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EVALUATION OF ANTENATAL CARE FACILITIES AND SERVICES IN PRIMARY HEALTHCARE CENTERS IN BAGHDAD/IRAQ

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ABSTRACT

Background: Proper antenatal care (ANC) is essential for improving reproductive health and reducing maternal morbidity and mortality. Assessing the quality of care requires evaluating health system components, including human resources, supplies, infrastructure (structure), service provision and management of complications (process), and coverage, health outcomes, and client satisfaction. **Aim:** This study aimed to assess the availability and functionality of ANC facilities in different primary health care (PHC) centers in Baghdad and compare these variables between central and peripheral areas and between family health and ordinary centers. **Methods:** A descriptive cross-sectional study was conducted from August 1 to December 31, 2020. Thirty PHCs were selected using a simple random sampling technique. Data were collected through direct observation and a checklist assessing service availability and functionality. **Results:** A total of 300 ANC clients were enrolled from the selected PHCs, with 159 (53%) residing in Al-Karkh and 141 (47%) in Al-Rusafah; 216 (72%) lived in central areas, and 165 (55%) attended family health PHCs. A significant association was found between service levels and both geographical location and type of PHC. **Conclusions:** Most ANC clients received a good level of services, and most PHCs had adequate facilities. However, disparities existed in ANC services and facility availability between central and peripheral areas and between family health and ordinary PHCs. Addressing these inequalities is crucial to ensuring equitable maternal healthcare access across Baghdad.

KEYWORDS: Antenatal Care Facilities, Services, Primary Healthcare Centers.

INTRODUCTION

Antenatal care (ANC) is the routine health monitoring of presumed healthy pregnant women, focusing on screening and providing essential information on lifestyle, pregnancy, and delivery.[1] It involves monitoring maternal and fetal health, providing preventive care and treatment, health education, and emotional support for pregnant women.[2] The provision of specialized care during pregnancy through public health services was a late development in obstetrics. It was not until the late 1930s that the United Kingdom mandated regular check-ups for all pregnant women. By the mid-20th century, international awareness of maternal mortality prompted national governments and donor agencies to ensure maternity care access in developing countries.[3] ANC is crucial in improving maternal knowledge about pregnancy, childbirth, and newborn care.[4] Low ANC uptake is a major contributor to high maternal mortality in developing countries and is

a key maternal care component essential for maternal and neonatal survival.[5] In 2015, approximately 303,000 women and adolescent girls died due to pregnancy and childbirth complications, and 2.6 million babies were stillborn. Nearly all maternal (99%) and neonatal deaths (98%) occurred in low- and middle-income countries. Many of these deaths could have been prevented with access to quality ANC.[6] The World Health Organization (WHO) provides global, evidence-based ANC guidelines to ensure positive pregnancy experiences.[7] These recommendations emphasize person-centered care and well-being through a human rights-based approach.[8] WHO divides ANC recommendations into five categories: nutritional interventions, maternal and fetal assessment, preventive measures, physiological symptom management, and health systems.[9] WHO's 2016 ANC guidelines also advocate for midwife-led continuity of care, task-shifting for health promotion and supplement distribution, rural health worker recruitment, community

