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Statistical Analysis of Obstetric Complications A Hospital Based Data in WadMedani Obstetrics and Gynecology Hospital, Gezira State, Sudan (2017)

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Abstract

Obstetric complications are an issue of concern in all countries and especially, in developing countries. The prevalence of obstetrics complications measures the development path and the implementation of motherhood initiative 1999 for reducing obstetric complications and maternal mortality. The study aimed at estimating the level and socio-economic causes of obstetric complication in Gezira state. The data source of this research is based on a longitudinal sample of 400 women who were admitted to Wad Medani Obstetrics and Gynecology Hospital. The research used descriptive statistics, cross tabs with chi- square and logistic regression analyses utilizing SPSS program. The main study results include that: the rate of obstetric complications is high in Gezira state amounting to 60 % approximately. The results also indicated that the modal complications are pregnancy induced hypertension, septicemia and placenta previa while the modal problems are malaria and anemia. The study recommended reducing intervention delays by consultants upon admission, abolish unnecessary cesarean sections and women must go to antenatal care clinics according to WHO protocol.

Background

The World Health Organization's (WHO's) 10th revision of the International Statistical Classification of Diseases and Related Health Problems (ICPD+10) defines obstetric complications as "the complications that affect women while pregnant or within 42 days of termination of pregnancy irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes [1] Fewer Sudanese women suffer from complications today than they did 5 or 10 years ago, thanks in large part, to the national safe motherhood programs. Many of these challenges involve addressing the delays women face when they need essential obstetric care. In Sudan and other countries, most complications could be avoided if women had timely access to high-quality emergency obstetric services. Every year about some 16390 Sudanese women and half of their newborns suffer from complications related to pregnancy and childbirth. Although this level of complications (520 complications per 100,000 live births) is relatively high by international standards, recent evidence suggests that a woman's lifetime risk of complication causes in Sudan has dropped dramatically, from 1 in 80 to 1 in 550 during 2010 [2].

Sudan's reproductive health tragedy has been helped because the country conducted two nationally representative studies less than 5 years apart. The objective of this study was to estimate the level of obstetric complications in Gezira state and to determine the socio cultural factors affecting obstetric complications among pregnant women in Gezira state.

Data

The primary data source is based on the information provided through questionnaire for women who were admitted to Wad Medani Obstetrics and Gynecology hospital. The respondent's questionnaire consists of three sections defining characteristics of respondents, causes of obstetric complications and mother follow up during pregnancy.

Initially the sample size is obtained according to the simple random sampling formula:

$$n^* = t^2pq/d^2$$

Where:

n* is sample size .
p is the anticipated population proportion.
q= 1-p
d is the absolute precision required on either side of the anticipated population proportion.

t^2 is the standard score for normal distribution, t value with confidence limit of 95%, is approximately 2, p is an estimate of the anticipated population proportion taken as 50%, q = 1-p = 50. d is the probability that x samples in N samples will be wrong, taken here as 1 to 20 that is 5%. The value of n* will then be:

$$n^* = (2)^2 (50) (50)/ 25 = 400$$

Methods of Analysis

The study presented the analysis of survey data using both descriptive and inferential statistics. The frequencies procedure provides statistics and graphical displays that are useful for describing many types of variables. The inferential statistics utilizes crosstabs and logistic regressions. The crosstabs procedure forms two-way and multiday tables and provides a variety of tests and measures of association for two-way tables. The cross tabulations show the frequency of each response for variable (see appendix). Logistic regression is useful for situations in which you want to be able to predict the presence or absence of a characteristic or outcome based on values of a set of predictor variables. It is similar to a linear regression model but is suited to models where the dependent variable is dichotomous. Logistic regression coefficients can be used to estimate odds ratios for each of the independent variables in the model. Logistic regression is applicable to a broader range of research situations than discriminant analysis. Binary logistic regression is most useful when you want to model the event probability for a categorical response variable with two outcomes.

Descriptive statistics shows the age distribution of respondents by five years age groups. The mean of the distribution is 28.85 with standard error of 5.311. This gives a 5% confidence interval in the range of (27.44, 29.91). The range of the probability limits is very narrow suggesting that the distribution is approximately normal with the highest response 31.5% at age group 25-29. Only 3.8% are primagradivas and 1.8% are multipara. These two age groups are specifically higher risk groups.

