



HELLP Syndrome and Heart Disease: A Cross Sectional Study in Jeddah- KSA

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Authors' contributions

This work was carried out in collaboration among all authors. Authors ISM and AKA took part in formal analysis. Authors SKA, AAAlharbi and KAA wrote the original draft. Author AMA managed the investigations. Authors GMA, AOM, ASA, AAAlotaibi, RAA and AMAA wrote, reviewed and edited the manuscript. All authors read and approved the final manuscript.

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ABSTRACT

Background: HELLP is a potentially life-threatening conditions which has some similarity with preeclampsia therefore, it poses a challenging diagnostic and management issues for clinician. It is composed of H=hemolysis, EL=elevated liver enzymes and LP=low platelets. The aims of this study are to assess the prevalence of HELLP syndrome among Saudi Arabian, besides, assessing the risk factors related to it.

Methodology: This is an analytical cross-sectional study conducted in kingdom of Saudi Arabia (female who previously get pregnant) from 07/08/2020 till 29/11/2020. The study was depending on using of online questionnaire assessing demographic factors including age and nationality besides disease-related information: Heart disease, Smoker patient, related risk factors of disease and DM patient.

Results: We included 457 women who agreed to participate in the study and completed the questionnaire. 36.1% of participants were aged between 25-35 years. 13.3% of the sample had reported that they are smokers and 6.1% as X-smokers while 16.8% of the sample had diabetes mellitus. The prevalence of HELLP was 38.3%. It was found that age is not a significant factor in occurrence of HELLP symptoms except in having distribution of liver function ($P=0.005$). Cardiac diseases are another significant risk factor in developing symptoms of HELLP especially high blood pressure where 46% of patients with cardiac disease reported having high blood pressure during pregnancy with a risk of eight times over those with no cardiac disease ($OR=8.03$, 95% $CI=4.2100$ to 15.3 , $P=0.000$) however, it has no significant effect on developing disturbance in liver function.

Conclusion: we had found the 38.3% of females in Saudi Arabia had HELLP in their pregnancy, with increase the prevalence of some other conditions including smoking, diabetes mellitus, hypertension and autoimmune diseases which all found to increase the risk for developing HELLP in females. More investigation is needed to explore the same prevalence using hospital based study design.

Keywords: HELLP; platelets; hemolysis; pregnancy.

1. INTRODUCTION

For long time, preeclampsia is known to be associated with hemolysis, distribution of liver enzyme and thrombocytopenia [1]. However, in 1982, Weinstein found that these symptoms constitute an entirely different conditions than severe preeclampsia naming it HELLP, which is a short for H=hemolysis, EL=elevated liver enzymes and LP=low platelets [2]. This condition is now known as a different condition than severe preeclampsia or its complications [3,4]. HELLP is a potentially life-threatening conditions which has some similarity with preeclampsia therefore, it poses a challenging diagnostic and management issues for clinician [5,6] as it is difficulty to diagnosis HELLP syndrome especially when high blood pressure and protein in the urine aren't present [7]. Its symptoms are sometimes mistaken for gastritis, flu, acute hepatitis, gall bladder disease, or other conditions. HELLP syndrome in its complete form can be serious condition which associated with high risk for both mother and its fetus [4,8] where a wide range of complications related to HELLP [9].

The health of a pregnant woman is always important because she is responsible for the health of herself and the health of her child. Therefore, she must be under close surveillance, especially in the third trimester during pregnancy, which is the closest to the occurrence of any health problems, which may lead to an increased likelihood of preeclampsia, which accompanies many health complications and Thoughts, linking HELLP syndrome to heart disease means a lot, as heart disease may be a risk factor for this syndrome, and therefore we must find the link to reduce this health problem therefore, in this study we aimed to assess the prevalence of HELLP syndrome among Saudi Arabian, besides, assessing the risk factors related to it.

