

Determinants of health facility delivery differ between urban and rural pregnant women in Benin City Nigeria

Wisdom B. Omorogbe

omowisdom@gmail.com

Department of Obstetrics and Gynaecology, Edo Specialist Hospital

Victor Ohenhen

Department of Obstetrics and Gynaecology, Edo Specialist Hospital

Obehi Okojie

Department of Community Health, School of Medicine, University of Benin

Research Article

Keywords: Health facility delivery, skilled birth attendance, maternal health, urban-rural comparison, delivery care, Nigeria

Posted Date: July 30th, 2026

DOI: <https://doi.org/10.21203/rs.3.rs-10284703/v1>

License:   This work is licensed under a Creative Commons Attribution 4.0 International License.

[Read Full License](#)

Additional Declarations: No competing interests reported.

Abstract

Background: Despite the proven benefits of health facility delivery in reducing maternal and neonatal mortality, Nigeria continues to experience low facility delivery rates with marked urban-rural disparities. Understanding factors influencing facility delivery decisions is crucial for designing effective interventions.

Objective: To identify and compare determinants of health facility delivery between urban and rural pregnant women in Benin City, Edo State, Nigeria.

Methods: A comparative longitudinal study involving 220 pregnant women in their third trimester (110 urban, 110 rural) was conducted from July 2023 to August 2024. Data on previous delivery practices, barriers to facility delivery, support systems, and knowledge about facility delivery importance were collected using structured questionnaires. Binary logistic regression analysis identified predictors of facility delivery. Statistical significance was set at $p < 0.05$.

Results: Health facility delivery prevalence was 79.1% (87) among urban respondents compared to 70.0% (77) among rural respondents ($p = 0.122$). Urban women prioritized availability of skilled healthcare providers (65.5% (57) urban vs 28.6% (22) rural), while rural women emphasized proximity to home (37.7% (29) rural vs 21.8% (19) urban). Financial constraints (76.5% (26) rural, 70.8% (17) urban) and transportation difficulties (38.2% (13) rural, 54.2% (13) urban) were major barriers. Gravidity (aOR=5.279, $p = 0.003$), support systems (aOR=19.150, $p < 0.001$), and excellent knowledge rating (aOR=16.499, $p = 0.048$) were significant predictors in urban areas. In rural areas, number of children (aOR=7.464, $p = 0.008$), support systems (aOR=6.411, $p = 0.002$), primary education (aOR=0.135, $p = 0.008$), and husband's skill level 2 occupation (aOR=0.164, $p = 0.046$) significantly predicted facility delivery.

Conclusion: Multiple socioeconomic, educational, and support-related factors influence facility delivery decisions differently in urban and rural settings. Context-specific interventions addressing financial barriers, strengthening support systems, improving health education, and ensuring skilled personnel availability are essential for increasing facility delivery rates.

INTRODUCTION

Globally, approximately 295,000 women died from pregnancy-related causes in 2017, with 94% of these deaths occurring in low- and middle-income countries [1]. Sub-Saharan Africa accounts for roughly 66% of global maternal deaths, with Nigeria contributing significantly to this burden [2,3]. The maternal mortality ratio in Nigeria remains unacceptably high at 512 deaths per 100,000 live births, one of the highest globally [4].

Health facility delivery attended by skilled birth attendants represents a critical intervention for reducing maternal and neonatal mortality [5,6]. Skilled attendance during childbirth enables timely identification and management of obstetric complications, including postpartum hemorrhage, obstructed labor,

sepsis, and pre-eclampsia—conditions responsible for the majority of maternal deaths [7,8]. The World Health Organization recommends that all deliveries should be attended by skilled health personnel in adequately equipped health facilities [9].

Despite these recommendations and proven benefits, Nigeria's facility delivery rate remains low at 39%, with substantial urban-rural disparities (61% urban vs 26% rural) [10]. This gap persists despite government policies promoting facility delivery and the establishment of primary healthcare facilities nationwide [11,12]. Several factors contribute to low facility delivery rates, including socioeconomic barriers, cultural beliefs, distance to facilities, perceived quality of care, and limited awareness of delivery complications [13-15].

Previous studies have identified various determinants of facility delivery, including maternal age, education, parity, household wealth, husband's education, and previous pregnancy experiences [16-18]. However, most studies have examined these factors in isolation or focused exclusively on either urban or rural populations. Comparative studies examining how determinants differ between urban and rural settings within the same geographic region are limited, yet such knowledge is crucial for designing targeted interventions.

The continuum of maternal care concept emphasizes that women who attend antenatal care (ANC) should continue care through facility delivery and postnatal services [19,20]. However, significant dropouts occur between ANC attendance and facility delivery, representing missed opportunities for safe childbirth [21,22]. Understanding why women who attend ANC subsequently deliver outside health facilities is essential for improving maternal health outcomes.

This study addresses these gaps by examining determinants of health facility delivery among pregnant women attending urban and rural health facilities in Benin City, Edo State, Nigeria. Specifically, we investigated: the prevalence of facility delivery in urban versus rural settings; reasons for facility delivery choices; barriers to accessing facility delivery services; and sociodemographic, knowledge-based, and support-related predictors of facility delivery. The findings will inform evidence-based policy and programmatic interventions to increase facility delivery rates and reduce maternal mortality in Nigeria.

METHODS

Study Design and Setting

This comparative longitudinal study was conducted from July 2023 to August 2024 in Benin City, Edo State, Nigeria. Study sites comprised the Uselu Primary Health Center, representing the urban setting in Egor Local Government Area, and Okokhuo Primary Health Center, representing the rural setting in Ovia North-East Local Government Area. Edo State, located in Nigeria's South-South geopolitical zone, has a population of approximately 4.75 million with diverse ethnic groups including Benin, Esan, Etsako, and Owan [23].

Study Population and Eligibility

The study population included pregnant women in their third trimester attending antenatal care services at the selected facilities and residing within the study communities. Inclusion criteria were: (1) third trimester pregnancy (≥ 28 weeks gestation); (2) residence in selected urban or rural communities; (3) written informed consent to participate. Exclusion criteria included: (1) nulliparous women (no previous deliveries); (2) high-risk co-morbid conditions requiring specialized care; (3) severe illness preventing interview participation; (4) unwillingness to provide consent.

