Predictors of Antenatal Care Utilization in Jordan: Findings from a National Survey

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Abstract

Objective: National interest in reaching the Millennium Development Goals in Jordan has led to advances in antenatal care (ANC) coverage, but disparities still exist. This paper examines factors that predict antenatal care utilization among Jordanian women, in an effort to minimize the gap in ANC use.

Methods: This study uses cross-sectional, nationally representative data collected through the Jordan National Family and Health Survey, 2007. The study population is 6725 women. The association between having >4 ANC visits and early initiation of ANC with a set of factors was examined using Chi-square test and binary logistic regression using SPSS version 20.

Results: Analysis reveal that the majority of women had more than four visits of ANC (92.5%) and had early initiation of ANC (88.6%). Binary logistic regression results confirm that the strongest predictors of >4 ANC visits are: higher education (OR=3.87, 95%CI= 2.7-5.5), planned pregnancy (OR= 1.8, 95%CI= 1.42-2.3) and having less children (OR= 1.75, 95%CI= 1.32-2.31). For early initiation of antenatal care, predictors are: having less children (OR= 2.1, CI= 1.6-2.6), having a planned pregnancy (OR= 1.78, 95%CI= 1.45-2.20), and living in the central region (OR= 1.39, 95% CI= 1.13-1.68).

Conclusions: Jordanian women experience high levels of ANC compared to developing countries, but disparities are evident. Interventions are needed to encourage girls' education, and promote benefits of family planning to both mothers and children. Outreach antenatal services can improve access to ANC in rural areas, in Northern, and in Southern regions of Jordan.

Keywords: Predictors, Antenatal care, Utilization, Jordan, Survey.

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Introduction

Providing regular health care services to mothers during and after pregnancy is very important for preventing maternal and neonatal mortality and poor birth outcomes[1,2]. Effective antenatal care (ANC) programs have been well established in developed countries for decades, and were later adopted, with local adjustments, by most developing countries.

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Antenatal care is usually assessed by both the time of initiation and the frequency of visits during pregnancy[3, 4].

The World Health Organization recommends that ANC for most normal pregnancies must consist of at least four visits during pregnancy and should start during the first trimester, with certain essential components for the visits[4]. National maternal mortality ratio for 2007 to 2008 in Jordan was estimated by Amarin et al. to be 19.1 per 100,000 live births[5]. This means that each year in Jordan, 38 women die as a result of child birth or its complications. Around 54% of these deaths are avoidable, where women had three or less antenatal visits, no ANC at all, or substandard care.

Several factors have been identified to influence maternal and specifically antenatal care use. Mother's education has been consistently recognized as the most significant positive predictor of utilizing ANC[6-12]. Parity, on the other hand, has been identified to have statistically significant negative relationship with adequate levels of ANC[13,14]. Family income was also reported as a significant factor enabling greater utilization of maternal care[2, 8, 11, 12]. Living in rural areas, coupled with extra time needed to reach health facility and the cost of transportation are associated with lower levels of maternal care use[11,12,15, 16]. However, the relationship between age and use of ANC is inconsistent in the reviewed literature.

Jordan is a low middle-income country with a population of 6,670,023[17]. Based on commonly used developmental indicators, Jordan ranks higher than most countries in the low middle-income category. As a result of declining mortality rate and high fertility rate (3.8 in 2010), the population growth rate is estimated to be 2.2% and infant mortality rate was 23 per 1,000 live births in 2010[18]. Antenatal care is provided in the public sector by 432 maternal and child care centers distributed across Jordan and also by public hospitals. Nevertheless, 64% of women in 2007 reported receiving antenatal care in private clinics and hospitals[19].

Jordan's health system is a complex combination of several public and private programs. Two major public programs that finance as well as deliver care are the Ministry of Health (MOH) and Royal Medical Services (RMS). The health expenditure as percentage of the GDP was 9.3 in 2009, and the per capita health expenditures in 2009 was JD336[20]. Approximately 82% of Jordanians are health insured[21]. The antenatal care coverage in Jordan for ≥4 visits was 94.5 in 2012[22], 92.5% in 2007[19], compared to 68.4% in 1990 and 58% in 1983[23]. Regarding antenatal care delivery, 98.7% of births took place in a health facility and were attended by skilled personnel. Postnatal care utilization rate ranged from 2.5 to 49.3% of women who gave birth in different Jordanian directorates[23].

