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Risk Factors of Hepatitis B Viral Infection among Women in the Reproductive Age in North Gaza Governorate in 2008

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Abstract

Hepatitis B virus infection is a common worldwide problem characterized by an inflammatory process of the liver cells with prevalence of 5% worldwide.

Case control study design conducted to identify the risk factors of hepatitis B viral infection among women in the childbearing age in 2008. 100 women "mean age 30.21years" attended Al-Awda Hospital for delivery in 2008 their HBsAg test were positive and one control for each. The results showed that the main statistically significant risk factors were; educational status, working status, type of work, dental intervention, place of dental intervention, place of surgical operation, body tattooing, familial infection with HB, caring of infected patient, sharing family with nail cutter and keeping tooth brush with each other. No statistically significant differences were found related to using unsterile injection, age, type of delivery, place of delivery, surgical operation, living area, blood transfusion, touching of infected blood, sharing familial tooth brush, needled sticking and travelling abroad. The researcher concluded that most of risk factors consider as controllable risk factors through life style modification and proper sterilization. In Palestine, practicing illegal sexual relations and injectable drug abuse are not BHV risk factors. The study recommended to do routine HBV screening to all women before delivery, mass vaccination of all women in childbearing age, HB vaccine combined with HBIG to all babies born to HBV infected mothers.

Keywords:
HBV,
Reproductive age,
Risk factors,
North Gaza.

1. Introduction:

Background:

Hepatitis B (HB) is a serious & common infectious disease of the liver, which is a major Public Health Problem, more than two billion alive individuals today have been infected with HB, and approximately 350 million are chronically infected and high risk for serious illness & death from liver cirrhosis & liver cancer which may be as complications from Hepatitis B Virus (HBV) infection, although 5–10% of adults infected with HBV will become chronic carriers, neonatal infection almost always leads to a chronic carrier state (90%) whereas 30–60% of children infected during the first five years of life will become chronic HBV carriers, It is transmitted horizontally by contact with blood or sexual contact & also transmitted

vertically from mother to infant (Al-Shamahy, 1999).

Hepatitis B considered as one of the preventable infectious diseases by effective immunization program, in which the immunization consider the most important tool for hepatitis B prevention, which provide 95% of protection to neonates whose mother is a hepatitis B carrier that if given as soon as after delivery.

Perinatal transmission can be prevented with the identification of HBsAg positive women and administration of immunoprophylaxis to their newborns, the precise mechanism of this has not yet been defined but it has been attributed to the immaturity of the immune system of newborns and young children and their inability to mount an effective control response against HBV infection (World Health Organization, 1996; Niesert et al., 1996).

Acute and chronic HBV infections are usually asymptomatic during childhood. Up to 25% of infants and older children who acquire chronic HBV infection will eventually develop HBV-related hepatocellular carcinoma or cirrhosis. The risk of perinatal transmission of HBV is 70% – 90% for infants born to mothers who are HBsAg and HBeAg positive, but it decreases to 5% – 20% for infants born to anti-HBe positive mothers. Children of HBV-infected mothers remain at high risk of acquiring HBV infection by person-to-person (horizontal) transmission during the first 5 years of life. More than 90% of the perinatal HBV infections can be prevented with the identification of HBsAg-positive pregnant women so that their newborns can receive hepatitis B vaccine and hepatitis B immune globulin (HBIG) soon after birth. If a woman delivering has an unknown HBsAg status, the first dose of hepatitis B vaccine should be administered to the newborn as soon as possible. If this mother is found HBsAg positive or her status remains unknown, HBIG should be administered within the first week of life (World Health Organization, 1996; Niesert et al., 1996).

Worldwide, it has also been recommended that hepatitis B vaccine should be integrated into routine vaccination schedules for infants, usually as a part of the World Health Organization's (WHO) Expanded Program on Immunization (EPI), which implicated in our program in Palestine in 1993 (World Health Organization, 1996; Niesert et al., 1996).

The acute and chronic consequences of HBV infection are major health problems world widely. In USA the reported incidence of acute HB increased by 37% from 1979 to 1989, and an estimated 200,000-300,000 new infections occurred annually during the period 1980-1991. The estimated 1 million-1.25 million persons with chronic HBV infection in the United States are potentially infectious to others. In 2000 screening for HBV in Palestine 3% was seropositive & Palestine falls in the intermediate prevalence rate 3 – 11% as other Middle East countries (MOH- Annual Report, 2001, 2004).

Problem statement:

Examining the distribution of the risk factors of hepatitis B virus among women in the childbearing age in North Gaza governorate consider indicator of evaluating its transmission. The study findings might help in developing creative ways in the decrease of the prevalence of HBV infection, and it give an idea about the situation of HBV infection in Gaza strip. Knowing the risk factors of HBV infection & following preventive procedures will help in the decrease of the incidence & prevalence of HBV infection among newborns, this in the presence of studies decided that the neonatal acquiring of HBV from infected mothers occurs in 70% – 90% of infants (Hay et al., 1995).

This problem can be controlled if we screened women prior delivery, a lot of countries aware toward this controllable health problem, this is for healthy future free from hepatitis B infection, Ministry of Health may be in need to develop new policy toward screening all women attending delivery rooms even in the governmental or private sectors to protect as early as possible the newborns from the hepatitis B infection, this will affect the cost of treatment in the future & new generation free from HB infection.

Justification of the study:

HB infection is a global public health problem, this problem is associated with morbidity and mortality, & it consider a source of infection to others in silence, especially when there is millions of people infected with the virus & do not know about their condition unless they do laboratory serological investigation. This problem started to be highlighted due to its' seriousness when Alawda hospital started to refer the positive cases of HBV to the epidemiology department in the second half of 2004, since that date the epidemiology department reporting about 10 cases weekly of newly discovered mothers, this indicate that a lot of women in the reproductive age may not screened & the danger will be directly on the newborn to be infected with HBV, so this need protective measures to the newborns & it will be useful & effective

if it was soon after birth so if not known no rapid intervention will be.

The researcher anticipates that the Ministry of Health (MOH) may be in need to develop new policy toward screening all women attending delivery rooms even in the governmental, Non-Governmental Organizations (NGOs) or private sectors to protect as early as possible the newborns from the HB infection, this will affect the cost of treatment in the future and new generation free of HB infection.

The aim of the study:

Identification the risk factors of HB viral infection among women in the childbearing age in 2008.

Objectives:

1. To identify the risk factors of HB infection among women delivered in Alawda hospital.
2. To give guide for the development of protective measures to the newly born babies to mothers infected with HB viral infection.
3. To evaluate the adherence to the national guidelines of all infected women delivered in north Gaza.
4. To suggest recommendations to the policy makers & professionals for the adoption of creative ways to control the infection among the newborns.