Sample Size Calculation

Sample size was determined using Cochran's formula for comparing two proportions: $n = 4(Z_{1-\alpha/2} + Z_{1-\beta})^2(P)(1-P) / d^2$, where $Z_{1-\alpha/2} = 1.96$ (95% confidence level), $Z_{1-\beta} = 0.842$ (80% power), $p_1 = 0.79$ (facility delivery rate in urban Nigeria) [24], $p_2 = 0.40$ (facility delivery rate in rural Nigeria) [24], $P = (p_1 + p_2)/2 = 0.595$, and $d = p_1 - p_2 = 0.39$.

This yielded a minimum sample of 50 per group. Accounting for 10% non-response and a design effect of 2, the final sample size was 110 per group (total $n=220$).

Sampling Technique

Multi-stage sampling was employed. Stage one involved random selection of two Local Government Areas from four in Benin City through balloting. Stage two entailed selecting one urban and one rural ward from each LGA using simple random sampling. Stage three utilized consecutive sampling to recruit eligible participants until target sample sizes were achieved. Proportional allocation based on monthly ANC attendance ensured representative sampling from each facility.

Data Collection Procedures

Data were collected using pretested, interviewer-administered structured questionnaires, comprising five sections: (1) socio-demographic characteristics; (2) previous delivery experiences and practices; (3) knowledge about facility delivery importance; (4) barriers to accessing facility delivery services; (5) support systems for facility delivery.

Research assistants included trained Community Health Extension Workers, nurses, and medical students who underwent one-day intensive training on study objectives, ethical considerations, and questionnaire administration. Where available, ANC cards and child health records were reviewed to verify self-reported information. Pre-testing was conducted among 16 pregnant women (10% of sample) in Ovia North-East LGA to identify and correct ambiguities.

Variables and Measurements

Dependent variable: Health facility delivery for previous pregnancy, defined as delivery at any public or private health facility attended by skilled birth attendants (doctors, nurses, or midwives).

Independent variables included: Socio-demographic factors (age, education, marital status, employment, occupation, income, parity) and obstetric factors (gravidity, gestational age, previous ANC attendance).

Data Analysis

Data were entered and analyzed using IBM SPSS Statistics version 25. Descriptive statistics included frequencies, percentages for categorical variables, and means with standard deviations for continuous variables. Chi-square tests and Fisher's exact tests assessed associations between categorical variables. Independent t-tests compared continuous variables between urban and rural groups.

Binary logistic regression was performed separately for urban and rural respondents to identify independent predictors of facility delivery. Variables with $p < 0.25$ in bivariate analysis were included in initial models. Backward elimination retained variables with $p < 0.05$ in final models. Results were presented as adjusted odds ratios (aOR) with 95% confidence intervals (CI). Model fit was assessed using Hosmer-Lemeshow goodness-of-fit test and Nagelkerke R^2 . Multicollinearity was checked using variance inflation factors. Statistical significance was set at $p < 0.05$ (two-tailed).

Ethical Considerations

Ethical approval was obtained from the Ethics and Research Committee of the University of Benin Teaching Hospital (Approval number: ADM/E22/A/VOL. VII/148654826). Written informed consent was obtained from all participants after explaining study objectives, procedures, risks, benefits, and participants' rights to withdraw without penalty. Confidentiality and anonymity were maintained throughout the study.

RESULTS

Socio-demographic Characteristics

Table 1 Socio-demographic characteristics by setting

Variable	Rural (n=110) n(%)	Urban (n=110) n(%)	χ^2/t	p-value
Age (years), mean $\pm$ SD	37.96 $\pm$ 8.5	34.83 $\pm$ 8.3	3.128t	0.841
Education level			7.312a	0.026*
Primary	36 (32.7)	19 (17.3)		
Secondary	19 (17.3)	20 (18.2)		
Tertiary	55 (50.0)	71 (64.5)		
Marital status			5.136b	0.059
Married	104 (94.5)	94 (85.5)		
Single	5 (4.5)	14 (12.7)		
Separated/Divorced	1 (0.9)	2 (1.8)		
Employment status			1.826a	0.401
Self-employed	52 (47.3)	61 (55.5)		
Employed	41 (37.3)	32 (29.1)		
Unemployed	17 (15.5)	17 (15.5)		
Monthly income (₦)			45.883a	<0.001*
<20,000	0 (0.0)	26 (23.6)		
20,000–50,000	15 (13.6)	29 (26.4)		
50,000–100,000	44 (40.0)	36 (32.7)		
>100,000	51 (46.4)	19 (17.3)		
Gravidity, mean $\pm$ SD	1.8 $\pm$ 0.7	1.5 $\pm$ 0.6	3.346t	0.841

*a Chi-square test; b Fisher's exact test; t t-test; *Statistically significant*

Mean age was 34.83 $\pm$ 8.3 years for urban respondents and 37.96 $\pm$ 8.5 years for rural respondents. Urban women had significantly higher tertiary education (64.5% vs 50.0%, $p=0.026$) and more were single (12.7% vs 4.5%). Monthly income differed significantly, with more rural respondents earning >₦100,000 (46.4% vs 17.3%, $p<0.001$). Detailed socio-demographic characteristics are presented in Table 1.

Previous Delivery Experiences

Table 2 Previous delivery practices and experiences

Variable	Rural (n=110) n(%)	Urban (n=110) n(%)	χ^2	p-value
Gravidity			10.794a	0.005*
2–3 times	37 (33.6)	58 (52.7)		
4–5 times	58 (52.7)	47 (42.7)		
>5 times	15 (13.6)	5 (4.5)		
Place of last delivery			11.632a	0.009*
Public health facility	66 (60.0)	58 (52.7)		
Private health facility	11 (10.0)	30 (27.3)		
Home	12 (10.9)	9 (8.2)		
Traditional birth attendant	21 (19.1)	13 (11.8)		

a Chi-square test; *Statistically significant

Among respondents with previous deliveries, 70.0% of rural and 79.1% of urban women delivered in health facilities, though this difference was not statistically significant ($p=0.122$). Public health facilities were most commonly used (60.0% rural, 52.7% urban), followed by private facilities (10.0% rural, 27.3% urban) (Table 2).

