of the level of laboratory service (31) in PHC on PHC performance . These findings suggest that The level of laboratory service in PHC could be a strong trigger to

improve the PHC performance, but alone it is not an enough condition to improve the PHC performance. In the Indian context, patient could access public laboratory facility only on referral from medical doctor (30) (See Figure1,2)

Conclusion

The study concludes that laboratory services could play an important role in maximizing the government hospitals Care Services performance. Higher level laboratory service in government hospitals Care Services could help in getting more visits in the in primary healthcare Services. The training of existing laboratory techniques could be a cost-effective approach in resource-constrained settings to maximize the returns from the existing medical workforce in government hospitals Care Services. Finally, study found that government hospitals Care Services with lower population coverage could benefit from higher level laboratory service as compared to other government hospitals Care Services in enhancing their performance in terms of number of government hospitals Care Services visits per day.

References:

1. Yadav, H., Shah, D., Sayed, S., Horton, S., & Schroeder, L. F. (2021). Availability of essential diagnostics in ten low-income and middle-income countries: results from national health facility surveys. *The Lancet Global Health*, 9(11), e1553-e1560.
2. Kinyenje, E., Ngowi, R. R., Msigwa, Y. S., Hokororo, J. C., Yahya, T. A., German, C. C., ... & Eliakimu, E. S. (2022). Contribution of quality improvement initiative in strengthening laboratory services in Primary Healthcare Facilities in Tanzania: findings from 2017/2018 Star Rating Assessment. *medRxiv*, 2022-12.
3. Darcy, N. M., Somi, G., Matee, M., Wengaa, D., & Perera, S. (2017). Analysis of Data Dissemination and Use Practices in the Health Sector in Tanzania: Results of desk review and interviews with key stakeholders. *Journal of Health Informatics in Africa*, 4(1).
4. Mariki, G. A., & Chilongola, J. O. (2020). Risk factors for placental malaria and birth weight outcome among pregnant women attending Mawenzi Regional Referral Hospital, Moshi, north eastern Tanzania. *International Journal of Tropical Disease & Health*, 41(8), 46-53.
5. Lieneck, C., Weaver, E., & Maryon, T. (2021, February). Pandemic Pause: Systematic Review of Cost Variables for Ambulatory Care Organizations Participating in Accountable Care Organizations. In *Healthcare* (Vol. 9, No. 2, p. 198). MDPI.
6. Navathe, A. S., Liao, J. M., Wang, E., Isidro, U., Zhu, J., Cousins, D. S., & Werner, R. M. (2021, August). Association of patient outcomes with bundled payments among hospitalized patients attributed to accountable care organizations. In *JAMA Health Forum* (Vol. 2, No. 8, pp. e212131-e212131). American Medical Association.
7. Maniatopoulos, G., Hunter, D. J., Erskine, J., & Hudson, B. (2020). Large-scale health system transformation in the United Kingdom: Implementing the new care models in the NHS. *Journal of health organization and management*, 34(3), 325-344.
8. Yan, J., & Zhao, D. (2020). Administrative mechanism of joint participation and cooperation in the early stages of the COVID-19 outbreak in Wuhan. *Risk Management and Healthcare Policy*, 13, 723.
9. Tashkandi, S. A., Alenezi, A., Bakhsh, I., AlJuryyan, A., AlShehry, Z. H., AlRashdi, S., ... & Aboabat, A. (2021). Clinical laboratory services for primary healthcare centers in urban cities: a pilot ACO model of ten primary healthcare centers. *BMC Family Practice*, 22(1), 1-17.
10. Strobel, C. J., Oldenburg, D., & Steinhäuser, J. (2022). Factors influencing defensive medicine-based decision-making in primary care: A scoping review. *Journal of Evaluation in Clinical Practice*.
11. Schmidt, M., Schmidt, S. A. J., Adelborg, K., Sundbøll, J., Laugesen, K., Ehrenstein, V., & Sørensen, H. T. (2019). The Danish health care system and epidemiological research: from health care contacts to database records. *Clinical epidemiology*, 11, 563.
12. Heidt, B., Siqueira, W. F., Eersels, K., Diliën, H., van Grinsven, B., Fujiwara, R. T., & Cleij, T. J. (2020). Point of care diagnostics in resource-limited settings: A review of the present and future of PoC in its most needed environment. *Biosensors*, 10(10), 133.
13. Ondoa, P., Ndlovu, N., Keita, M. S., Massinga-Loembe, M., Kebede, Y., Odhiambo, C., ... & Nkengasong, J. (2020). Preparing national tiered laboratory systems and networks to advance