2. Methodology:

Introduction:

This study is based on data collected for pregnant women and their results of Australian antigen in the year of 2008. Those women attended Al-Awda hospital for delivery & routine screening test for HBV was done, the positive cases referred to the epidemiology department, the data collected through the questionnaire to the positive cases & one control for each matched to the same criteria with the cases in the epidemiology departments in Jabalia health care center & El-Rimal health care center.

Study design:

The research study is conducted through quantitative Case Control study. This study design based on the deliveries registered in Al-Awda hospital in North Gaza governorate in 2008 and those referred to the epidemiology department.

The study population:

The target population of this study is the women attended the delivery room of Al-Awda hospital living in north Gaza governorate in the period between January 2008 to December 2008 and one control for each case similar to the selection criteria except that their Australian antigen were negative.

Setting of the study:

The study is carried on Al-Awda hospital & the epidemiology departments in Jabalia health care center & El-Rimal health care center.

Sample and sampling:

All reported women that their Australian Antigen was positive after screening in Al-Awda hospital in 2008 consider as cases & one control for each is included in the study with the same inclusion criteria to the cases.

Sampling procedure:

The study was conducted by Case Control study through reviewing the delivery registries in the epidemiology departments in Jabalia health care center & El-Rimal health care center to identify the cases referred from Al-Awda hospital which consider the unique hospital screen the women for HB prior delivery.

Selection of cases:

Hepatitis B positive case is the one who has positive HBsAg in the blood. This can be detected by Australian antigen "HBsAg".

Selection of controls:

One control for each case selected with the same inclusion criteria for the cases but their Australian antigen "HBsAg" results were negative, living in north Gaza, in the same age group of cases and attended Al-Awda hospital for delivery.

Inclusion criteria:

Cases All women that their Australian Antigen were positive in the reproductive age attended delivery room in Al-Awda hospital living in North Gaza governorate.

Controls The same number of women that their Australian Antigen were negative in the reproductive age in North Gaza governorate.

Exclusion criteria:

Any women attended the delivery room in Al-Awda hospital living outside North Gaza governorate & any women in the reproductive age delivered outside Al-Awda hospital.

Tool of the study:

The cases and controls were been interviewed by using self-constructed questionnaire. The questionnaire was including demographic, socioeconomic, delivery and other determinant variables to determine the risk factors associated with HBV infections among the women in reproductive age.

Data collection:

Data were collected by using self-constructed questionnaire with close ended questions which was collected by the researcher and 2 well trained data collectors including demographic, socioeconomic, delivery & other variables associated with the risk factors of getting Hepatitis B infection.

Data entry:

Over viewing of the questionnaires was the first step, prior to data entry; this step followed by designing an entry model using the computer Statistical Package for Social Sciences "SPSS".

The coded questionnaires were entered into the computer by the researcher. Data cleaning is done through checking out a random number of the questionnaires and through exploring descriptive statistics frequencies for all variables.

All suspected or missed values were checked by revising the available sheets.

Data analysis:

It is done through frequency of the study variables. Description of the study population was done also.

Frequency, tabulation and Pie chart are used to present the study variables.

A comparison between cases and controls for the risk factors of hepatitis B virus were done. Chi square test are calculated. Statistically significant values are considered at P value is equal or less than 0.05.

Ethical consideration:

1. Approval from the Ministry of Health.
2. Approval from Helsinki committee.
3. Approval from the client with consent form.

3. Results & Discussion:

Distribution of subjects (Cases) by socio demographic characters:

Table 1 *Subjects (Cases) and Socio-demographic Status*

		No.	%
Age	16 - 30 years	58	58
	31years & more	42	42
Total		100	100
Educational status	Elementary level & below	30	30
	Secondary level	56	56
	University level	14	14
Total		100	100
Living Area	Jabalia village	35	35
	Jabalia camp	29	29
	Biet lahia	22	22
	Biet Hanoun	14	14
Total		100	100

Table 1 shows the distribution of cases and the different socio-demographic factors in which the age distribution shows that there were 58% of the cases their ages between 16 & 30 years while 42% over 31 years.

About the educational status in the same table it is clear that most of the most of the cases in the secondary level 56% & 30% of them in the elementary level & below, while 14% had university level.

We can conclude from the same that most of the cases living in Jabalia village 35%, 29% in Jabalia camp, 22% living in Biet Lahia & the least 14% living in Biet Hanoun.

Distribution of subjects (Cases) by delivery history:

Table 2 *Subjects (Cases) and Delivery History*

		NO.	%
First delivery	Yes	16	16
	No	84	84
Total		100	100
Type of current delivery	SVD	78	78
	CS	22	22
Total		100	100
Type of previous delivery	SVD	67	79.8
	CS	17	20.2
Total		84	100
Place of delivery	Private	23	27.4
	Governmental	59	70.2
	UNRWA	2	2.4
Total		84	100

From Table 2 we can identify the distribution of the cases with delivery related variables, it is clear that most of the cases 84% their delivery not the first & 16% this delivery consider the first, also most of the cases 78% their deliveries were spontaneous vaginal deliveries & 22% delivered through cesarean section, but the type of previous deliveries with total of 84% it were 79.8% (67 case) delivered through spontaneous vaginal deliveries while 20.2% (17 case) delivered through cesarean section.

About the place of delivery we can show that most of the cases 70.2% delivered in the governmental health care sector, 27.4% delivered in private clinics or hospital and only 2.4% delivered in UNRWA clinics.

Distribution of subjects (Cases) by working history:

Table 3 *Subjects (Cases) and Working History*

		NO.	%
Working women	Yes	11	11
	No	89	89
Total		100	100
Type of work	Working in medical field	3	27.3
	Not working in medical field	8	72.7
Total		11	100

This Table 3 showing the distribution of the cases with the women`s working history, which show that most of the cases 89% not working in any field and 11% of them still working even in the medical field or other fields.

But in relation to the type of the work of the working women (11 cases) it indicate that most of the cases 72.7% (8 cases) still working in fields other than medical field and 27.3% still working in the medical field.