In Jordan, Abbas and Walker in 1986, Obermeyer and Potter in 1991 and most recently Shakhatreh et al. in 1996, have all examined factors that influence antenatal care in Jordan, and have pinpointed differentials and disparities in ANC utilization. Despite the fact that maternal mortality decreased by half in the last 10 years[5], disparities still exist. Although previous research in Jordan has addressed factors that predict use of maternal services, little is known about the relative importance of these factors as predictors for antenatal care use in the last 15 years. This

information will be instrumental for designing new effective interventions to improve the quality of ANC in Jordan.

Hence, this present study comes to answer the following questions: What is the level of antenatal care utilization in Jordan? What are the factors that predict differences in receiving more than four ANC visits? And, what are the factors that predict early initiation of ANC among Jordanian women? This will inform health policy makers about important factors that contribute to differences in the utilization of antenatal care among Jordanian women. This will hopefully contribute to the efforts to minimize the gaps in ANC services by improving planning, organization and provision of antenatal care services in Jordan.

Methods

Data Sources

This study utilizes data extracted from the 2007 Jordan Population and Family Health Survey (JPFHS) (DHS, 2008)[19], carried out by the Department of Statistics as part of the worldwide Demographic and Health Survey program. This is the fourth survey and is based on a nationally representative sample of 14,564 households and 10,879 ever-married women, 18 to 49 years old. This study used a stratified two-stage cluster sample design, with a response rate of 97%. The sample covered all 12 Jordanian governorates, rural and urban areas, in the Northern, Central and Southern regions. For the purpose of this study, the author extracted data related to 6,725 women who had at least one birth in the last five years preceding the survey. In the case of more than one pregnancy, only the last pregnancy was counted. More recent set of data was available (DHS, 2010)[23], but it did not contain any data about maternal health. Information about the survey can be found in the JPFHS Report[19]. Data were requested and obtained from Measure DHS for this study. This study was approved by the Institutional Review Board (IRB) in Jordan University of Science and Technology.

Variables

There are two dependent variables (outcome variables) in this study that characterize antenatal care utilization and they are: number of antenatal care visits and timing of the first ANC visit. Antenatal care refers to any pregnancy-related health care a woman receives from a skilled health personnel. Utilization of antenatal care was measured by the number of ANC visits during pregnancy, for which a four visit cut-off point was used because it is the number of ANC visits recommended by the World Health Organization (WHO) for uncomplicated pregnancy. Number of ANC visits was dichotomized as inadequate ANC ($\leq$ 4 visits) and adequate ANC (> 4 visits). The timing of first antenatal care visit was dichotomized as early initiation (first visit during the first trimester, $\leq$ 3 months) and late initiation (first visit after the first trimester, > 3 months).

The independent variables considered in this study are maternal individual characteristics. These include the region of residence that has been categorized according to administrative division in Jordan into: Central, Northern, and Southern regions. The type of place of residence was categorized to urban/ rural residence. Wealth levels were constructed considering the poverty level in Jordan in 2007, which was 300JD's (US$430). Other variables are: mother's age at most recent pregnancy, number of children, level of

education, working status, and whether pregnancy was wanted and planned or not.

Statistical Analysis

Analysis was performed using SPSS version 20. Descriptive statistics were applied to obtain frequencies and percentages for maternal individual characteristics. The author used Chi-squire test to detect significant relationships between variables and to assess crude Odds Ratios (OR). The level of statistical significance for *p*-value is set as 0.05. Independent variables with no statistical significance in chi-square test were not entered in to the regression model.

Binary logistic regression was applied to assess adjusted Odds Ratios (aOR), to assess the relative importance of maternal individual characteristics as factors associated with having inadequate ANC visits and late initiation of ANC. Correlation between independent variables was checked and only one of the highly correlated variables was used in the analysis. Moderate correlation was detected between age and number of children (r= 0.59). Mild correlation was detected between education and working status (r= 0.31), education and wealth (r= 0.28), and between education and number of children (r= 0.28). Accordingly, age was excluded from the logistic regression model. In regression, backward elimination procedure was used to identify variables that are significantly associated with the dependent variables. .