mobilization, women-held case notes, and a minimum of eight ANC contacts.[10] To ensure ANC effectiveness, both content and quality must be monitored. WHO defines standard ANC quality based on three components: (i) assessment (history-taking, physical exams, laboratory tests), (ii) health promotion (nutrition counseling, birth planning, contraception, breastfeeding education), and (iii) care provision (tetanus immunization, psychosocial support, recordkeeping).[11] WHO recommends that ANC begins before 12 weeks of gestation, known as early ANC, which provides a critical opportunity for healthcare providers to deliver support and information.[12] Early ANC ensures timely risk detection through comprehensive history-taking, which includes assessing past obstetric, medical, and surgical history to identify potential complications.[13] Standard ANC includes routine physical exams, fetal heart rate auscultation, fundal height measurements, and maternal weight and blood pressure checks.[14] Additional tests may include blood group determination, Rh factor, hemoglobin levels, infectious disease screening, and gestational diabetes screening.[15] WHO also recommends iron and folic acid supplementation in areas where anemia is prevalent, as deficiencies in these nutrients increase the risk of maternal mortality, preterm birth, and low birth weight.[16] Assessing ANC quality requires examining health system components such as human resources, infrastructure, service provision, and maternal health outcomes.[17] ANC utilization varies globally, with significant underutilization in low-income countries in Africa and Asia.[18] Factors influencing ANC use include maternal age, education, income, employment, parity, and location. Some studies indicate higher ANC usage in urban areas, while others show no significant urban-rural difference.[19] In Iraq, maternity care services are provided at all levels of the healthcare system. Primary healthcare centers (PHCs) offer preventive services such as ANC, growth monitoring, and immunization, along with some curative services.[20] Understanding the disparities in ANC accessibility and quality between central and peripheral areas and between different types of PHCs is essential for improving maternal healthcare in Iraq. The aim of study is to assess health care services provided by PHCs and assess the availability & functionality of ANC facilities of PHCs in Baghdad, compare the availability and validity of ANC facilities between central & peripheral PHCs and to compare the ANC facilities & services between Family health PHCs & ordinary PHCs in Baghdad.

METHOD
This cross-sectional study was conducted in Baghdad, Iraq, from August 1, 2020, to March 31, 2021. The study included all pregnant women attending primary healthcare centers (PHCs) for antenatal care (ANC). Thirty PHCs were randomly selected: 16 from Al-Karkh and 14 from Al-Rusafa, including 19 central and 11 peripheral centers, as well as 19 ordinary and 11 family health PHCs. Participants were conveniently selected from these centers. Data were collected through direct researcher observation and a structured checklist used for 3 hours per visit, 1-2 times weekly.

The checklist consisted of two parts.
1. **Assessment of ANC Services Provided**
o **History:** Age, medication use, menstrual history, obstetric history, current symptoms.
o **Examination:** Blood pressure, weight, fetal heart sound, edema, breast exam, ANC card documentation.
o **Investigations:** Hemoglobin, random blood sugar, general urine exam, blood group.
o **Counseling:** Nutrition, tetanus toxoid (TT) vaccination, contraception, breastfeeding, labor discussion, follow-up visits.
o **Treatment and Vaccination:** Iron tablets, folic acid, TT injection.

2. **Resource Availability Checklist**
o **Infrastructure:** Electricity, water supply, functional toilets, waiting areas, privacy for exams.
o **Equipment:** Weighing machine, thermometer, BP apparatus, stethoscope, fetal stethoscope, refrigerator, laboratory tools.
o **Supplies:** ANC cards, registers, health education materials, syringes, reagents, soap.
o **Medications:** TT vaccine, iron, folic acid, calcium tablets.
o **Safety Measures:** Disinfectants, gloves, sharps containers.
  Data were analyzed using SPSS version 22. Descriptive statistics (frequencies, percentages) were used, and the chi-square test assessed associations between variables. A p-value <0.05 was considered statistically significant.

Variable Definitions
- **Available:** Accessible and ready at all times.
- **Functioning:** Working properly.
- **Good Condition:** ≥80% of services/facilities available.
- **Average Condition:** 60-79% available.
- **Poor Condition:** <60% available.

Ethical Approval
Approval was obtained from the Family Medicine Scientific Council, Al-Rusafa Health Directorate, and Al-Karkh Health Directorate.

Pilot Study
A pilot study was conducted in two PHCs (one in Al-Rusafa, one in Al-Karkh), which were excluded from the main study. It assessed checklist clarity and estimated an average completion time of 20 minutes per form.

RESULTS
There was no significant association between the area of PHCs (Al-Karkh or Al-Russafah) and level of service regarding history taking p value=0.272. a significant association was noticed between the geographical type of

PHCs and taking a good history, p value<0.001, good history was taken by doctors working in family health PHCs comparing to that of ordinary PHCs, P value<0.001, There was no significant association between the area of PHCs (Al-Krarkh or Al-Russafah) and level of service regarding examination done by doctors working in these centers, p value=0.410. a

significant association was noticed between the geographical type of PHCs and doing a good examination, p-value<0.001. The good examination was done by doctors working in family medicine centers compared to ordinary PHCs, P value<0.001, as shown in table 1.