Distribution of subjects (Cases) by different risk factors:

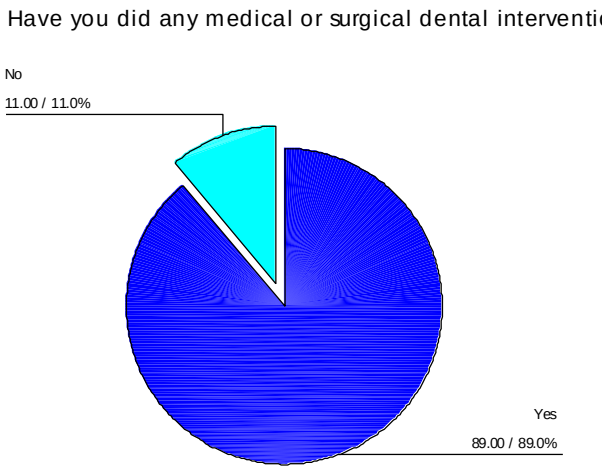

Figure 1 *Distribution of subjects (Cases) by any medical or surgical dental intervention*

It is clear in this Figure 1 that most of the cases 89% did medical or surgical dental intervention & 11% of the cases did not any medical or dental intervention.

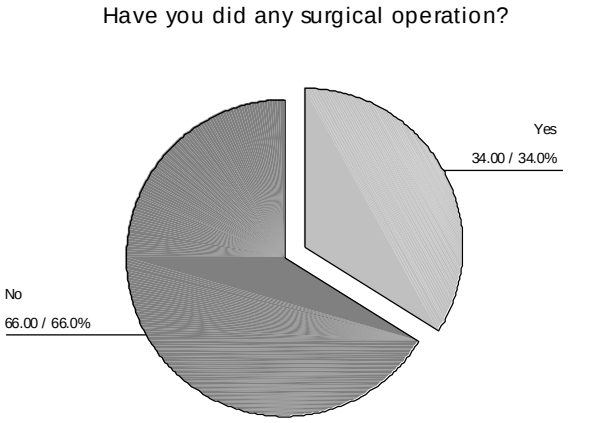

Figure 2 *Distribution of subjects (Cases) by history of surgical intervention*

Figure 2 shows that most of the cases 66% have no history of surgical operations & 34% of them surgically operated before.

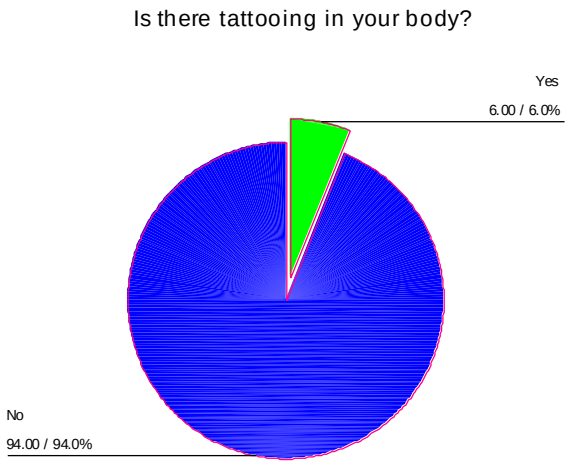

Figure 3 *Distribution of subjects (Cases) by body tattooing*

According to Figure 3, most of the cases 94% have no tattooing in their bodies & 6% answered that there is tattooing in their bodies.

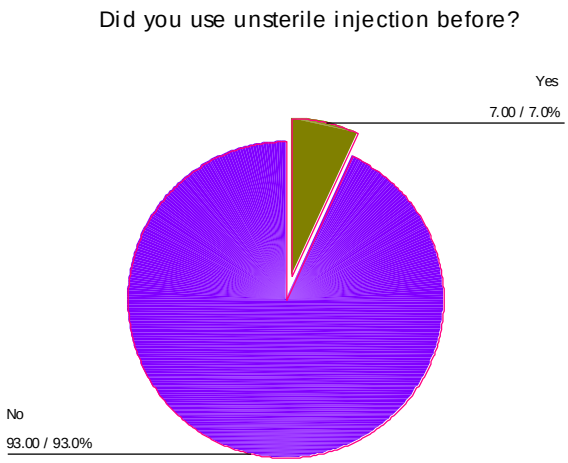

Figure 4 *Distribution of subjects (Cases) by using unsterile injection*

Figure 4 reveals that the majority of the cases 93% did not use unsterile injection & 7% answered that they were used unsterile injection in their lives.

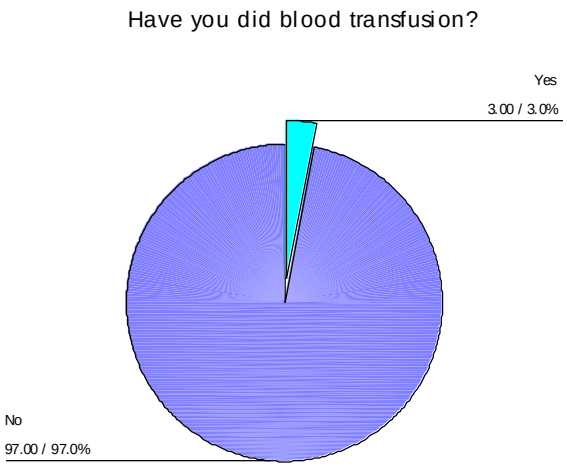

Figure 5 *Distribution of subjects (Cases) by blood transfusion*

Figure 5 showing us that most of the cases 97% there is no blood transfused to them before & 3% answered that blood transfused to them before.

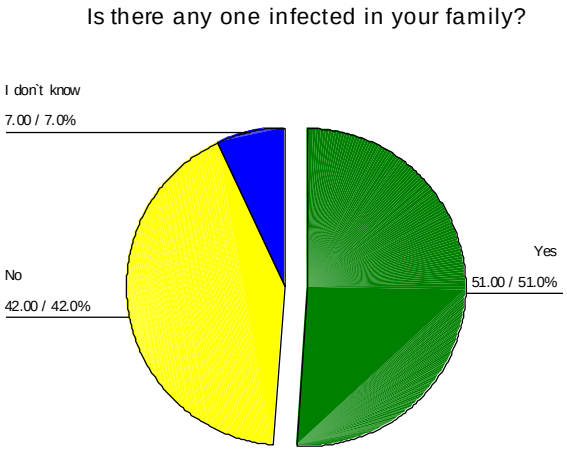

Figure 6 *Distribution of subjects (Cases) by familial infection with HBV*

From Figure 6 we can identify that more than half of the cases 51% have familial history of HBV, 42% have no and 7% they do not know if any one of their families infected with HBV.