Age groups	Frequency	Percent
15-19	15	3.8
20-24	78	19.5
25-29	126	31.5
30-34	112	28
35-39	62	15.5
40-44	7	1.8
Total	400	100

Source: Obstetric complications survey, Wad Medani Obstetric and Gynecology Hospital, 2017.

Table 1: Age Distribution of Respondents.

The occupational distribution of respondents is asymmetric highly skewed to the right with the majority of respondents being housewives.

Occupational status	Frequency	Percent
Worker	17	4.3
Professional	42	10.5
Worker	4	1
Uniformity	1	0.3
Housewives	336	84
Total	400	100

Source: Obstetric complications survey, WadMedani Obstetrics and Gynecology Hospital, 2017.

Table 2: Occupational Distribution of Respondents.

Respondents years of schooling distribution appears to be normal and reflects well and adequately the years of schooling distribution of all respondents, where more than half of the respondents are concentrated in the middle of distribution. The mean of the distribution is 11.5 with standard error of .125 this gives a 5% confidence interval in the range of (11.81, 11.44). The range of the probability limits is very narrow suggesting that the distribution is approximately normal with the highest response 45% that means the respondents in this category have more than ten years of education. For obstetric complication table see (appendix 1).

The Crosstabs procedure offers tests of independence and measures of association and agreement for nominal and ordinal data. One can also obtain estimates of the relative risk of an event given the presence or absence of a particular characteristic, and you can test for significant differences in column proportions in the cross tabulation table. The results of the survey are stored in obstetric complications. Use the crosstabs procedure to test the hypothesis that the levels of obstetric complications are related to a number of independent variable. Results are shown in table (4).

Respondents Years of schooling	Frequency	Percent
0	16	4
1-4	24	6
5-9	72	18
10-14	182	45.5
15-19	105	26.3
20+	1	0.3
Total	400	100

Source: Obstetric complications survey, WadMedani Obstetric and Gynecology Hospital, 2017.

Table 3: Respondents Years of Schooling.

Dependent variable	χ^2	df	sig
1. Age of respondents	8.851	5	0.115
2. Years of schooling of respondents	6.979	5	0.222
3. Occupation of respondents	5.091	3	0.165
4. Marital status of respondents	2.429	2	0.297
5. Number of years of marriage	14.638	5	0.012
6. Number of pregnancies	1.348	2	0.51
7. Number of births	14.754	2	0.001
8. Number of abortion	0.964	2	0.617
9. Pregnancy duration per weeks	83.993	6	0
10. Age of husband	17.709	10	0.06
11. Husband years of schooling	4.029	5	0.545
12. Husband occupation	4.191	4	0.381
13. Family income	5.821	1	0.016
14. Tetanus vaccination	3.382	1	0.066
15. Insurance	2.536	1	0.111
16. Health services in area	0.111	1	0.741
17. Type health services	0.502	4	0.973
18. Hospital distance	13.106	16	0.665
19. Number of follow-up	7.5	5	0.186
20. Type of follow up cadre	3.606	4	0.462
21. Obstetric complications	396.49	3	0
22. Suffering period per months	38.976	3	0
23. Where did you seen	385.81	4	0
24. How you admitted to the hospital	2.26	4	0.688
25. who made the admission	2.391	3	0.495
26. Current clinical status	82.853	2	0
27. Days in the waiting list of operation	17.003	7	0.017
28. Satisfaction with service provided	0.082	1	0.774
29. General conditions of admission to hospital	0.209	1	0.648
30. Diagnosis at admission	370.79	19	0
31. Type of birth	20.706	2	0
32. Number of birth hours	16.654	5	0.005
33. Birth attendant	20.387	2	0
34. Intervention after admission	31.726	8	0
35. Type of anesthesia	4.835	3	0.184
36. Who did the anesthesia	4.636	3	0.2

Source: Obstetric complications survey, WadMedani Obstetric and Gynecology Hospital, 2017.

Table 4: Chi-Square Test of Association between Dependent and Independent Variable.