Results

Descriptive Analysis Results

The analysis of antenatal care utilization in this paper was carried out on a representative sample of Jordanian women who had at least one live birth in the five years preceding the 2007 JPFHS survey. Out of the 10876 women surveyed, 6725 women met these criteria. Table 1 presents the individual characteristics of women included in this analysis. Almost two thirds of the study population is urban (67.9%), and it is distributed almost evenly on the three geographic regions in Jordan (Central, North, and South). Nearly half of the women gave birth to their last child when they were 26 to 35 years old, and two thirds of them had three children or more. Educational level is relatively high, where 88% of women attained secondary education (high school) or higher. Employment rate among Jordanian women is very low, only 13.4% worked outside their home. The majority of women in the sample came from households that are considered poor (58.2%), compared to 21% which are rich. Only two thirds of the women had a planned and wanted pregnancy. Table 1 also shows that 92.5% of women had more than four ANC visits, and 88.6% of them started antenatal care during the first trimester.

In table one, results of chi-square test are presented. The analysis revealed significant association between attending more than 4 ANC visits and being younger, with less children, highly educated, employed, living in urban areas, residing in the central region, being wealthy, and having a planned pregnancy. Women who started ANC in the first trimester are more likely to live in the central region, to be younger, have less children, with higher education, to be employed, rich, and to have a planned pregnancy.

Table 1. Maternal individual characteristics by outcome variables for women who had a live birth in the five years preceding the 2007JPFHS*, Chi-square results (N= 6725)

Demographic and socio-economic characteristics	% (n)	Number of ANC visits % (n)		Initiation of ANC** % (n)	
		<4 visits	≥4 visits	≤ 3 m	>3 m
Urban/Rural			**p<0.001**		p=0.40
Urban	67.9 (4563)	57.6 (291)	68.7 (4272)	66.6 (503)	68.2 (3996)
Rural	32.1 (2162)	42.4 (214)	31.3 (1984)	33.4 (252)	31.8 (1863)
Region of Residence			**p<0.001**		**p<0.001**
Central	36.4 (2450)	27.7 (140)	37.1 (2310)	27.2 (205)	37.7 (2209)
North	33.3 (2241)	35.6 (180)	33.1 (2061)	37.7 (285)	32.7 (1915)
South	30.2 92034)	36.6 (185)	29.7 (1849)	35.1 (265)	29.6 (1735)
Age when gave birth			**p<0.001**		**p<0.001**
≤ 25 years	26.6 (1791)	19.6 (99)	27.2(1692)	27.6 (1618)	20.1 (152)
26-35 years	53.6 (3606)	52.5(265)	53.7 (3341)	54.1 (3172)	51.1 (386)
>35 years	19.7 (1328)	27.9 (141)	19.1 (1187)	18.2 (1069)	28.7 (217)
Number of children			**p<0.001**		**p<0.001**
1-2	33.2 (2231)	20.8 (105)	34.2 (2126)	35.0 (2052)	21.6 (163)
3-5	44.1 (2965)	40.4 (204)	44.4 (2761)	44.3 (5298)	43.2 (326)
≥ 6	22.7 (1529)	38.8 (196)	21.4 (1333)	20.6 (1209)	35.2 (266)
Level of education			**p<0.001**		**p<0.001**
No education	5.0 (336)	14.3 (72)	4.2 (264)	4.3 (254)	7.7 (58)
Primary	6.9 (467)	13.7 (69)	6.4 (398)	6.3 (368)	10.7 (81)
Secondary	59.2 (3978)	54.9 (277)	59.5 (3701)	59.3 (3472)	58.8 (444)
Higher	28.9 (1944)	17.2 (87)	29.9 (1857)	30.1 (1765)	22.8 (172)
Working status			**p= 0.005**		**p=0.024**
Unemployed	86.6 (5824)	90.7 (458)	86.3 (5366)	86.1 (5043)	89.1 (673)
Employed	13.4 (901)	9.3 (47)	13.7 (854)	13.9 (816)	10.9 (82)
Wealth			**p<0.001**		**p=0.002**
Poor	58.2 (3916)	71.3 (360)	57.2 (3556)	57.1 (3347)	63.4 (479)
Middle	20.8 (1400)	16.4 (83)	21.2 (1317)	21.2 (1243)	19.6 (148)
Rich	21.0 (1409)	12.3 (62)	21.7 (1347)	21.7 (1269)	17.0 (128)
Pregnancy was wanted			**p<0.001**		**p<0.001**
Then	69.2 (4657)	54.5 (275)	70.5 (4382)	71.5 (4192)	54.4 (411)
Later	15.9 (1068)	17.8 (90)	15.7 (978)	15.3 (894)	20.5 (155)
Not at all	14.9 (1000)	27.7 (140)	13.8 (860)	13.2 (773)	25.0 (189)
Total	100 (6725)	7.5 (505)	92.5 (6220)	11.4 (755)	88.6 (5859)