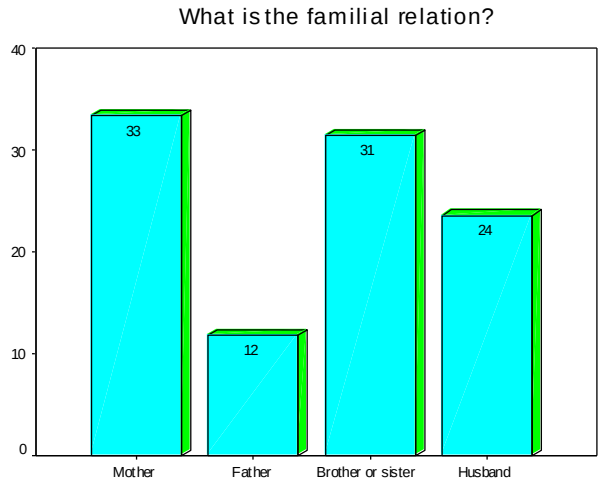

Figure 7 *Distribution of subjects (Cases) by which one of the families infected with HBV?*

The Figure 7 indicates that 33% of the cases -(from total of 51case)- their mothers were infected with HBV infection, 31% brothers or sisters infected with HBV infection, 24% their husband & 12% their fathers were infected with HBV infection.

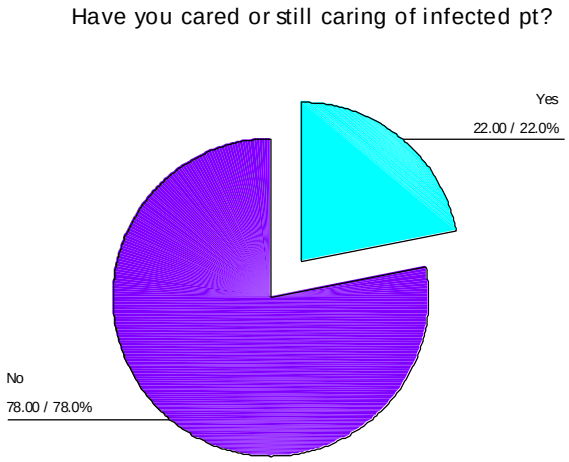

Figure 8 *Distribution of subjects (Cases) by caring of persons infected with HBV*

It is clear in this Figure that most of the cases 78% did not care of any HBV infected persons & 22% they were care or still caring of HBV infected persons.

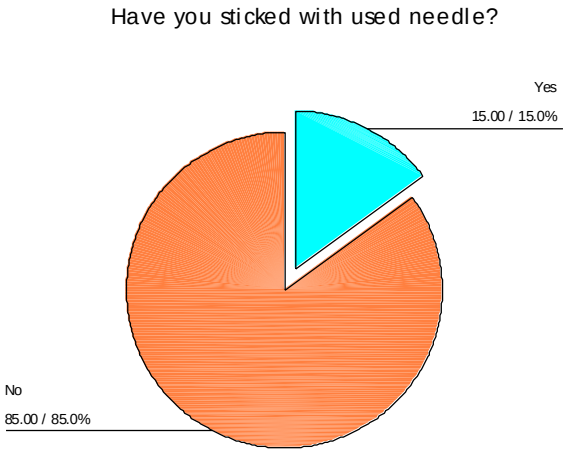

Figure 9 *Distribution of subjects (Cases) by needle sticking*

We can conclude from the Figure 9 that the majority of the cases 85% did not stick with needle & 15% they were stick before with needle.

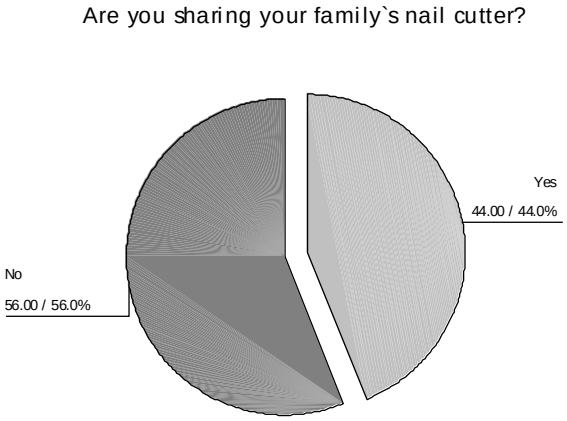

Figure 10 *Distribution of subjects (Cases) by familial nail cutter sharing*

The familial nail cutter sharing seems to be relatively equal, according to Figure 10 there were 44% of the cases sharing the nail cutter with each other & 56% did not share.

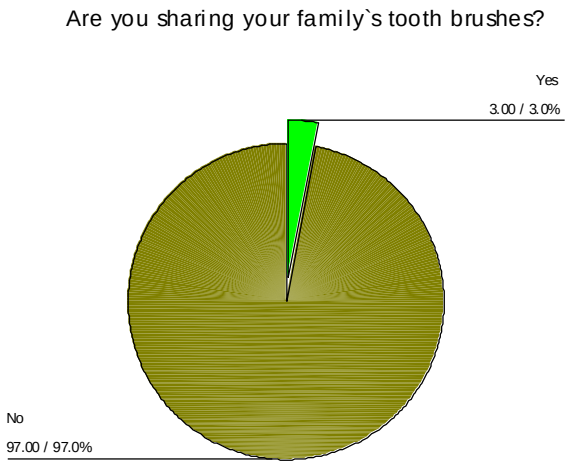

Figure 11 *Distribution of subjects (Cases) by familial tooth brush sharing*

In his Figure 11 it is differ in distribution from the familial nail cutter sharing which shows that the majority of the cases 97% did not sharing the tooth brush with each other & 3% doing it.

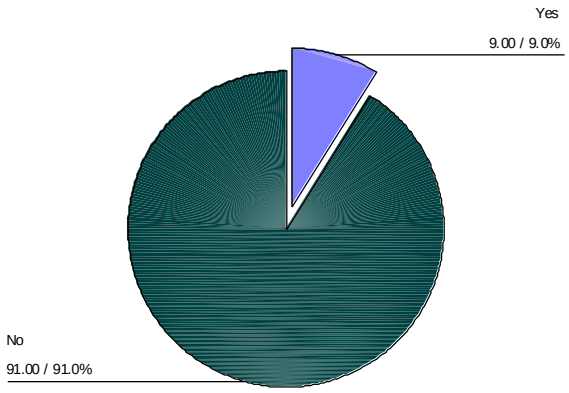

Figure 12 *Distribution of subjects (Cases) by accidental injury in the cueffaire*

According to this Figure 12 it showing us that 91% of the cases did not injure in cueffaire while only 9% of them injured.