Reasons for Facility Delivery

Table 3 Reasons for choosing health facility delivery

Reason	Rural (n=77) n(%)	Urban (n=87) n(%)
Closeness to home	29 (37.7)	19 (21.8)
Availability of skilled healthcare providers	22 (28.6)	57 (65.5)
Positive reputation of facility	32 (41.6)	29 (33.3)
Previous positive experiences	27 (35.1)	31 (35.6)
Referral from healthcare provider	3 (3.9)	24 (27.6)
Availability of emergency obstetric care	4 (5.2)	14 (16.1)

Multiple responses permitted

Reasons for choosing facility delivery differed significantly between settings (Table 3). Rural respondents prioritized proximity to home (37.7%) and positive facility reputation (41.6%), while urban respondents emphasized availability of skilled healthcare providers (65.5%) and referral from healthcare

providers (27.6%). Previous positive experiences were similarly valued across settings (35.1% rural, 35.6% urban).

Barriers to Health Facility Delivery

Table 4 Barriers to accessing health facility delivery services

Barrier	Rural (n=34) n(%)	Urban (n=24) n(%)
Financial constraints	26 (76.5)	17 (70.8)
Lack of transportation	13 (38.2)	13 (54.2)
Distance to health facility	20 (48.8)	4 (16.7)
Fear/anxiety about facility childbirth	7 (20.6)	1 (4.2)
Preference for traditional birth practices	1 (2.9)	4 (16.7)
Lack of awareness about facility delivery importance	1 (2.9)	0 (0.0)

Multiple responses permitted

About one-third of rural respondents (30.9%) reported encountering barriers to facility delivery compared to 21.8% of urban respondents ($p=0.126$) (Table 4). Financial constraints were the most common barrier in both settings (76.5% rural, 70.8% urban), followed by lack of transportation (38.2% rural, 54.2% urban). Distance to health facilities posed a greater barrier for rural women (48.8% vs 12.1% urban). Cultural/religious preferences for home delivery were minimal in both settings.

Support Systems and Knowledge

Table 5 Support systems and knowledge about facility delivery

Variable	Rural (n=110) n(%)	Urban (n=110) n(%)	χ^2	p-value
Has support system			0.948a	0.330
Yes	72 (65.5)	65 (59.1)		
No	38 (34.5)	45 (40.9)		
Type of support (n=72 rural, n=65 urban)				
Financial	9 (12.5)	38 (58.5)		
Transportation	5 (6.9)	9 (13.8)		
Emotional	8 (11.1)	3 (4.6)		
Combined support	50 (69.4)	15 (23)		
Self-rated knowledge			30.406a	<0.001*
Excellent	22 (20.0)	51 (46.4)		
Good	47 (42.7)	49 (44.5)		
Fair/Poor	41 (37.3)	10 (9.1)		
Information sources				
Healthcare providers	84 (76.4)	90 (81.8)		
Family/friends	60 (54.5)	36 (32.7)		
Community health workers	47 (42.7)	30 (27.3)		
Media	17 (15.5)	4 (3.6)		

a Chi-square test; *Statistically significant; multiple responses permitted for support type and information sources

Support systems encouraging facility delivery were reported by 65.5% of rural and 59.1% of urban respondents (p=0.330). Financial support was the predominant form of assistance in both settings (Table 5). Self-rated knowledge about facility delivery importance was significantly higher among urban women, with 46.4% rating their knowledge as excellent compared to 20.0% of rural women (p<0.001).

Satisfaction with Facility Delivery Services

Table 6 Satisfaction and quality of facility delivery care

Variable	Rural (n=77) n(%)	Urban (n=87) n(%)	χ^2	p-value
Satisfaction level			33.099a	<0.001*
Very satisfied	2 (2.6)	32 (36.8)		
Satisfied	51 (66.2)	46 (52.9)		
Neutral	15 (19.5)	6 (6.9)		
Dissatisfied	9 (11.7)	3 (3.4)		
Experienced disrespect/mistreatment			5.600a	0.018*
Yes	12 (15.6)	4 (4.6)		
No	65 (84.4)	83 (95.4)		
Nature of mistreatment (n=12 rural, n=4 urban)				
Delay in care	3 (25.0)	–		
Rude behavior	6 (50.0)	3 (75.0)		
Poor monitoring	–	1 (25.0)		
Other	3 (25.0)	–		

a Chi-square test; *Statistically significant

Among women who delivered in facilities, satisfaction levels assessed using the 5-point Likert Scale differed significantly between settings ($p<0.001$) (Table 6). Only 2.6% of rural respondents reported being very satisfied compared to 36.8% of urban respondents. However, the majority in both settings reported general satisfaction (66.2% rural, 52.9% urban). Experiences of disrespect during facility delivery were significantly more common among rural women (15.6% vs 4.6%, $p=0.018$).

Factors Associated with Facility Delivery

Table 7 Bivariate analysis of factors associated with facility delivery

Variable	Rural: Facility delivery n(%)	Rural p-value	Urban: Facility delivery n(%)	Urban p-value
Age group				
<20 years	4/5 (80.0)	0.173	6/12 (50.0)	0.022*
21–30 years	29/49 (59.2)		48/61 (78.7)	
31–40 years	31/39 (79.5)		27/29 (93.1)	
>40 years	13/17 (76.5)		6/8 (75.0)	
Education level				
Primary	20/36 (55.6)	0.051	13/19 (68.4)	0.253
Secondary	16/19 (84.2)		18/20 (90.0)	
Tertiary	41/55 (74.5)		56/71 (78.9)	
Monthly income				
<50,000	12/15 (80.0)	0.858	43/55 (78.2)	0.038*
50,000–100,000	30/44 (68.2)		29/36 (80.6)	
>100,000	37/51 (72.5)		18/19 (94.7)	
Gravidity				
2–3 times	24/37 (64.9)	0.034*	38/58 (65.5)	<0.001*
4–5 times	46/58 (79.3)		46/47 (97.9)	
>5 times	7/15 (46.7)		3/5 (60.0)	
Has support system				
Yes	61/72 (84.7)	<0.001*	62/65 (95.4)	<0.001*
No	16/38 (42.1)		25/45 (55.6)	
Encountered barriers				
Yes	30/34 (88.2)	0.005*	21/24 (87.5)	0.252
No	47/76 (61.8)		66/86 (76.7)	

**Statistically significant; percentages represent proportion delivering in health facilities*

Bivariate analysis revealed several factors significantly associated with facility delivery (Table 7). In urban settings, age group ($p=0.022$), monthly income ($p=0.038$), and gravidity ($p<0.001$) were significantly associated with facility delivery. In rural settings, gravidity ($p=0.034$) and experiencing

barriers ($p=0.005$) showed significant associations. Having a support system was strongly associated with facility delivery in both settings (rural: 84.7% vs 42.1% without support, $p<0.001$; urban: 95.4% vs 55.6%, $p<0.001$).