2. METHODOLOGY

This is an analytical cross-sectional study conducted in kingdom of Saudi Arabia (female who previously get pregnant) from 07/08/2020 till 29/11/2020. Sample size will be calculated using OpenEpi for sample size calculation for cross

sectional where inclusion criteria include female who previously get pregnant excluding male and single female. The study was depending on using of online questionnaire assessing demographic factors including age and nationality besides disease-related information: Heart disease, Smoker patient, related risk factors of disease and DM patient. Moreover, the prevalence of HELLP was calculated by applying different symptoms of it and each participant could choose more than one choice.

Data was entered and analyzed using SPSS version 25. Descriptive statistics was performed and categorical data was displayed as frequencies and percentages while measures of central tendencies and measures and dispersion was used to summarize continuous variables. Univariate and multivariate analysis was performed to investigate association between exposure factors and associated disease. Statistical significance is set at a P value of 0.05 or less.

3. RESULTS AND DISCUSSION

In this study, we included 457 women who agreed to participate in the study and completed the questionnaire. 36.1% of participants were aged between 25-35 years old while 33% were below 25 years and 30.9 % were over 35 years old. Moreover, almost all participants were Saudi Arabian (84.9%). 13.3% of the sample had reported that they are smokers and 6.1% as X-smokers while 16.8% of the sample had diabetes mellitus. Moreover, 14.4% of the women had

eclampsia, 10.5% had autoimmune diseases and 10.1% had platelets thrombocytes (Table 1).

Moreover, it was found that 61.7% of participants of this study did not have any type of symptoms of HELLP syndrome therefore, the prevalence of HELLP was 38.3%. Moreover, 13.6% of females reported having High blood pressure and excess protein in urine in the last pregnancy while 12.9% had thrombocytopenia, 9.2% had disturbance of liver function and 7% had hemolysis (Fig. 1).

In Table 2, we discuss the possible risk factors of occurring of HELLP symptoms, it was found that age is not a significant factor in occurrence of HELLP symptoms except in having distribution of liver function ($P=0.005$) where women below 25 year had higher risk of developing a distribution of liver functions over women of 25-35 year by 1.7 times (OR= 1.7, 95% CI of 0.8492 to 3.4248) and over older women over 35 years by 4.5 time (OR=4.6, 95% CI: 1.7057 to 12.615). Moreover, diabetes mellitus is considering a significant risk factor for developing HELLP symptoms which is related to all symptoms where diabetic patients have higher risk for developing thrombocytopenia by five time (OD: 5.3, 95%CI: 2.9654 to 9.6907, $p= 0.000$), excess protein in urine by two folds (OD: 2.3, 95% CI: 1.2605 to 4.3059, $p=0.000$), disturbance of liver functions by five time (OD: 5.1, 95% CI: 2.6071 to 9.9, $P=0.000$), high blood pressure by three time (OD:3.1, 95% CI: 1.7065 to 5.63, $P=0.000$) and hemolysis by four time (OD:4.2, 95%CI;1.8992 to 9.28, $P=0.000$).