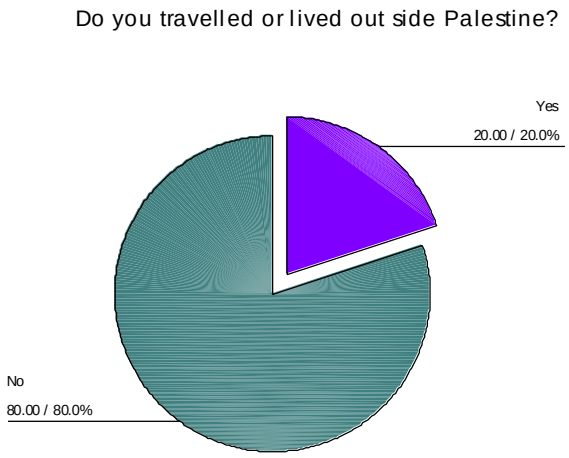

Figure 13 *Distribution of subjects (Cases) by travelled abroad or lived outside Palestine*

It is clear in Figure 13 that 80% of the cases did not travelled aboard or lived outside Palestine & 20% of them travelled aboard or lived outside Palestine.

Distribution of subjects (Cases) by pre and post-delivery epidemiological intervention:

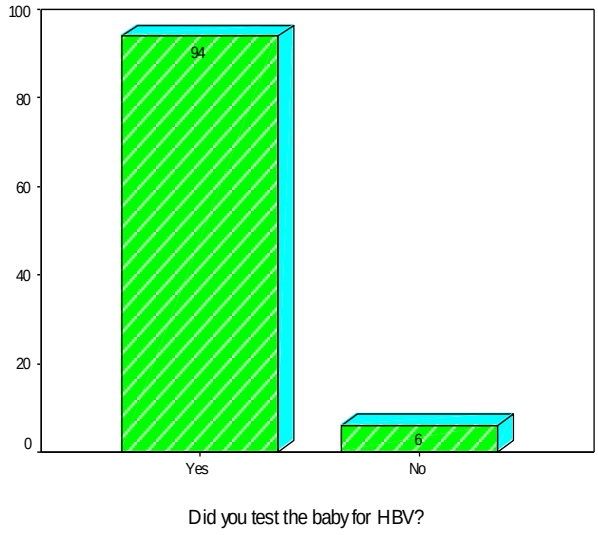

Figure 14 *Distribution of subjects (Cases) by HBV test of the baby*

From this Figure 14 we can show that most of the cases 94% did test to HBV in the epidemiology department even in Gaza department or North Gaza department and 6% of them did not test for HBV.

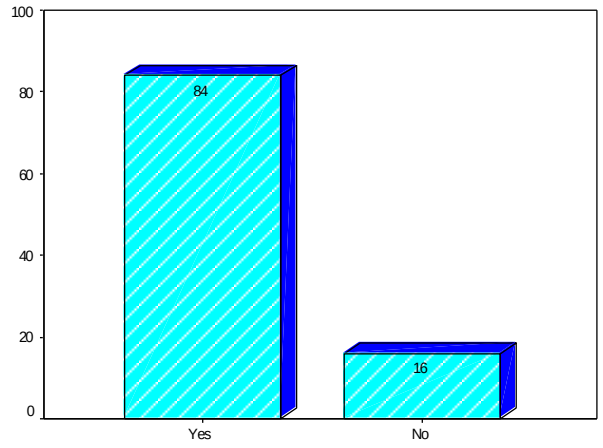

Figure 15 *Distribution of subjects (Cases) by breast feeding of the baby*

It is clear in this Figure 15 that the majority of the cases 84% they breast feed from their mothers and 16% of them did not breast feed.

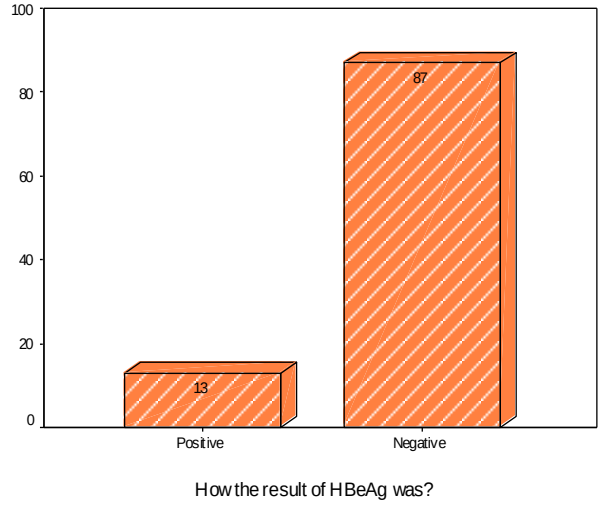

Figure 16 *Distribution of subjects (Cases) by HBeAg result of the women*

We can conclude from this that the majority of the cases 87% tested for HBeAg and their results were negative and 13% of them were positive.

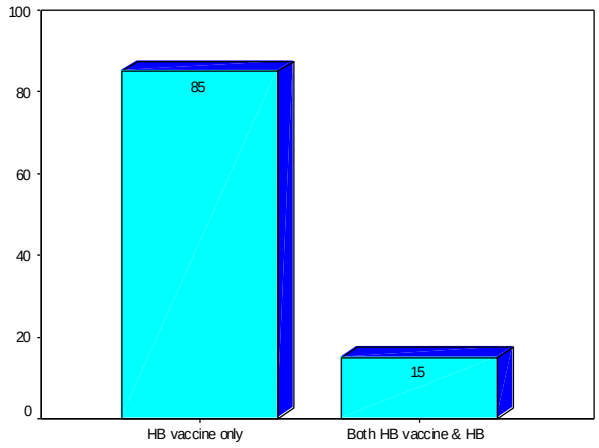

Figure 17 *Distribution of subjects (Cases) by baby vaccination with HB vaccine and HBIG*

This Figure showing us that most of the babies 85% vaccinated with HB vaccine only and 15% vaccinated with both HB vaccine and HBIG in the epidemiology department.

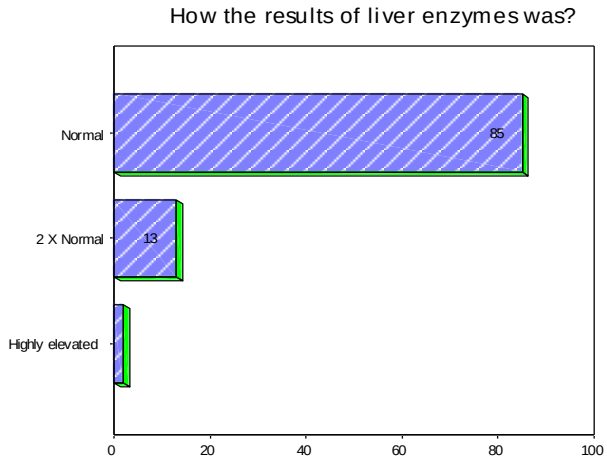

Figure 18 *Distribution of subjects (Cases) by liver enzymes of the women*

The Figure 18 tells us that most of the cases 85% their liver enzymes results were within the normal range and 15% of them more than the normal range even doubled or more.