Table 1: Association between the level of history assessment the level of examination and area, geographical type, and family health PHCs.

	Area				Geographical type				Family health			
	Karkh (159)		Russafah (141)		Central (216)		Peripheral (84)		No (165)		Yes (135)	
	N	%	N	%	N	%	N	%	N	%	N	%
Poor (33)	21	63.6	12	36.4	3	9.1	30	90.9	33	100.0	0	0.0
Average (69)	39	56.5	30	43.5	36	52.2	33	47.8	45	65.2	24	34.8
Good (198)	99	50.0	99	50.0	177	89.4	21	10.6	87	43.9	111	56.1
	0.278				0.001				0.001			

	Area				Geographical type				Family health			
	Karkh (159)		Russafah (141)		Central (216)		Peripheral (84)		No (165)		Yes (135)	
	N	%	N	%	N	%	N	%	N	%	N	%
Poor (108)	60	55.6	48	44.4	54	50.0	54	50.0	93	86.1	15	13.9
Average (72)	41	56.9	31	43.1	51	70.8	21	29.2	51	70.8	21	29.2
Good (120)	58	48.3	62	51.7	111	92.5	9	7.5	21	17.5	99	82.5
	0.410				0.001				0.001			

There was no significant association between the area of PHCs (Al-Karkh or Al-Russafah) and level of service regarding investigation done to the clients by doctors working in these centers, p-value=0.659. A significant association was noticed between the geographical types of PHCs, and level investigations as client visited central PHCs had good instigation comparing to peripheral PHCs client, p value=0.001, the good investigation was done by doctors working in family medicine centers than that of ordinary PHCS, with significant association P

value=0.001, There was no significant association between the area of PHCs (Al-Karkh or Al- Russafa) and level of service regarding counseling done to the clients by doctors working in these centers, p value=0.182. a significant association was noticed between central PHCs and doing good counselling, p value<0.001, good counselling was done by doctors working in family health PHCs than that of ordinary PHCs, P value<0.001, as shown in table 2.

Table 2: Association between the level of investigation level of client counseling and area, geographical type, and family health PHCs.

	Area				Geographical type				Family health			
	Karkh (159)		Russafa (141)		Central (216)		Peripheral (84)		No (165)		Yes (135)	
	N	%	N	%	N	%	N	%	N	%	N	%
Poor (36)	17	47.2	19	52.8	3	8.3	33	91.7	33	91.7	3	8.3
Average (141)	78	55.3	63	44.7	102	72.3	39	27.7	84	59.6	57	40.4
Good (123)	64	52.0	59	48.0	111	90.2	12	9.8	48	39.0	75	61.0
	0.659				0.001				0.001			

	area				Geographical type				Family health			
	Karkh (159)		Russafah (141)		Central (216)		Peripheral (84)		No (165)		Yes (135)	
	N	%	N	%	N	%	N	%	N	%	N	%
Poor (90)	55	61.1	35	38.9	27	30.0	63	70.0	87	96.7	3	3.3
Average (72)	36	50.0	36	50.0	57	79.2	15	20.8	42	58.3	30	41.7
Good (138)	68	49.3	70	50.7	132	95.7	6	4.3	36	26.1	10 2	73.9
	0.182				0.001				0.001			

There was no significant association between the area of PHCs (Al-Karck or Al-Rusafah) and level of service

regarding drug availability, p value=0.448. a significant association was noticed between central PHCs and good

drugs availability, p value=0.001, good drugs availability was found in family health PHCs than that of ordinary PHCs, P value=0.001, There was a significant association between the geographical types of PHCs and state of infrastructure with the better state in central PHCs (P-value = 0.029), as shown in table 3.

Table 3: Association between the level of drug prescription infrastructure status and area, geographical type, family health PHCs.