Predictors of Health Facility Delivery – Rural Respondents

Table 8 Predictors of health facility delivery, rural respondents

Predictor	B	aOR	95% CI	p-value
Education level				
Primary vs Tertiary	-2.002	0.135	0.031–0.590	0.008*
Secondary vs Tertiary	0.261	1.298	0.240–7.016	0.762
Number of children	2.010	7.464	1.687–33.031	0.008*
Husband's occupation				
Skill level 2 vs Level 4	-1.808	0.164	0.028–0.967	0.046*
Skill level 3 vs Level 4	-0.557	0.573	0.084–3.907	0.569
Has support system				
Yes vs No	1.858	6.411	1.942–21.172	0.002*
Self-rated knowledge				
Excellent vs Fair/Poor	0.385	1.470	0.256–8.440	0.666
Good vs Fair/Poor	0.364	1.439	0.400–5.178	0.578

*Model $R^2=43.0-52.2$; Hosmer-Lemeshow $\chi^2=6.847$, $p=0.553$; aOR=adjusted odds ratio; CI=confidence interval; *Statistically significant*

Binary logistic regression for rural respondents (Table 8) identified several significant predictors. Primary education level was associated with significantly lower odds of facility delivery (aOR=0.135, 95%CI: 0.031–0.590, $p=0.008$) compared to tertiary education. Number of children showed a strong positive association (aOR=7.464, 95%CI: 1.687–33.031, $p=0.008$). Having a support system significantly increased odds of facility delivery (aOR=6.411, 95%CI: 1.942–21.172, $p=0.002$). Husband's occupation at skill level 2 was associated with reduced facility delivery odds (aOR=0.164, 95%CI: 0.028–0.967, $p=0.046$).

Predictors of Health Facility Delivery – Urban Respondents

Table 9 Predictors of health facility delivery, urban respondents

Predictor	B	aOR	95% CI	p-value
Gravidity (continuous)	1.664	5.279	1.757–15.860	0.003*
Has support system				
Yes vs No	2.952	19.150	4.287–85.550	<0.001*
Self-rated knowledge				
Excellent vs Fair/Poor	2.803	16.499	1.023–266.050	0.048*
Good vs Fair/Poor	2.678	14.559	0.706–300.401	0.083
Monthly income				
<50,000 vs >100,000	-2.250	0.105	0.003–4.365	0.236
50,000–100,000 vs >100,000	-2.051	0.129	0.003–5.322	0.280

*Model $R^2=38.5-44.7$; Hosmer-Lemeshow $\chi^2=8.432$, $p=0.392$; aOR=adjusted odds ratio; CI=confidence interval; *Statistically significant*

For urban respondents (Table 9), gravidity was a significant predictor, with each additional pregnancy increasing facility delivery odds (aOR=5.279, 95%CI: 1.757–15.860, $p=0.003$). Having a support system showed the strongest association (aOR=19.150, 95%CI: 4.287–85.550, $p<0.001$). Self-rated excellent knowledge about facility delivery importance significantly predicted facility delivery (aOR=16.499, 95%CI: 1.023–266.050, $p=0.048$) compared to fair/poor knowledge.

DISCUSSION

This study reveals important differences in facility delivery patterns and determinants between urban and rural settings in Benin City, Nigeria. While facility delivery rates were higher among urban women (79.1%) compared to rural women (70.0%), both rates fall short of international targets. Understanding the distinct factors influencing facility delivery decisions in each setting is crucial for designing effective, context-specific interventions.

The overall facility delivery rate of 74.5% in our study exceeds the national average of 43% reported in the 2023/2024 NDHS [10], likely reflecting the study's focus on women actively engaged in ANC services and the relatively higher socioeconomic status of Benin City residents compared to rural Nigeria broadly. However, the persistent urban-rural gap (79.1% vs 70.0%) mirrors national patterns and highlights ongoing inequities in maternal health service access [25,26].

The 30% non-facility delivery rate among rural women who attended ANC represents a significant gap in the continuum of care—a phenomenon documented across sub-Saharan Africa [27,28]. This disconnect

between ANC attendance and facility delivery suggests that barriers to facility delivery persist even when women engage with formal healthcare systems during pregnancy. Addressing this gap is critical, as the majority of maternal deaths occur during delivery and the immediate postpartum period [29].

The striking difference in facility delivery motivations between settings provides important insights. Urban women's emphasis on skilled healthcare provider availability (65.5%) reflects greater health literacy and expectation of quality care, consistent with findings from other African urban centers [30,31]. Their higher rates of referral from healthcare providers (27.6%) suggest more integrated and proactive healthcare systems in urban areas.

In contrast, rural women's prioritization of proximity (37.7%) and facility reputation (41.6%) underscores the practical constraints and limited options facing rural populations. When distance and transportation are major barriers, women must compromise between accessibility and quality, often choosing the nearest facility regardless of service quality. This finding aligns with studies across low-income settings showing distance as a critical determinant of facility delivery, consistent with the primary healthcare principle of health facilities being close to where people live and work [32,33].

The relatively low emphasis on emergency obstetric care availability in both settings (5.2% rural, 16.1% urban) is concerning, suggesting limited awareness of potential complications requiring emergency intervention. This knowledge gap may contribute to delayed care-seeking when complications arise, increasing maternal mortality risk [34].

Financial constraints emerged as the predominant barrier in both settings (76.5% rural, 70.8% urban), underscoring the economic burden of facility delivery despite Nigeria's free maternal health policies in some states [35]. These costs include not only direct medical fees but also transportation, medications, supplies, and opportunity costs of time away from productive activities [36,37]. The similarity of financial barriers across settings suggests that poverty transcends geographic location, affecting maternal health outcomes regardless of infrastructure availability. Provision of a basic health fund for this category of women should be implemented in primary healthcare facilities.

The disproportionate impact of distance on rural women (48.8% vs 16.7% urban) confirms geographic access as a rural-specific barrier requiring targeted interventions. Combined with transportation difficulties (38.2% rural, 54.2% urban), these findings highlight the need for decentralized delivery services, ambulance systems, and transportation voucher programs in rural areas. Studies from Tanzania and Ethiopia have demonstrated the effectiveness of such interventions in increasing facility delivery rates [38,39].