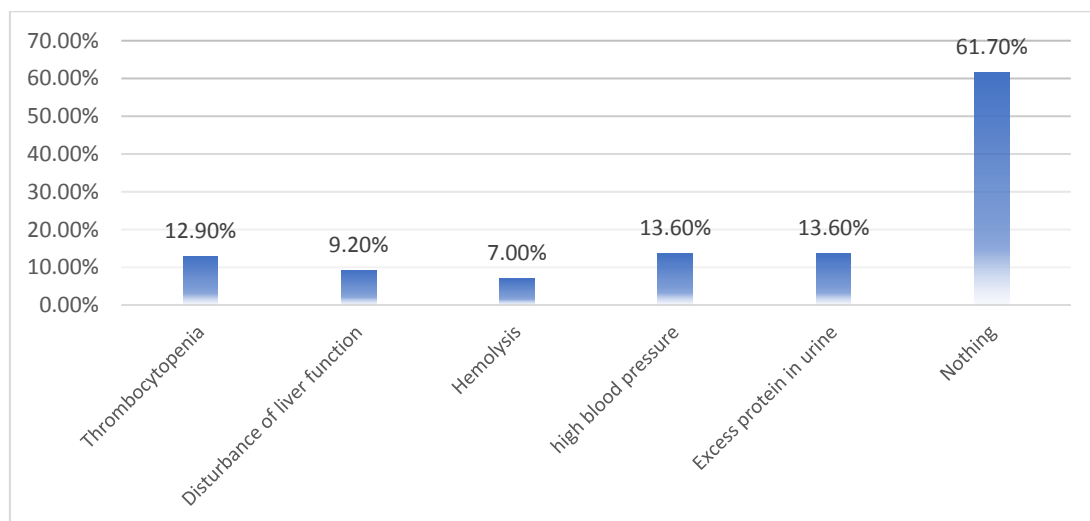


Fig. 1. Patients experienced different symptoms of HELLP

Table 1. Demographic factors

	Variable	Frequency	Percent
Age	Below 25 year	151	33.0
	25-35 year	165	36.1
	Above 35 year	141	30.9
Nationality	Saudi	388	84.9
	Non-Saudi	69	15.1
Are you smoker	No	368	80.5
	Yes	61	13.3
	X-smoker	28	6.1
Are you diabetic patient?	No	380	83.2
	Yes	77	16.8
Do you have any cardiac disease?	No	407	89.1
	Yes	50	10.9
Have you ever had severe preeclampsia (eclampsia)?	No	391	85.6
	Yes	66	14.4
Do you have any autoimmune disease?	No	409	89.5
	Yes	48	10.5
Do you have (Platelets thrombocytes)?	No	411	89.9
	Yes	46	10.1

Cardiac diseases are another significant risk factor in developing symptoms of HELLP especially high blood pressure where 46% of patients with cardiac disease reported having high blood pressure during pregnancy with a risk of eight times over those with no cardiac disease (OR=8.03, 95% CI=4.2100 to 15.3, P=0.000) however, it has no significant effect on developing disturbance in liver function. Eclampsia and autoimmune diseases had significant effects on developing symptoms of HELLP especially Thrombocytopenia (36.4% and 37.5%) and (P= 0.000 for both). Having Platelets thrombocytes had effect on some symptoms of HELLP including hemolysis and thrombocytopenia. Considering smoking, it was found that smoking of mother is considered a great risk factor of developing symptoms of HELLP where smokers had higher risk for developing hemolysis by more than 3 times (OD=3.36, 95% CI: 1.4362 to 7.88, P=0.00), thrombocytopenia by 4.6 times (OD=4.63, 95% CI: 1.7057 to 12.615, P=0.00), excess protein in urine by times almost one fold (OD=0.98, 95% CI: 0.4407 to 2.1912, P=0.00), disturbance of liver function by almost three times (OD=2.8, 95% CI: 1.3468 to 6.218, P=0.00), and high blood pressure by three times (OD=3.18, 95% CI: 1.6374 to 6.1788, P=0.00) than non-smoker women (Table 2).

In this study, we aimed to assess the prevalence of HELLP among Saudi Arabian women who had experienced pregnancy where we had included

457 women. Finding of the study showed that 13.3% of women were smokers and prevalence of diabetes mellitus, cardiac diseases, preeclampsia, autoimmune diseases and platelet thrombocytes were 16.8%, 10.9%, 14.4%, 10.5% and 10.1% respectively. The prevalence of diabetes mellitus in this study is higher than other studies including WHO country profile in 2016 which reported the prevalence of diabetes mellitus among female Saudi Arabian was 13.8% [10] and lower than other studies as study of Khalid Alqurashi 2011 who reported a prevalence of 27.6% in female in Saudi Arabia [11]. Moreover, the prevalence of cardiac conditions in this study was lower than the results of study of M Alshaikh 2016 who reported a prevalence of 21.8% [12].