	Area				Geographical type				Family health			
	Karkh 159		Russafa 141		Central 216		Peripheral 84		No 165		Yes 135	
	N	%	N	%	N	%	N	%	N	%	N	%
Fair 111	62	55.9	49	44.1	57	51.4	54	48.6	87	78.4	24	21.6
Good189	97	51.3	92	48.7	159	84.1	30	15.9	78	41.3	111	58.7
P-value	0.448				0.001				0.001			

	Area				Geographical type				Family health			
	Karkh 16		Russafah 14		Central 19		Peripheral 11		No 19		Yes 11	
	N	%	N	%	N	%	N	%	N	%	N	%
Poor 6	3	50.0	3	50.0	1	16.7	5	83.3	6	100.0	0	0.0
Average 5	3	60.0	2	40.0	4	80.0	1	20.0	4	80.0	1	20.0
Good 10	10	52.6	9	47.4	14	73.7	5	26.3	9	47.4	10	52.6
P-value	0.942				0.029				0.046			

There was a significant association between the geographical type of PHCs and state of equipment availability with a better state in central PHCs (P-value = 0.029), good state noticed in family health PHCs comparing to ordinary with a significant association (P-value = 0.046), and there was no significant association between the area of PHCs and state of equipment availability (P-value = 0.942), There was a good state of supplies availability in family health PHCs comparing to ordinary with a significant association (P-value < 0.001), there was no significant association between the area of PHCs and state of supplies availability (P-value = 0.623). There was no significant association between geographical type of PHCs and state of supplies availability (P-value = 0.161), as shown in table 4.

Table 4: association between equipment availability supplies availability and are, geographical type and family health PHCs.

	Area				Geographical type				Family health			
	Karkh (16)		Russafa (14)		Central (19)		Peripheral (11)		No (19)		Yes (11)	
	N	%	N	%	N	%	N	%	N	%	N	%
Poor (5)	3	60.0	2	40.0	0	0.0	5	100.0	5	100.0	0	0.0
Average (14)	6	42.9	8	57.1	8	57.1	6	42.9	14	100.0	0	0.0
Good (11)	7	63.6	4	36.4	11	100.0	0	0.0	0	0.0	11	100.0
P-value	0.555				< 0.001				< 0.001			

	Area				Geographical type				Family health			
	Karkh (16)		Russafah (14)		Central (19)		Peripheral (11)		No (19)		Yes (11)	
	N	%	N	%	N	%	N	%	N	%	N	%
Poor (8)	4	50	4	50.0	4	50	4	50.0	8	100	0	0.0
Average (13)	6	46.2	7	53.8	7	53.8	6	46.2	10	76.9	3	23.1
Good (9)	6	66.7	3	33.3	8	88.9	1	11.1	1	11.1	8	88.9
P-value	0.623				0.161				<0.001			

No significant association was found between drug availability and area, geographical type, and whether family health or ordinary PHCs, P-value was 0.951, 0.070, and 0.059 respectively, A significant association was found between the geographical type of PHCs and protocol availability with more available in central PHCs (P-value = 0.012) and protocol display with more display in central PHCs (P-value < 0.001), as shown in table 5.

Table 5: Association between drugs availability status protocol status availability and area, geographical type, and family health PHCs.

		Area				Geographical type				Family health			
		Karkh 16		Rusafah 14		Central 19		Peripheral 11		No 19		Yes 11	
Poor	7	4	57.1	3	42.9	2	28.6	5	71.4	6	85.7	1	14.3
Average	11	6	54.5	5	45.5	9	81.8	2	18.2	4	36.4	7	63.6
Good	12	6	50.0	6	50.0	8	66.7	4	33.3	9	75.0	3	25.0
		0.951				0.070				0.059			

		Area				Geographical type				Family health			
		Karkh 16		Rusafah (14)		Central (19)		Peripheral (11)		No (19)		Yes (11)	
		N	%	N	%	N	%	N	%	N	%	N	%
Protocol (available)	No 4	1	25.0	3	75.0	0	0.0	4	100.0	4	100.0	0	0.0
	Yes 26	15	57.7	11	42.3	19	73.1	7	26.9	15	57.7	11	42.3
P-value		0.315				0.012				0.268			
Protocol (display)	No 6	3	50.0	3	50.0	0	0.0	6	100.0	6	100.0	0	0.0
	Yes 24	13	54.2	11	45.8	19	79.2	5	20.8	13	54.2%	11	45.8
P-value		1				0.001				0.061			

There was a significant association between geographical type of PHCs and disinfectant availability (P-value = 0.041), no other significant association between disinfectant availability and area, geographical type of PHCs, and whether it is family health or ordinary PHCs, as shown in table 6.