Interestingly, cultural and religious barriers were minimal in both settings, contrasting with findings from northern Nigeria and other regions where traditional beliefs significantly influence delivery location choices [40,41]. This may reflect the relatively higher education levels in our sample and the predominance of Christianity, which typically supports modern healthcare utilization. However, the 20.6%

of rural women reporting fear/anxiety about facility childbirth warrants attention, as negative perceptions of facility care can deter utilization even when accessible [42].

The significantly lower satisfaction levels among rural women, with only 2.6% reporting being "very satisfied" compared to 36.8% of urban women, reflects substantial quality-of-care disparities. Rural health facilities in Nigeria often face chronic shortages of skilled personnel, essential medicines, and equipment—factors critically affecting service quality [43,44]. The higher prevalence of disrespectful care experiences among rural women (15.6% vs 4.6%) is particularly concerning, as mistreatment during facility delivery discourages future utilization and perpetuates negative community perceptions of facility-based care [45,46].

These findings align with the growing recognition of respectful maternity care as essential for improving facility delivery rates [47]. Women who experience or hear about disrespectful treatment may choose home delivery for subsequent pregnancies, even when facilities are accessible. Addressing provider attitudes through training on respectful care, improving working conditions to reduce staff burnout, and implementing accountability mechanisms are critical interventions [48,49].

In rural areas, maternal education emerged as a powerful predictor, with primary education associated with 86.5% lower odds of facility delivery compared to tertiary education. This finding underscores education's multifaceted role in maternal health—influencing knowledge, decision-making autonomy, economic resources, and health-seeking behaviors [50,51]. The strong protective effect of tertiary education suggests that even secondary education may be insufficient to overcome deeply entrenched barriers in resource-limited settings.

The positive association between number of children and facility delivery (aOR=7.464) appears counterintuitive, as higher parity typically correlates with reduced facility delivery in many settings due to perceived maternal experience and complacency [52]. However, our finding may reflect several factors: (1) women with more children may have experienced complications in previous pregnancies, motivating facility delivery; (2) multigravida women may have better established relationships with healthcare systems; (3) selection bias, as women who consistently deliver in facilities accumulate more children over time compared to those experiencing higher mortality with home deliveries.

Husband's occupation significantly influenced facility delivery, with skill level 2 occupations (typically low-skilled, unstable employment) associated with reduced odds. This finding highlights the importance of household economic stability beyond simple income measures. Men in precarious employment may lack the financial security, health insurance, or job flexibility to support facility delivery costs and time requirements [53,54]. Interventions targeting male partners—including health education, economic empowerment, and workplace policies supporting maternal health—could improve facility delivery rates [55].

The critical role of support systems (aOR=6.411) emphasizes that facility delivery decisions are rarely made autonomously but within complex social networks. Support encompasses financial assistance,

transportation, childcare for other children, and emotional encouragement. Community-based interventions leveraging these existing support structures—such as birth preparedness groups and transport schemes—have shown promise in other African settings [56,57].

Urban predictors differed notably from rural ones, reflecting distinct barriers and facilitators. Gravidity's positive association with facility delivery suggests that in urban settings with better healthcare access, women's accumulated experience with the healthcare system increases confidence and familiarity with facility-based services. Each pregnancy provides additional exposure to health information and provider counseling about delivery risks [58].

Support systems showed the strongest association in urban areas (aOR=19.150), even more pronounced than in rural settings. This may reflect urban nuclear family structures where women lack extended family support, making organized support systems particularly crucial. Urban women's support often involves financial assistance for private facility costs, as urban private healthcare utilization is higher [59]. Programs establishing community support groups for pregnant women could leverage this protective factor.

Knowledge about facility delivery importance independently predicted facility delivery in urban areas (aOR=16.499 for excellent knowledge), demonstrating that in settings where facilities are accessible, health literacy becomes the critical determinant. This contrasts with rural areas where structural barriers (distance, cost, availability) may override knowledge effects. Urban health education interventions can therefore more directly translate into behavior change, suggesting efficiency in targeting health promotion efforts in urban populations while simultaneously addressing infrastructure in rural areas [60].

The non-significant association between income and facility delivery in urban multivariate analysis, despite significant bivariate associations, suggests that income's effect may be mediated through other factors like education, knowledge, and support systems. This highlights the complexity of socioeconomic influences on health behaviors and the importance of multivariate analysis in identifying independent predictors [61].

This study contributes to understanding breakdowns in the maternal care continuum. Among women attending ANC, approximately 30% of rural and 21% of urban women still delivered outside facilities, contributing to missed opportunities for safe delivery. This pattern mirrors findings from Cambodia and South Asia showing substantial dropouts between ANC and facility delivery [62,63]. The continuum of care framework emphasizes that each component—ANC, facility delivery, postnatal care—must be accessible and acceptable for optimal maternal and neonatal outcomes [64].

Interventions must therefore address not only individual determinants but also health system factors ensuring continuity. These include: (1) integrating delivery planning into ANC counseling; (2) establishing referral linkages between primary care facilities and delivery centers; (3) implementing tracking systems to follow pregnant women through delivery; (4) providing birth preparedness packages during ANC including transport arrangements and facility orientations [65,66].

These findings have several important policy and programmatic implications:

Differentiated strategies by setting. Urban interventions should prioritize health education and quality improvement, leveraging existing infrastructure. Rural interventions require infrastructure development, transportation solutions, and community engagement to overcome access barriers. One-size-fits-all approaches will fail to address setting-specific determinants.

Financial protection mechanisms. Given that financial constraints affect both settings, expanding the National Health Insurance Scheme (NHIS) coverage specifically for delivery services, implementing free delivery policies (as in some Nigerian states), and providing emergency transport subsidies are critical [67,68]. Evidence from Rwanda and Ghana demonstrates that financial protection mechanisms substantially increase facility delivery rates [69,70].

Quality improvement and respectful care. Addressing quality-of-care deficits, particularly in rural facilities, requires multi-faceted approaches: (1) adequate staffing and skill enhancement through training; (2) ensuring essential medicines and equipment availability; (3) provider training on respectful maternity care; (4) establishing feedback and accountability mechanisms; (5) improving working conditions to reduce provider burnout [71,72].

Male partner and community engagement. Interventions engaging husbands and community leaders in maternal health promotion can address household decision-making dynamics and mobilize community support systems. Successful models include male partner involvement programs, community health education by traditional leaders, and community birth preparedness committees [73,74].