- diagnostics in Africa and meet the continent's health agenda: Insights into priority areas for improvement. *African Journal of Laboratory Medicine*, 9(2).
14. Ndlovu, Z., & Ellman, T. (2021). Lay testing cadres and point-of-care diagnostic tests for HIV and other diseases: An essential combination in health service delivery. *PLoS Medicine*, 18(11), e1003867.
 15. Parekh, B. S., Ou, C. Y., Fonjungo, P. N., Kalou, M. B., Rottinghaus, E., Puren, A., ... & Nkengasong, J. N. (2018). Diagnosis of human immunodeficiency virus infection. *Clinical microbiology reviews*, 32(1), e00064-18.
 16. Alrawahi, S., Sellgren, S. F., Alwahaibi, N., Altouby, S., & Brommels, M. (2019). Factors affecting job satisfaction among medical laboratory technologists in University Hospital, Oman: an exploratory study. *The International journal of health planning and management*, 34(1), e763-e775.
 17. Idemen, B. T., Sezer, E., & Unalir, M. O. (2020, July). LabHub: A New Generation Architecture Proposal for Intelligent Healthcare Medical Laboratories. In *International Conference on Intelligent and Fuzzy Systems* (pp. 1284-1291). Springer, Cham.
 18. Lubin, I. M., Astles, J. R., Shahangian, S., Madison, B., Parry, R., Schmidt, R. L., & Rubinstein, M. L. (2021). Bringing the clinical laboratory into the strategy to advance diagnostic excellence. *Diagnosis*, 8(3), 281-294.
 19. Thirunavukkarasu, A., Alotaibi, N. H., Al-Hazmi, A. H., Alenzi, M. J., Alshaalan, Z. M., Alruwaili, M. G., ... & Alosaimi, T. H. (2021, December). Patients' Perceptions and Satisfaction with the Outpatient Telemedicine Clinics during COVID-19 Era in Saudi Arabia: A Cross-Sectional Study. In *Healthcare* (Vol. 9, No. 12, p. 1739). MDPI.
 20. Landaas, E. J., Baird, G. S., Hansen, R. N., Flum, D. R., & Sullivan, S. D. (2020). Integrating formal technology assessment into an integrated healthcare delivery system: smart innovation. *International Journal of Technology Assessment in Health Care*, 36(1), 58-63.
 21. SyamRoy, B. (2017). Family Welfare Structure in the Country and Issue-Based Management Support Structure. In *India's Journey Towards Sustainable Population* (pp. 187-192). Springer, Cham.
 22. Jain, R., & Rao, B. (2015). Medical diagnostic laboratories provisioning of services in India. *CHRISMED Journal of Health and Research*, 2(1), 19.
 23. Bogale, T. (2021). Facilitators and Barriers of Patient Centered Care Practice in Public Hospitals of Benishangul Gumuze Regional State, South West Ethiopia. *Rehabilitation*, 6(1), 10-19.
 24. Girma, M., Desale, A., Hassen, F., Sisay, A., & Tsegaye, A. (2018). Survey-defined and interview-elicited challenges that faced Ethiopian Government Hospital Laboratories as they applied ISO 15189 accreditation standards in resource-constrained settings in 2017. *American Journal of Clinical Pathology*, 150(4), 303-309.
 25. Awoke, D., & Daniel, M. (2017). Health professionals' stance towards medical laboratory technology: A cross-sectional study. *Journal of Medical Laboratory and Diagnosis*, 8(3), 12-17.
 26. Al-Hammadi, S., Alsuwaidi, A. R., Alshamsi, E. T., Ghatasheh, G. A., & Souid, A. K. (2017). Disseminated *Bacillus Calmette-Guérin* (BCG) infections in infants with immunodeficiency. *BMC research notes*, 10(1), 1-5.
 27. Msallam, A. A., Al Shobaki, M. J., & Abu-Naser, S. S. (2020). The Reality of Achieving the Requirements of Total Quality Management in University Colleges.
 28. Almatrafi, D., Altaweel, N., Abdelfattah, M., Alqazlan, M., Darrar, H., Alomari, A., ... & Alsulami, M. (2018). Assessment of customer satisfaction with the clinical laboratory services provided in King Abdullah Medical City, Makkah. *The Egyptian Journal of Hospital Medicine*, 70(11), 2029-2037.
 29. McCall, S. J., Souers, R. J., Blond, B., & Massie, L. (2016). Physician satisfaction with clinical laboratory services: a College of American Pathologists Q-probes study of 81 institutions. *Archives of pathology & laboratory medicine*, 140(10), 1098-1103.
 30. Koster, W., Ndione, A. G., Adama, M., Guindo, I., Sow, I., Diallo, S., ... & Ondo, P. (2021). An oral history of medical laboratory development in francophone West African countries. *African journal of laboratory medicine*, 10(1), 1-10.
 31. Jain, R., & Rao, B. (2019). Role of laboratory services in primary health center (PHC) outpatient department performance: an Indian case study. *Primary health care research & development*, 20.