After studying the distribution of HBV cases by demographical variables, delivery history, working status & the different risk factors, I will in the next pages explores the relationship between those different variables & the statistical significance level that may affect the HBV occurrence among the women in

childbearing age in north Gaza governorate. These risk factors could be demographic such as living area, age or educational status.

Other risk factors may affect HBV occurrence delivery history, travelling history, working in the health field, dental intervention, blood transfusion or donation, and tattooing, surgical intervention, sexual intercourse with infected partner, unsterile injection, kidney dialysis, barber razor and family sharing with tooth brush or nail cutter.

These risk factors some of it will appear there is correlation between it & HBV infection occurrence & some not with statistical significance exploration between those risk factors & the cases & controls.

Analysis of HBV infection with different variables:

Table 4 *HBV infection and socio-demographic variables*

Variable		Case		Control		Total		P value	CI	Odds ratio
		No.	%	No.	%	No.	%			
Age	**16-30 yrs**	58	58	60	60	118	59	.443	.524-1.618	.921
	Over 31 yrs	42	42	40	40	82	41			
Total		100	100	100	100	200	100			
Educational status	**Elementary & below**	30	30	15	15	45	22.5	.000	-	-
	Secondary level	56	56	34	34	90	45			
	University	14	14	51	51	65	32.5			
Total		100	100	100	100	200	100			
Living area	**Jabalia village**	35	35	25	25	60	30	.436	-	-
	Jabalia camp	29	29	37	37	66	33			
	Biet-Lahia	22	22	24	24	46	23			
	Biet-Hanoun	14	14	14	14	28	14			
Total		100	100	100	100	200	100			

This Table 4 shows the relationship between socio demographic variables & HBV infection among the women in childbearing age which has three variables age, educational status & the living area.

First of all the age which shows that 58% of the cases their ages between 16–30 years, compared to 60% of the controls in the same age group, while the percentage of the women in age over 31 years in the cases it was 42% and in the controls 40% and the difference did not reach statistical significance level (P value 0.443).

This means that the age of the women does not affect the chance of getting HBV infection; this finding could be explained as the age is not classified as one of the risk factors of HBV infection.

So we can explain that this result differ from other studies that which told us that older women have more chance to get HBV infection due to the time factor, according to Pollack et al. study in 2005 HBV is endemic and it estimated that 15%–40% of infection were get at early ages (Pollack et al., 2005).

About Khalil et al. (2002) study in Saudi Arabia related to HBV infection among pregnant women it shows that there is strong association between age and HBV infection which differ from my study.

The second related to the educational level and HBV infection it shows that 30% of the cases in the elementary level and below while 15% of the controls in the same age group, 56% of the cases had the secondary level while 34% in the controls and 14% of the cases had the university level while 51% in the controls, and the difference between two groups is highly statistically significant (P value < 0.01).

This means that group of the elementary level and university level have low exposure to the HBV infection than secondary level which means that the risk is higher among the women in the secondary educational level, this group more exposed to work hazard or contact than elementary level, with respect to the university level it can interpretated that this group more educated and may be vaccinated to HBV.

As mentioned in the literature review by Abdul Mujeeb et al. in their study in Karachi in 2000 there were 45.6% of the cases of HBV their educational level are lesser than primary schooling level (Abdul Mujeeb et al., 2006).

This result agree with Rushdi study in Palestine about risk factors of HCV about the educational level there was higher risk to get infection among secondary school level than elementary school level (Rushdi, 2005).

About the third variable it shows that all of the cases & controls in this table do not differ according to the locality in the four living area in north Gaza governorate but it's clear that the least cases & controls living in Biet-Hanoun & the highest number of cases from Jabalia village and the difference did not reach statistical significance level (P value 0.436).

This means that the living area of the does not affect the chance of getting HBV infection; this finding could be explained as living area is not classified as one of the risk factors of HBV infection we can rationalize this result that all of the four areas in North Gaza governorate living at the same low to moderate socio-economical status even village or camp.

These three socio demographic variables show that there is 2 variables were statistically not significant & the third "educational status" was statistically significant.

Table 5 *HBV infection and working variables*

Variable		Case		Control		Total		P value	CI	Odds ratio
		No.	%	No.	%	No.	%			
Working status	**Working**	11	11	46	46	57	28	.000	.061-.280	.130
	Not working	89	89	54	54	143	72			
Total		100	100	100	100	200	100			
Type of work	**In medical field**	3	27.3	33	71.7	36	63.2	.009	.034-.645	.148
	Not in medical field	8	72.7	13	28,3	21	36.6			
Total		11	100	46	100	57	100			

This Table 5 shows the relationship between the working variables & HBV infection related to the working status & the type of work and both variables were statistically significant.

Firstly the relationship between the working status and HBV infection which clarifies that 11% of the cases working & 89% of the cases do not working, while 46% of the controls working & 54% of them do not working and the difference between two groups reached the statistical significance level (P value < 0.01).

This means that there is relationship between HBV infection & the working status, so the working status consider as risk factor to cause HBV infection among the women in childbearing age in North Gaza governorate.

Secondly the relationship between the type of work among 11 working women and HBV infection which clarify that 72.7% most of the cases working in fields other than the medical field & 27.3% (3) cases working in the medical field, while 71.7% (33) controls working in the medical field & 28.3% of them do not working in the medical field and the difference between two groups reached the statistical significance level (P value < 0.01).

This means that there is relationship between HBV infection & the type of work, so the type of work consider as risk factor to cause HBV infection, which prove that the working women especially in the medical field more opportunity to contact with the various infectious materials or people to get HBV infection.

These results supported by multiple related studies in different countries, Aganga-Williams et al. (1999) study in Nigeria showed that women working in occupations related to needle work and secretarial jobs were at increased risk of being infected with HBV. According to Thomas, D. Sero-prevalence study in 1996 it indicated those oral surgeons are at increased risk of getting HBV infection (Thomas, 1996). Abdul Mujeeb et al. study also supported these results that among 7325 blood donors 3% were professional and health care providers (Abdul Mujeeb et al., 2006).

Mayo clinic staff also supported these results by any one working in jobs exposing to blood and blood products is vulnerable to get HBV infection (Mayo Clinic Staff, 2007).