Variable in equation	B	SE	Wald.	Df	Sig	Exp(B)	Odd ratio
Sufficient income	0.313	0.976	0.328	1	0	1.368	13.819
Young women (15-19)	-2.954	5.995	-0.082	4	0.561	0.052	0.003
Pregnant primagradivas	17.039	5.646	0.534	2	0	25127697	1
Pregnancy duration	44.812	7.67	0.762	6	0.524	2.89E+19	1
Pregnancy induced hypertension	12.806	6.694	0.286	24	0	36.425	1.057
Pregnancy anemia	-1.333	5.184	-0.05	24	0.631	0.264	0.129
Consultant follow up	0.584	4.557	0.028	4	0	1.793	5.112
Women on treatment	-0.582	3.126	-0.06	2	0.712	0.559	1.607
Diagnosis at admission	-13.721	5.656	-0.429	24	0.61	0	0
Natural delivery	-2.428	4.896	-0.101	4	0.733	0.088	0.009
Duration of labor	-0.327	0.892	-0.411	5	0.041	0.721	6.678
Registrar birth attendance	-0.034	2.23	-0.007	4	0.004	0.967	858.668
Intervention after admission	1.279	3.173	0.127	11	0	3.592	1.92
Days in the waiting list of operation	-0.149	5.91	-0.004	9	0.004	0.862	39.017
Constant	-1.031	10.742	-0.009	1	0.245	0.357	0.308

Source: Obstetric complications survey, WadMedani Obstetric and Gynecology Hospital, 2017.
Table 5: Variable in Equation.

In using the binary logistic regression estimation, the parameter estimates table summarizes the effect of each predictor. The ratio of the coefficient to its standard error, squared, equals the Wald statistic. If the significance level of the Wald statistic is small (less than 0.05) then the parameter is useful to the model. The predictors and coefficient values shown in the last step are used by the procedure to make predictions. The meaning of a logistic regression coefficient is not as straightforward as that of a linear regression coefficient. While B is convenient for testing the usefulness of predictors, Exp (B) is easier to interpret. Exp (B) represents the ratio-change in the odds of the event of interest for a one-unit change in the predictor.

They are a number of independent variable that are not significant and have no association with obstetric complications these include (Age of respondents, Years of schooling of respondents, Occupation of respondents, Marital status of respondents, Number of pregnancies, Number of abortion, Age of husband, Husband years of schooling, Husband occupation, Tetanus vaccination, Insurance, Health services in area, Type health services, Hospital distance, Number of follow-up, Type of follow up cadre, How you admitted to the hospital, who made the admission, Satisfaction with service provided, General conditions of admission to hospital, Type of anesthesia, Who did the anesthesia). In state they are number of independent (Number of years of marriage, Number of births, Pregnancy duration per weeks, Family income, Obstetric complications, Suffering period per months, Level of the doctor seen, Where did you seen, Current clinical status, Days in the waiting list of operation, Diagnosis at admission, Type of birth, Number of birth hours, Birth attendant, Intervention after admission).

For example, Exp (B) for doctor level is equal to 5.112, which means that the odds of default for a pregnant woman who has seen a doctor during her pregnancy are five times the odds of default for a woman who has not seen a doctor, all other things being equal. What this difference means in terms of probability depends upon the original probability of default for the women who have seen a doctor. In the case of a pregnant woman whose probability of default is 0.5, the odds she will default are related to the probability by this equation. Thus, her corresponding odds of default are 1.In the case of a pregnant woman whose probability of default is 0.9, her odds of default are In the case of a woman whose probability of default is 0.9, and her odds of default are 9.

The odds of default for a pregnant woman with consultant follow up are 9*5.112 = 46.008, so the corresponding probability of default reduces to 0.028. The same analysis is applicable to sufficient income; Pregnancy induced hypertension, Women on treatment, Duration of labor, Intervention after admission, Registrar birth attendance and Days in the waiting list of operation. However, each of these has a different probability of default ranging between (0.000, 0.286).

Conclusion

The investigation found that among the sampled women who were admitted to Wad Madni Obstetrics and Gynecology Hospital between the period (15 May to 25 June 2017), 59.6% had obstetric complications. The most frequent complication was pregnancy induced hypertension representing 10.2%, while the most frequent obstetric problem was pregnancy malaria. Other complications and problems were found but with lower frequencies. These include Septicemia representing 7.8%, Placenta Previa representing 3.8%, Diabetes representing 7.3% and pregnancy anemia representing 7.9%. However, 5.2% of the sampled women had synergistic problems. 16 of the 37 predictors included in the questionnaire had statistically significant association with health problem during pregnancy. These include 11 predictors that were highly associated at 0.01 level of significance. These include number of birth, pregnancy duration, suffering period, level of doctor seen, diagnosis at admission, and birth attendant. The variables left out of the analysis at the last step nine of them have significance values larger than 0.05, so no more are added.

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