* The Jordan Population and Family Health Survey.

** Total N= 6614, the number of women who had antenatal care.

Logistic Regression Results

Table 2 presents results of binary logistic regression carried out to investigate the net effect of the factors associated with utilizing adequate ANC (> 4 visits), and of early initiation of ANC (during the first trimester).

The odds of having > 4 ANC visits are 1.35 times higher for women living in urban areas compared to those who live in rural areas (95% CI= 1.11-1.64). No significant difference exists in the number of ANC visits received among women residing in the Central, Northern or Southern regions. Women who have 1-2 children are more likely to receive adequate ANC compared to those with >6 children (OR= 1.75, 95%CI= 1.32-2.31), and women who are wealthy are 1.67 times more likely to have attended adequate ANC compared to the poor (95% CI= 1.24-2.26). Education has proved to be the most significant factor with the strongest association with receiving adequate ANC. Women with secondary and higher education are 2.7 and 3.87 times more likely to have adequate ANC (95%CI= 2.0-3.7 and 2.7-5.5 respectively). Working women are just as likely to attend ANC as non-working women. Having a planned and wanted pregnancy increases the odds of receiving adequate ANC compared to women who did want the pregnancy at all (OR= 1.8, 95% CI= 1.42-2.3).

When the net effect of each of the independent variables was assessed using binary logistic regression presented in Table 2, the likelihood of starting first ANC visit during the first trimester were significantly higher for women living in the Central region (OR = 1.4, 95%CI= 1.13-1.68), with less children (OR= 2.0, 95%CI= 1.64-2.62), with higher education (OR= 1.44, 95%CI= 1.01-2.05), who are rich (OR= 1.26, 95%CI= 1.01-1.58), in addition to women who had a planned and wanted pregnancy (OR = 1.8, 95%CI= 1.45-2.2) (Table 2).

Table 2. Factors that predict number of ANC visits and timing of the first ANC visit for women who had a live birth in the five years preceding the 2007 JPFHS[*], results of binary logistic regression analysis

Demographic and socio-economic characteristics	Number of ANC visits (N=6725)	Timing of First ANC visit (N=6614)
	Adjusted OR (95% CI)**	**Adjusted OR[†] (95% CI)**
Place of Residence (Rural)[‡]		
Urban	1.35 (**1.11-1.64**)	----------
Region of Residence (South)		
Central	1.24 (0.98-1.57)	1.38 **(1.13-1.68)**
North	1.00 (0.80-1.24)	0.99 (0.83-1.20)
Number of children (≥ 6)		
1-2	1.75 **(1.32-2.31)**	2.07 **(1.64-2.62)**
3-5	1.34 **(1.06-1.68)**	1.42 **(1.17-1.72)**
Level of education (No education)	1.43 (0.99-2.07)	0.93 (0.64-1.37)
Primary	2.72 (**2.0-3.69**)	1.31 (0.95-1.79)
Secondary	3.87 (**2.70-5.54**)	1.44 **(1.01-2.05)**
Higher		
Wealth (Poor)		
Middle	1.39 **(1.07-1.79)**	1.15 (0.94-1.41)
Rich	1.67 **(1.24-2.26)**	1.26 **(1.01-1.58)**