Educational interventions. Long-term investments in female education remain fundamental for improving maternal health outcomes. In the shorter term, health literacy programs integrated into ANC, community education campaigns, and school-based reproductive health education can enhance knowledge about facility delivery importance [75,76].

Infrastructure and service delivery innovation. Rural areas require innovative service delivery models including: (1) maternity waiting homes near delivery facilities; (2) mobile clinics providing ANC and facilitating delivery planning; (3) upgrading primary health centers for basic emergency obstetric care; (4) establishing emergency transport systems with community-level communication (phone access, community radio) [77,78].

STUDY STRENGTHS AND LIMITATIONS

This study's strengths include its comparative design enabling direct assessment of urban-rural differences, adequate sample size with high response rate, use of validated questionnaires, and multivariate analysis identifying independent predictors while controlling for confounders. The longitudinal component allowed verification of delivery outcomes rather than relying solely on previous experiences.

Sampling from women already attending ANC likely overestimates facility delivery rates compared to the general population, as ANC attendees are predisposed to facility-based care. Self-reported data may be subject to recall bias for previous deliveries and social desirability bias regarding knowledge and practices. The study could not follow all women through current delivery due to migration and address changes, limiting prospective analysis.

CONCLUSION

Health facility delivery rates in Benin City show concerning urban-rural disparities, with multiple interacting factors influencing delivery location decisions differently in each setting. The findings provide evidence to guide policy formulation and program design, emphasizing that improving facility delivery requires not merely building more facilities, but ensuring these facilities are accessible, affordable, acceptable, and provide quality respectful care that encourages women to return for subsequent pregnancies.

DECLARATIONS

Ethics Approval and Consent to Participate

Ethical approval was obtained from the Ethics and Research Committee of the University of Benin Teaching Hospital (Approval number: ADM/E22/A/VOL. VII/148654826). Written informed consent was obtained from all participants after explaining study objectives, procedures, risks, benefits, and participants' rights to withdraw without penalty. Confidentiality and anonymity were maintained throughout the study.

All human-related procedures were performed in accordance with relevant guidelines and regulations as approved by Ethics and Research Committee of the University of Benin Teaching Hospital (Approval number: ADM/E22/A/VOL. VII/148654826).

Consent for Publication

Not applicable.

Availability of Data and Materials

The datasets generated and/or analyzed during the current study are available from the corresponding author on reasonable request.

Competing Interests

The authors declare no competing interests.

Funding

No external funding was received for this study.

Clinical Trial Number: not applicable.

Authors' Contributions

WBO conceived the study, designed the methodology, collected data, performed statistical analysis, and drafted the manuscript. OHO supervised the study, provided critical inputs to study design and data interpretation, and critically reviewed the manuscript. VO contributed to data collection, literature review, and manuscript revision. All authors read and approved the final manuscript.

Acknowledgements

We acknowledge all pregnant women who participated in this study. We thank the management and staff of Uselu Primary Health Center and Okokhuo Primary Health Center for their cooperation. We appreciate all women who volunteered their time to participate, and the research assistants for their dedication during data collection.

References

1. World Health Organization. Trends in maternal mortality 2000 to 2017: estimates by WHO, UNICEF, UNFPA, World Bank Group and the United Nations Population Division. Geneva: World Health Organization; 2019.
2. Kinney MV, Kerber KJ, Black RE, Cohen B, Nkrumah F, Coovadia H, et al. Sub-Saharan Africa's mothers, newborns, and children: where and why do they die? PLoS Med. 2010;7(6):e1000294.
3. Alkema L, Chou D, Hogan D, Zhang S, Moller AB, Gemmill A, et al. Global, regional, and national levels and trends in maternal mortality between 1990 and 2015, with scenario-based projections to 2030: a systematic analysis by the UN Maternal Mortality Estimation Inter-Agency Group. Lancet. 2016;387(10017):462-74.
4. National Population Commission (NPC) [Nigeria] and ICF. Nigeria Demographic and Health Survey 2018. Abuja, Nigeria, and Rockville, Maryland, USA: NPC and ICF; 2019.
5. Tura G, Fantahun M, Worku A. The effect of health facility delivery on neonatal mortality: systematic review and meta-analysis. BMC Pregnancy Childbirth. 2013;13:18.

6. Lee HY, Leslie HH, Oh J, Kim R, Kumar A, Subramanian SV, et al. The association between institutional delivery and neonatal mortality based on the quality of maternal and newborn health system in India. *Sci Rep.* 2022;12(1):6220.
7. Khan KS, Wojdyla D, Say L, Gülmezoglu AM, Van Look PF. WHO analysis of causes of maternal death: a systematic review. *Lancet.* 2006;367(9516):1066-74.
8. Ronsmans C, Graham WJ. Maternal mortality: who, when, where, and why. *Lancet.* 2006;368(9542):1189-200.
9. World Health Organization. Making pregnancy safer: the critical role of the skilled attendant. Geneva: WHO; 2004.
10. National Population Commission (NPC) [Nigeria] and ICF. Nigeria Demographic and Health Survey 2018. Abuja, Nigeria: NPC and ICF; 2019.
11. Ashir GM, Doctor HV, Afenyadu GY. Performance based financing and uptake of maternal and child health services in Yobe State, northern Nigeria. *Glob J Health Sci.* 2013;5(3):34-41.
12. Doctor HV, Findley SE, Bairagi R, Dahiru T. Northern Nigeria Maternal, Newborn and Child Health Programme: selected analyses from population-based baseline survey. *Open Demography J.* 2011;4(1):11-21.
13. Moyer CA, Mustafa A. Drivers and deterrents of facility delivery in sub-Saharan Africa: a systematic review. *Reprod Health.* 2013;10(1):40.
14. Anastasi E, Borchert M, Campbell OMR, Sondorp E, Kaducu F, Hill O, et al. Losing women along the path to safe motherhood: why is there such a gap between women's use of antenatal care and skilled birth attendance? A mixed methods study in northern Uganda. *BMC Pregnancy Childbirth.* 2015;15(1):287.
15. Gabrysch S, Campbell OM. Still too far to walk: literature review of the determinants of delivery service use. *BMC Pregnancy Childbirth.* 2009;9(1):34.
16. Boah M, Mahama AB, Ayamga EA. They receive antenatal care in health facilities, yet do not deliver there: predictors of health facility delivery by women in rural Ghana. *BMC Pregnancy Childbirth.* 2018;18(1):125.
17. Ahmed S, Creanga AA, Gillespie DG, Tsui AO. Economic status, education and empowerment: implications for maternal health service utilization in developing countries. *PLoS One.* 2010;5(6):e11190.
18. Fekadu M, Regassa N. Skilled delivery care service utilization in Ethiopia: analysis of rural-urban differentials based on national demographic and health survey (DHS) data. *Afr Health Sci.* 2015;14(4):974-84.
19. Kerber KJ, de Graft-Johnson JE, Bhutta ZA, Okong P, Starrs A, Lawn JE. Continuum of care for maternal, newborn, and child health: from slogan to service delivery. *Lancet.* 2007;370(9595):1358-69.
20. Singh K, Story WT, Moran AC. Assessing the continuum of care pathway for maternal health in South Asia and sub-Saharan Africa. *Matern Child Health J.* 2016;20(2):281-9.