Table 6: association between safety materials availability and area, geographical type, and PHCs.

		Area				Geographical type				Family health			
		Karkh 16		Russafah 14		central 19		peripheral 11		No 19		Yes 11	
		N	%	N	%	N	%	N	%	N	%	N	%
Disinfectant	No (3)	3	100.0	0	0.0	0	0.0	3	100.0	3	100.0	0	0.0
	Yes (27)	13	48.1	14	51.9	19	70.4	8	29.6	16	59.3	11	40.7
		0.228				0.041				0.279			
Latex gloves	No (2)	2	100.0	0	0.0	1	50.0	1	50.0	1	50.0	1	50.0
	Yes (28)	14	50.0	14	50.0	18	64.3	10	35.7	18	64.3	10	35.7
		0.485				1				1			
Sharps container	No (4)	2	50.0	2	50.0	3	75.0	1	25.0	2	50.0	2	50.0
	Yes (26)	14	53.8	12	46.2	16	61.5	10	38.5	17	65.4	9	34.6
		1				1				0.611			

DISCUSSION

Proper antenatal care (ANC) is essential for improving reproductive health and reducing maternal morbidity and mortality.[21] This study aimed to evaluate ANC services across different geographical areas and PHC types in Baghdad, identifying deficiencies in facilities and services and exploring possible explanations. The study found that most clients received a good level of ANC services, which was superior to findings from a 2015 study in Pakistan, where most clients received poor-quality services.[22] However, ANC services in Baghdad were comparable to those in Iran, where they were rated as acceptable.[23] Despite this generally good level of ANC, significant gaps were noted, particularly in peripheral and ordinary PHCs, where deficiencies were observed in history-taking, examinations, investigations, counseling, and drug availability (iron pills, folic acid, and TT vaccination). In contrast, central and family health PHCs provided a better quality of ANC services. Similar findings were reported by Toan et al. in Vietnam, where peripheral areas had lower ANC service utilization. Many rural women missed essential screenings like blood pressure and urine tests, increasing the risk of undetected complications such as pre-eclampsia.[24] A 2013 study in Nigeria by Emmanuel et al. also highlighted the inadequate use of ANC services in rural areas.[25] Health education is a critical ANC component, and poor counseling rates in rural areas reflect weak communication between healthcare providers and women.[19] However, in this study, most clients received a good or average level of counseling. The poor utilization of ANC services in rural areas may be attributed to cultural and social factors affecting standardized healthcare implementation.[26] A key finding was the disparity between ordinary and family health PHCs. While most clients in family health PHCs received good ANC services, those in ordinary PHCs had average or poor service levels. The role of family medicine in improving healthcare systems has been widely recognized, with many countries strengthening PHCs through multidisciplinary teams, universal health coverage, and national health insurance programs.[27] The

study also found that most PHCs had a good level of infrastructure, equipment, and supplies, with better conditions in central and family health PHCs than in peripheral and ordinary PHCs. Similar findings were reported in a study on pay-for-performance interventions in Rwanda, where increased facility inputs only marginally improved ANC service uptake.[28] A 2018 study in Iraq by Atheer Kadhim highlighted financial resource adequacy but pointed to deficiencies in skills, strategic planning, and human resource development. The study emphasized the need to strengthen the family healthcare model.[29] Adequate infrastructure, including well-ventilated rooms, private examination spaces, and essential medical supplies, is crucial for effective ANC service delivery.[30] Measuring healthcare quality is becoming increasingly important in improving population health outcomes. While infrastructure and medical supplies are fundamental, they provide limited insights into service quality, highlighting the need for ongoing evaluation of primary healthcare services.[31] **Study Limitations**: this study was conducted during the COVID-19 pandemic, which reduced ANC attendance. Consequently, additional visits were required to collect adequate data.

CONCLUSION
Most antenatal care clients got a good level of services. Most primary health care centers had a good level of facilities. A large disparity in ANC facilities and services between the central and peripheral PHCs in Baghdad. The large disparity in ANC adequacy between the family health and ordinary PHCs.

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