Demographic and socio-economic characteristics	Number of ANC visits (N=6725)	Timing of First ANC visit (N=6614)
	Adjusted OR (95% CI)**	**Adjusted OR† (95% CI)**
Working status (unemployed)		
Employed	0.95 (0.61-1.34)	----------
Pregnancy wanted (Not wanted at all)	1.81 (**1.42-2.30**)	1.78 **(1.45-2.20)**
Wanted at time of pregnancy	1.25 (0.92-1.70)	1.07 (0.83-1.37)
Wanted later after pregnancy		

* The Jordan Population and Family Health Survey

** Variables in the model are: region of residence, type of place of residence, number of children, education, wealth, working status, and pregnancy was wanted or not.

† Variables in the model are: region of residence, number of children, education, wealth, and pregnancy was wanted or not.

‡ Reference category in parenthesis

Discussion

In this paper, we attempt to examine the factors that influence differentials in antenatal care use, in terms of quantity, and time of initiation of care among Jordanian women, based on the 2007 JPFHS data. The overall picture provided by this data indicates that Jordanian women experience high levels of antenatal care utilization, but the quality of this antenatal care, which cannot be properly evaluated given the available data, might be deficient for a significant proportion of these women.

Among women in the sample, 92.5% of women received more than four ANC visits during their last pregnancy. This proportion in Jordan is above average for a developing country, and is higher than many countries in the region such as Egypt, Turkey, and Morocco, but lower than some others like Bahrain[23].

The current study reveals that residence in rural areas significantly decreased the likelihood of attending antenatal care in Jordan. Nevertheless, residence in rural areas in Jordan did not impede women from starting ANC care early in pregnancy. The need for transportation in many cases acts as barrier to accessing health care for women in rural areas, which increases the cost of health care.

Women on the Central region were more likely to initiate care earlier. This indicates the existence of a set of health system factors in the Northern and Southern regions that negatively influences the availability, accessibility, quality, and/or affordability of ANC services, thereby decreasing overall utilization. Policy level changes can be introduced to the health care system in Jordan. Offering proper incentives to health care professionals, for example, can make working in rural areas more attractive, reducing the longstanding problem of shortages in health care professionals and the high turnover rates in rural areas. Using mobile clinics in the most remote rural areas in the Northern and Southern regions, may improve ANC service delivery for women, and can be a practical solution for such a problem.

The current results regarding women's educational level conform with studies in the

literature in regard to the role of education as the most significant predictor of utilizing antenatal care in terms of quantity and time of initiation[1, 6, 11, 14]. Education raises the socio-economic status for women and their families. Education also affects health care utilization by making women more able to navigate the health care system, and by enhancing women's autonomy which renders women more capable of making decisions related to their own health, as well as that of their children. However, there is some evidence that lack of education might not be a strong predictor of antenatal care use if proper program interventions were tailored to encourage women to utilize the available antenatal care services[24].

Having more than six children is the strongest predictor of late initiation of ANC, and heavily influences utilization, which is consistent with previous results in some developing countries[11, 24, 25]. Usually, women during their first pregnancy are most likely to seek antenatal care, and after having a larger family, women will tend to underutilize health care because of increased responsibilities women have, which makes ANC visits of less priority to her. This result can be also explained by the fact that a woman with higher birth order does have accumulated experience from previous pregnancies. This makes her more informed about potential complications that would need medical attention, and may skip unnecessary ANC visits if she feels good.

The proportion of women who have more than six children is becoming much smaller in Jordan in recent years, after the organized family planning programs on a national level with evident media coverage. Keeping the current momentum of family planning campaigns in Jordan will result in further reduction in family size. This can only work if program planners continue taking into consideration the cultural and religious issues that complicate the Jordanian society's critical attitudes towards family planning.

No relationship was detected between women's working status and use of ANC. This can be explained by the difficulty women might have to take time off work to go for ANC which offsets the positive role of work in increasing women's autonomy and income, which should enhance decision making ability and access to health care. This contradicts previous studies where women's employment positively affected use of quality health care[26].

Expectedly, unplanned pregnancy is strongly associated with both inadequate ANC and late initiation of antenatal care. This clearly expresses the importance of promoting family planning in Jordan. The impact of becoming pregnant accidentally is tremendous on the psychological state of a woman, and it negatively affects women's motivation to follow up the baby during pregnancy[25].