21. Kikuchi K, Ansah EK, Okawa S, Enuameh Y, Yasuoka J, Nanishi K, et al. Effective linkages of continuum of care for improving neonatal, perinatal, and maternal mortality: a systematic review and meta-analysis. *PLoS One*. 2015;10(9):e0139288.
22. Bayu H, Fisseha G, Mulat A, Yitayih G, Wolday M. Missed opportunities for institutional delivery and associated factors among urban resident pregnant women in South Tigray Zone, Ethiopia: a community-based follow-up study. *Glob Health Action*. 2015;8(1):28082.
23. National Population Commission Nigeria. 2006 Population and Housing Census. Priority Tables Volume 1. Abuja: NPC; 2009.
24. Dahiru T, Oche OM. Determinants of antenatal care, institutional delivery and postnatal care services utilization in Nigeria. *Pan Afr Med J*. 2015;21:321.
25. Doctor HV, Nkhana-Salimu S, Abdulsalam-Anibilowo M. Health facility delivery in sub-Saharan Africa: successes, challenges, and implications for the 2030 development agenda. *BMC Public Health*. 2018;18(1):765.
26. Wanjira C, Mwangi M, Mathenge E, Mbugua G, Ng'ang'a Z. Delivery practices and associated factors among mothers seeking child welfare services in selected health facilities in Nyandarua South District, Kenya. *BMC Public Health*. 2011;11(1):360.
27. Wang W, Alva S, Wang S, Fort A. Levels and trends in the use of maternal health services in developing countries. DHS Comparative Reports No. 26. Calverton, Maryland: ICF Macro; 2011.
28. Adewuyi EO, Auta A, Khanal V, Bamidele OD, Akuoko CP, Adefemi K, et al. Prevalence and factors associated with underutilization of antenatal care services in Nigeria: a comparative study of rural and urban residences based on the 2013 Nigeria demographic and health survey. *PLoS One*. 2018;13(5):e0197324.
29. Li XF, Fortney JA, Kotelchuck M, Glover LH. The postpartum period: the key to maternal mortality. *Int J Gynaecol Obstet*. 1996;54(1):1-10.
30. Afulani PA, Moyer C. Explaining disparities in use of skilled birth attendants in developing countries: a conceptual framework. *PLoS One*. 2016;11(4):e0154110.
31. Iyaniwura CA, Yussuf Q. Utilization of antenatal care and delivery services in Sagamu, south western Nigeria. *Afr J Reprod Health*. 2009;13(3):111-22.
32. Thaddeus S, Maine D. Too far to walk: maternal mortality in context. *Soc Sci Med*. 1994;38(8):1091-110.
33. Gabrysch S, Campbell OM. Still too far to walk: literature review of the determinants of delivery service use. *BMC Pregnancy Childbirth*. 2009;9:34.
34. Maternal health and safe motherhood programme: maternal and newborn health/safe motherhood unit, division of reproductive health (technical support). Geneva: World Health Organization; 1994.
35. Federal Ministry of Health Nigeria. National Health Policy 2016: Promoting the Health of Nigerians to Accelerate Socio-economic Development. Abuja: FMOH; 2016.

36. Kruk ME, Mbaruku G, Rockers PC, Galea S. User fee exemptions are not enough: out-of-pocket payments for 'free' delivery services in rural Tanzania. *Trop Med Int Health*. 2008;13(12):1442-51.
37. Borghi J, Ensor T, Somanathan A, Lissner C, Mills A. Mobilising financial resources for maternal health. *Lancet*. 2006;368(9545):1457-65.
38. Mrisho M, Schellenberg JA, Mushi AK, Obrist B, Mshinda H, Tanner M, et al. Factors affecting home delivery in rural Tanzania. *Trop Med Int Health*. 2007;12(7):862-72.
39. Mekonnen Y, Mekonnen A. Factors influencing the use of maternal healthcare services in Ethiopia. *J Health Popul Nutr*. 2003;21(4):374-82.
40. Adamu YM, Salihu HM. Barriers to the use of antenatal and obstetric care services in rural Kano, Nigeria. *J Obstet Gynaecol*. 2002;22(6):600-3.
41. Envuladu EA, Agbo HA, Lassa S, Kigbu JH, Zoakah AI. Factors determining the choice of a place of delivery among pregnant women in Russia village of Jos North, Nigeria: achieving the MDGs 4 and 5. *Int J Med Biomed Res*. 2013;2(1):23-7.
42. Bohren MA, Vogel JP, Hunter EC, Lutsiv O, Makh SK, Souza JP, et al. The mistreatment of women during childbirth in health facilities globally: a mixed-methods systematic review. *PLoS Med*. 2015;12(6):e1001847.
43. Okafor II, Ugwu EO, Obi SN. Disrespect and abuse during facility-based childbirth in a low-income country. *Int J Gynaecol Obstet*. 2015;128(2):110-3.
44. Omo-Aghoja L, Aisien O, Akuse J, Bergstrom S, Okonofua F. Maternal mortality and emergency obstetric care in Benin City, South-south Nigeria. *Int J Obstet Gynecol*. 2013;1(1):1-6.
45. Bowser D, Hill K. Exploring evidence for disrespect and abuse in facility-based childbirth: report of a landscape analysis. Washington DC: USAID; 2010.
46. Freedman LP, Kruk ME. Disrespect and abuse of women in childbirth: challenging the global quality and accountability agendas. *Lancet*. 2014;384(9948):e42-4.
47. World Health Organization. The prevention and elimination of disrespect and abuse during facility-based childbirth. Geneva: WHO; 2014.
48. Rosen HE, Lynam PF, Carr C, Reis V, Ricca J, Bazant ES, et al. Direct observation of respectful maternity care in five countries: a cross-sectional study of quality of care. *Reprod Health*. 2015;12:96.
49. Abuya T, Warren CE, Miller N, Njuki R, Ndwiga C, Maranga A, et al. Exploring the prevalence of disrespect and abuse during childbirth in Kenya. *PLoS One*. 2015;10(4):e0123606.
50. Simkhada B, Teijlingen ER van, Porter M, Simkhada P. Factors affecting the utilization of antenatal care in developing countries: systematic review of the literature. *J Adv Nurs*. 2008;61(3):244-60.
51. Elo IT. Utilization of maternal health-care services in Peru: the role of women's education. *Health Transit Rev*. 1992;2(1):49-69.
52. Bell J, Curtis SL, Alayon S. Trends in delivery care in six countries. DHS Analytical Studies No. 7. Calverton, Maryland: ORC Macro; 2003.