Table 6 *HBV infection and delivery variables*

Variable		Case		Control		Total		P value	CI	Odds ratio
		No.	%	No.	%	No.	%			
Type of current delivery	**SVD**	78	78	86	86	164	82	.099	.276-1.206	.577
	CS	22	22	14	14	36	18			
Total		100	100	100	100	200	100			
Type of previous delivery	**SVD**	67	79.8	79	85.9	146	83	.191	.294-1.432	.649
	CS	17	20.2	13	14.1	30	17			
Total		84	100	92	100	176	100			
Place of previous delivery	**Private**	23	27.4	35	38	58	33	.322	-	-
	Governmental	59	70.2	55	59.8	114	64.8			
	UNRWA	2	2.4	2	2.2	4	2.2			
Total		84	100	92	100	176	100			

This Table 6 shows the relationship between the delivery variables & HBV infection related to the type of deliveries even current or previous & place of previous deliveries and all of these variables were statistically not significant.

The first shows the relationship between HBV infection and the type of current delivery in which 78% of the cases delivered through SVD & 22 of them through CS while 86% of the controls delivered through SVD & 14% of them through CS and the difference between groups does not reach statistical significance level (P value 0.099).

This relationship shows that the type of current delivery does not consider as risk factor for HBV infection, it can be interpretated by that most of cases delivered through SVD, they are not for risk to get HBV infection & the rest of the cases 22% through CS those considered at risk to get HBV infection as surgical procedure and in the worst conditions & to consider the women get infection it will not appear serologically at least for 3 to 6 months later.

The second shows the relationship between HBV infection and the type of the previous delivery - (total of 176 deliveries) - in which 79.8% - (67case) - of the cases delivered through SVD & 20.2 of them through CS while 85.9% of the controls delivered through SVD & 14.1% of them through CS and the difference between groups does not reach statistical significance level (P value 0.191).

This relationship shows that the type of the previous delivery does not consider as risk factor for HBV infection.

And the third shows the relationship between HBV infection and the place of the previous delivery - (total of 176 deliveries) - in which most of the cases 70.2% - (59case) - delivered in the governmental health care settings, 27.4 of them in the private sector & 2.4% of the cases in UNRWA delivery room while 59.4% of the controls delivered governmental health care settings, 38% delivered in the private sector & 2.2% in UNRWA delivery room and the difference between groups does not reach statistical significance level (P value 0.322).

This relationship shows that the place of the previous delivery does not consider as risk factor for HBV infection.

All of these delivery related variables were statistically not significant and according to the results we cannot consider as risk factor among the women in childbearing age in North Gaza governorate, the little number of cases did CS may played a role in this result as supported by Rushdi (2005) it can be rationalized that there a protocol for infection control and universal precaution in Palestine that steer all of the health care facilities to follow it for controlling of blood born infections in delivery rooms and operation rooms.

HBV infection and different risk factor variables:

Table 7 *HBV infection and dental intervention related variables*

Variable		Case		Control		Total		P value	CI	Odds ratio
		No.	%	No.	%	No.	%			
Having dental intervention	**Yes**	89	89	79	79	168	84	.041	.976-4.738	2.151
	No	11	11	21	21	32	16			
Total		100	100	100	100	200	100			
Place of dental intervention	**Private**	21	23.6	7	8.9	28	16.7	.030	-	-
	Governmental	36	40.4	34	43	70	41.7			
	UNRWA	32	36	38	48.1	70	41.7			
Total		89	100	79	100	168	100			

The table shows the relationship between the surgical or medical dental intervention and the place of intervention with HBV infection and both variables were statistically significant, which clarify in the first one that most of the cases 89% did this intervention & 11% of them did not, while 79% of the controls did the dental intervention & 21% of them did not and the difference between two groups reached the statistical significance level (P value < 0.05).

This means that there is relationship between HBV infection & the surgical or medical dental intervention, so the surgical or medical dental intervention consider as risk factor to cause HBV infection.

This result doesn't agree with the study by Rushdi (2005) that no consideration of the infection of HCV in relation to any dental intervention, but it supported by Immunization Action Coalition that women not sexually active, no I.V drug use and had no contact with HBV infected persons developed active HB and by molecular epidemiological technique discovered that the women's virus was identical from HBV infected women had had teeth extracted at the same oral surgeon clinic (Immunization Action Coalition, 2007).

Also Alizadeh et al. (2006) in their study in Iran expressed that there is association between dental surgery and the risk of transmission oh HBV.

The second table shows the relationship between HBV infection and the place of the dental intervention - (total of 168) - in which most of the cases 40.4% - (36 case) – did the dental intervention in the governmental health care clinics, 36% of them in the private clinics & 23.6% of the cases in UNRWA clinics while 48.1% of the controls in the governmental health care clinics, 43% in the private clinics & 8.9% in UNRWA clinics and the difference between groups reached the statistical significance level (P value 0.03).

This relationship shows that the place of the dental intervention considers as risk factor to cause HBV infection which means that some of private, governmental or private clinics contribute in HBV infection as they don't follow the standard precaution for infection control as well as sterilization of the instruments.

Table 8 *HBV infection and surgical intervention related variables*

Variable		Case		Control		Total		P value	CI	Odds ratio
		No.	%	No.	%	No.	%			
Any surgical operation	**Yes**	34	34	26	26	60	30	.140	.797-2.696	1.466
	No	66	66	74	74	140	70			
Total		100	100	100	100	200	100			
Place of surgical operation	**Private**	9	26.5	15	57.7	24	40	.020	-	-
	Governmental	17	50	10	38.5	27	45			
	Outside Palestine	8	23.5	1	3.8	9	15			
Total		34	100	26	100	60	100			

This table shows the relationship between the surgical operation and place of it with HBV infection in which the place of operation was statistically significant & the operation itself was not significant, the most of the cases 66% did surgical operation & 34% of them did not, while 74% of the controls did the surgical operation & 26% of them did not and the difference between two groups did not reach the statistical significance level (P value 0.140).

This means that there is no relationship between HBV infection & the surgical operation & will not be considered as risk factors to cause HBV infection.

In this study the result differs from many of studies related to this variable that there is association between surgical intervention and HBV infection but we can support this result with some reasons first of all the infection control measures in the operation rooms, nosocomial infection control committees follow up and recommendations and safe procedures for both patients and health workers.

The second table shows the relationship between HBV infection and the place of the surgical operation - (total of 60 surgeries) - in which most of the cases 50% - (10case) – did the surgical operation in the governmental health care settings, 26.5% of them in the private sector & 23.5% of the cases outside Palestine while 57.7% of the controls in the governmental health care settings, 38.5% in the private sector & 3.8% outside Palestine and the difference between groups reached the statistical significance level (P value 0.02).

This relationship shows that the place of the surgical operation considers as risk factor to cause HBV infection, this can be rationalized as in the place of dental intervention that some of places may not follow the standard precaution for infection control as well as sterilization of the instruments.