It would be cost-effective also to educate and train people from these rural areas to go back and serve their own community. This will help in patients being cared for by health care providers who are more knowledgeable of the local norms and values, and whom they know as members of families in the community. This will increase the chances for follow-up generating better health outcomes. Also, this can dramatically reduce turnover rate for health care employees serving in rural areas.

The present study has a number of limitations. In this paper, the author was unable to address health care system factors

because the data were not available. The available data also did not include information about health insurance status; which could have explained some critical issues related to ANC utilization. Despite its limitations, this study has highlighted important associations between antenatal health care use and a number of maternal individual characteristics. Nevertheless, there is an immediate need for deeper exploration of the causes behind the existing disparities in ANC use.

More harmonized efforts are needed to introduce behavioral health promotion campaigns on a national level with inter-sectoral collaboration targeting women in reproductive age, and especially women with lower levels of education. Private sector partnerships and collaboration would be essential to support such efforts. A national plan for improving maternal health is present in Jordan, with a protocol for ANC, but there are challenges in the implementation and monitoring.

Mass media should be vigorously employed to deliver important messages to women regarding the effectiveness of ANC services during pregnancy. At the same time, adherence to national guidelines for ANC has to be strengthened in both public and private settings, to improve quality and content of ANC. Future research efforts may consider assessing barriers for seeking adequate health care among Jordanian women.

In conclusion, adequate utilization of quality antenatal care cannot be simply achieved by the mere existence of a health care center in every small village in Jordan; a wide array of health system variables and women's cultural, social, economic and political factors must all be meticulously considered.

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عوامل التنبؤ باستخدام الرعاية السابقة للولادة في الأردن: نتائج من مسح وطني

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الملخص

الهدف: لقد أدى الاهتمام الوطني في بلوغ الأهداف الإنمائية للألفية في الأردن إلى التقدم في تغطية النساء برعاية قبل الولادة (ANC)، لكن بعض التفاوت لا يزال موجوداً. تبحث هذه الورقة العوامل التي تتنبأ باستخدام الرعاية قبل الولادة بين النساء الأردنيات بهدف العمل على تقليل الفجوة بين النساء في استخدام (ANC).

الطريقة: تستخدم هذه الدراسة بيانات مقطعية ممثلة على المستوى الوطني، والتي تم جمعها من خلال المسح الوطني للأسرة والصحة في الأردن في سنة 2007. مجتمع الدراسة يتكون من 6725 امرأة، الذين لديهم ولادة حية في السنوات الخمس السابقة للمسح.

النتائج: تحليل البيانات يظهر أن الغالبية العظمى من النساء (92.5٪) حصلن على أكثر من 4 زيارات (ANC)، وكان البدء في (ANC) للكثير منهن في وقت مبكر (88.6٪). تؤكد نتائج الانحدار اللوجستي الثنائي أن أقوى عوامل التنبؤ لأ كثر من 4 زيارات (ANC) هي: التعليم العالي (OR = 3.9)، والحمل المخطط له (OR = 1.8) وعدد الأطفال (OR = 1.75)، والعوامل التي تتنبأ بالبدء ب(ANC) في وقت مبكر من الحمل هي: عدد الأطفال (OR = 2.1) وجود الحمل المخطط (OR = 1.8) بالإضافة إلى العيش في المنطقة الوسطى (العاصمة) (OR = 1.4).

الاستنتاجات: تحصل المرأة الأردنية على مستويات عالية من (ANC) مقارنة مع البلدان النامية الأخرى، ولكن الفوارق لا تزال قائمة في الحصول على (ANC). هناك حاجة إلى تدخلات الصحة العامة لتشجيع تعليم الإنا ث، والترويج لفوائد تنظيم الأسرة لكل من الأمهات والأطفال. ويمكن للخدمات الصح ية الممتدة أن تحسن الوصول إلى الرعاية الصحية قبل الولادة في المناطق الريفية، و في شمال وفي جنوب الأردن.

الكلمات الدالة: عوامل التنبؤ، الأمومة، الرعاية السابقة للولادة، الأردن، مسح وطني.