53. Navaneetham K, Dharmalingam A. Utilization of maternal health care services in Southern India. *Soc Sci Med.* 2002;55(10):1849-69.
54. Burgard S. Race and pregnancy-related care in Brazil and South Africa. *Soc Sci Med.* 2004;59(6):1127-46.
55. Mullany BC, Becker S, Hindin MJ. The impact of including husbands in antenatal health education services on maternal health practices in urban Nepal: results from a randomized controlled trial. *Health Educ Res.* 2007;22(2):166-76.
56. Moran AC, Sangli G, Dineen R, Rawlins B, Yaméogo M, Baya B. Birth-preparedness for maternal health: findings from Koupéla District, Burkina Faso. *J Health Popul Nutr.* 2006;24(4):489-97.
57. Mutiso SM, Qureshi Z, Kinuthia J. Birth preparedness among antenatal clients. *East Afr Med J.* 2008;85(6):275-83.
58. Gleit DA, Goldman N, Rodriguez G. Utilization of care during pregnancy in rural Guatemala: does obstetrical need matter? *Soc Sci Med.* 2003;57(12):2447-63.
59. Kruk ME, Rockers PC, Mbaruku G, Paczkowski MM, Galea S. Community and health system factors associated with facility delivery in rural Tanzania: a multilevel analysis. *Health Policy.* 2010;97(2-3):209-16.
60. Reynolds HW, Wong EL, Tucker H. Adolescents' use of maternal and child health services in developing countries. *Int Fam Plan Perspect.* 2006;32(1):6-16.
61. Mekonnen Y, Mekonnen A. Utilization of maternal health care services in Ethiopia. Calverton, Maryland: ORC Macro; 2002.
62. Countdown to 2015 decade report (2000-2010): taking stock of maternal, newborn and child survival. Geneva: WHO and UNICEF; 2010.
63. Singh K, Story WT, Moran AC. Assessing the continuum of care pathway for maternal health in South Asia and sub-Saharan Africa. *Matern Child Health J.* 2016;20(2):281-9.
64. Kerber KJ, de Graft-Johnson JE, Bhutta ZA, Okong P, Starrs A, Lawn JE. Continuum of care for maternal, newborn, and child health: from slogan to service delivery. *Lancet.* 2007;370(9595):1358-69.
65. Hodgins S, D'Agostino A. The quality-coverage gap in antenatal care: toward better measurement of effective coverage. *Glob Health Sci Pract.* 2014;2(2):173-81.
66. Villar J, Ba'aqeel H, Piaggio G, Lumbiganon P, Belizán JM, Farnot U, et al. WHO antenatal care randomised trial for the evaluation of a new model of routine antenatal care. *Lancet.* 2001;357(9268):1551-64.
67. Fapohunda BM, Orobaton NG. When women deliver with no one present in Nigeria: who, what, where and so what? *PLoS One.* 2013;8(7):e69569.
68. Saleh-Ebrahimi L, Janati A, Arab-Zozani M, Feyzi R. Free delivery or maternal healthcare packages: can they increase health facility deliveries? A systematic review. *J Clin Diagn Res.* 2018;12(4):IE01-IE07.

69. Basinga P, Gertler PJ, Binagwaho A, Soucat AL, Sturdy J, Vermeersch CM. Effect on maternal and child health services in Rwanda of payment to primary health-care providers for performance: an impact evaluation. *Lancet*. 2011;377(9775):1421-8.
70. Dixon J, Tenkorang EY, Luginaah IN, Kuuire VZ, Boateng GO. National health insurance scheme enrolment and antenatal care among women in Ghana: is there any relationship? *Trop Med Int Health*. 2014;19(1):98-106.
71. Kruk ME, Pate M, Mullan Z. Introducing The Lancet Global Health Commission on High-Quality Health Systems in the SDG Era. *Lancet Glob Health*. 2017;5(5):e480-e481.
72. Tunçalp Ö, Were WM, MacLennan C, Oladapo OT, Gülmezoglu AM, Bahl R, et al. Quality of care for pregnant women and newborns—the WHO vision. *BJOG*. 2015;122(8):1045-9.
73. Mullany BC. Barriers to and attitudes towards promoting husbands' involvement in maternal health in Katmandu, Nepal. *Soc Sci Med*. 2006;62(11):2798-809.
74. Tweheyo R, Konde-Lule J, Tumwesigye NM, Sekandi JN. Male partner attendance of skilled antenatal care in peri-urban Gulu district, Northern Uganda. *BMC Pregnancy Childbirth*. 2010;10:53.
75. Babalola S, Fatusi A. Determinants of use of maternal health services in Nigeria—looking beyond individual and household factors. *BMC Pregnancy Childbirth*. 2009;9:43.
76. Mekonnen Y, Mekonnen A. Factors influencing the use of maternal healthcare services in Ethiopia. *J Health Popul Nutr*. 2003;21(4):374-82.
77. van Lonkhuizen L, Stekelenburg J, van Roosmalen J. Maternity waiting facilities for improving maternal and neonatal outcome in low-resource countries. *Cochrane Database Syst Rev*. 2012;10:CD006759.
78. Lori JR, Wadsworth AC, Munro ML, Rominski S. Promoting access: the use of maternity waiting homes to achieve safe motherhood. *Midwifery*. 2013;29(10):1095-102.