Moreover, we had found that the prevalence of HELLP was 38.3% where the prevalence of High blood pressure and excess protein in urine in the last pregnancy was 13.6% for each, thrombocytopenia (12.9%), disturbance of liver function (9.2 %) and hemolysis (7%). The prevalence of thrombocytopenia in this study was higher than study conducted in Ethiopia where the prevalence was 8.8% [13]. Moreover, the prevalence of hypertension in this study is higher than reported in study of S Al Ghamdi who reported a prevalence of 3% of pregnant women [14]. On the other hand, the prevalence of hemolysis in this study was lower than a study conducted in India where the prevalence was 12.26% [15].

Table 2. Risk factors of HELLP symptoms

		Hemolysis	Thrombocytopenia	Excess protein in urine	Disturbance of liver function	High blood pressure
Age	Below 25 year	7.3%	17.9%	15.2%	14.6%	11.3%
	25-35 year	6.1%	10.9%	13.9%	9.1%	12.7%
	Above 35 year	5.0%	9.9%	11.3%	3.5%	17.0%
	P-value	.710	.081	.616	.005*	.330
Diabetic patients	Yes	15.6%	33.8%	23.4%	24.7%	27.3%
	No	4.2%	8.7%	11.6%	6.1%	10.8%
	P-value	.000*	.000*	.006*	.000*	.000*
Cardiac disease	Yes	8.0%	30.0%	22.0%	22.0%	46.0%
	No	5.9%	10.8%	12.5%	7.6%	9.6%
	P-value	0.586	.000*	.065	.001 ^{*,b}	.000*
Eclampsia	Yes	18.2%	36.4%	34.8%	21.2%	33.3%
	No	4.1%	9.0%	10.0%	7.2%	10.2%
	P-value	.000*	.000*	.000*	.000*	.000*
Autoimmune disease	Yes	18.8%	37.5%	29.2%	25.0%	25.0%
	No	4.6%	10.0%	11.7%	7.3%	12.2%
	P-value	.000*	.000*	.001*	.000 ^{*,b}	.014*
Platelets thrombocytes	Yes	13.0%	69.6%	13.0%	15.2%	17.4%
	No	5.4%	6.6%	13.6%	8.5%	13.1%
	P-value	.039*	.000*	.913	.136 ^b	.424
Smoking	Yes	14.8%	32.8%	13.1%	18.0%	26.2%
	No	4.9%	9.8%	13.3%	7.1%	10.1%
	X-smoker	3.6%	10.7%	17.9%	17.9%	32.1%
	P-value	.029*	.000*	.791	.006*	.000*

Moreover, we had studied the possible risk factors for developing HELLP in women finding that age is not associated with a risk for developing HELLP while diabetes mellitus, cardiac diseases, smoking, autoimmune disease and eclampsia had a significant effect on increasing the risk for developing HELLP. These results are similar with other studies including study of Weitgasser in 2000 who found that 31% of patients with HELLP had antibodies which may related to autoimmune diseases as diabetic mellitus [16]. In contrast to our study, other studies had shown that smoking during pregnancy was associated with a decreased risk of developing hypertensive disorders in pregnancy by 56% [17].

This study had some unavoidable limitations including depending on questionnaire to collect medical data about previous event in participants life which may lead to some memory bias or wrong report of their medical conditions. On the other hand, this up to our knowledge is the first study to assess the prevalence of HELLP among Saudi Arabian female.

4. CONCLUSION

In conclusion, we had found the 38.3% of females in Saudi Arabia had HELLP in their pregnancy, with increase the prevalence of some other conditions including smoking, diabetes mellitus, hypertension and autoimmune diseases which all found to increase the risk for developing HELLP in females. More investigation is needed to explore the same prevalence using hospital based study design.

CONSENT AND ETHICAL APPROVAL

Administrative approval was sought from the unit of biomedical ethics research committee, King Abdulaziz university. An informed consent was sought from the participants.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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