Table 9 *HBV infection and unsafe procedures & habits related variables*

variable		Case		Control		Total		P value	CI	Odds ratio
		No.	%	No.	%					
Body tattooing	**Yes**	6	6	0	0	6	3			
	No	94	94	100	100	194	97	.014	-	-
Total		100	100	100	100	200	100			
Using unsterile injection	**Yes**	7	7	3	3	10	5			
	No	93	93	97	97	190	95	.166	.611- 9.694	2.434
Total		100	100	100	100	200	100			
Blood transfusion	**Yes**	3	3	9	9	12	6			
	No	97	97	91	91	188	94	0.67	.082-1.191	.313
Total		100	100	100	100	200	100			
Touching infected blood	**Yes**	5	5	4	4	9	4.5			
	No	95	95	96	96	191	95.5	.500	.329-4.848	1.263
Total		100	100	100	100	200	100			
Cared or still caring infect patient	**Yes**	22	22	8	8	30	15			
	No	78	78	92	92	170	85	.005	1.36-7.693	3.244
Total		100	100	100	100	200	100			
Needle sticking	**Yes**	15	15	11	11	26	13			
	No	85	85	89	89	174	87	.264	.621-3.284	1.428
Total		100	100	100	100	200	100			

This table shows the relationship between the unsafe habits and procedures with HBV infection in which there were some statistically significant such as tattooing and caring of infected one and some statistically not significant such as using unsterile injections, touching infected blood, needle sticking and blood transfusion.

First of all related to body tattooing clarifies that most of the cases 94% have no tattooing in their bodies & 6% of them have it, while 100% of the controls have no tattooing in their bodies and the difference between two groups reached the statistical significance level (P value < 0.05).

This means that there is relationship between HBV infection & body tattooing, so the tattooing considers as risk factor to cause HBV infection, which prove many of related studies mentioned in the literature review considered that the tattooing has associated with increased risk of transmission of HBV infection (Nishioka & Gyorkos, 2001; AlAghber, 1998; Alizadeh et al., 2006).

The second shows the relationship between the unsterile injection and HBV infection which clarifies that most of the cases 93% did not exposed to unsterile injection & 7% of them exposed to it, while 97% of the controls did not exposed to unsterile injection 3% exposed to it and the difference between two groups

did not reach the statistical significance level (P value 0.166).

This means that there is no relationship between HBV infection & the unsterile injection & will not be considered as risk factors to cause HBV infection which differs from another previous studies it will not contribute to cause HBV infection; I think the rational can be for two reasons the is the little number of cases have used unsterile injections and the second is the moderate prevalence of HBV in North Gaza governorate as part of Palestine.

The third table was about the blood transfusion which shows that 97% of the cases did not transfuse blood & 3% did it compared to 91% of the controls did not it & 9% did blood transfusion and this difference did not reach statistical significance level (P value 0.67).

This result differs from other studies to consider blood transfusion as risk factor such as Hay et al. (1995); Alaghber (1998); Khalil et al. (2002); Alizadeh et al. (2006) stated that blood transfusion increase the chance of HBV transmission.

But in our study it differs which can be rationalized that only three cases transfused blood -little number-, blood transfusion in our country bend to strict regulations and precaution, the advanced laboratory tests of donated blood with complete exclusion to positive results and using of sterile instruments to collect the donated blood.

About the forth table it shows that 95% of the cases did not touch infected blood & 5% did it compared to 96% of the controls did not it & 4% touched infected blood and this difference did not reach statistical significance level (P value 0.67).

By this result it seems well that touching infected blood not cause of HBV infection & the interpretation for this result may be related to that the touched skin or mucus membrane is intact and as it appear in the table there is little number of cases.

The fifth table expressed the relationship between caring of infected patients and HBV infection which clarifies that most of the cases 78% did not care of those patients & 22% cared of them while most of the controls 92% did not care & 8% did it & the difference between two groups reached the statistical significance level (P value < 0.01).

This means that there is relationship between HBV infection & caring of infected patients, so the caring of infected patients infected with HBV considered as risk factor to cause HBV infection, which confirms that the caring of HBV infected person may be source of infection this result supported by the study of Ronald, and David in 1987 that having social contact with identified case of HBV infection and sharing of personal hygiene items were significant risk factor for HBV infection.

The latest table illustrates that 85% of the cases did not stick with needle & 15% did stick with it compared to 89% of the controls did not stick & 11% did stick with needle and this difference did not reach statistical significance level (P value 0.264).

By this result it seemed well that needle sticking is not cause of HBV infection & we can discuss that 15% of the prickled cases may be from non infected persons and in our community as Muslims and having controlling culture and law there is no diffused injectable drug abuse, but really this result differs from a lot of studies by Lemon et al. in 1982, AlAghber in 1998, Alizadeh et al. in 2006, Lavanchy in 2004 and Immunization Action Coalition in 2007 which expressed that needle prickling or sticking from infected HBV person have identified to cause HBV infection.

Table 10 *HBV infection and the knowledge about HBV*

Variable		Case		Control		Total		P value	CI	Odds ratio
		No.	%	No.	%					
Do you know HBV?	**Yes**	83	83	69	69	152	76	.015	1.120-4.296	2.194
	No	17	17	31	31	48	24			
Total		100	100	100	100	200	100			

This table shows the relationship between the knowledge about HBV and HBV infection which clarifies that most of the cases 83% know about the virus & 13% do not know about it, while 69% of the controls know about the virus and 31% of them do not know about it and the difference between two groups reached the statistical significance level (P value < 0.05) from this result we conclude that the women had know about the infection after they get it also we assure that the health education programs definitely will help in decreasing the prevalence of HBV infection.

Table 11 *HBV infection and the familial infection, relationship and it`s habit*

Variable		Case		Control		Total		P value	CI	Odds ratio
		No.	%	No.	%					
Having family infection.	Yes	51	51	9	9	60	30	.000	-	-
	No	42	42	85	85	127	63.5			
	I don`t know	7	7	6	6	13	6.5			
Total		100	100	100	100	200	100			
Which one of the families infected with HBV?	Mother	17	33.3	2	20	19	31.1	.059	-	-
	Father	6	11.8	1	10	7	11.5			
	Brother or sister	16	31.4	1	10	17	27.9			
	husband	12	23.5	5	50	17	27.9			
	Sibling	0	0	1	10	1	1.6			
Total		51	100	10	100	61	100			
Family sharing with nail cutter	Yes	44	44	77	77	121	60.5	.000	.127-4.32	.235
	No	56	56	23	23	79	39.5			
Total		100	100	100	100	200	100			
Family sharing with tooth brush	Yes	3	3	2	2	5	2.5	.500	.248-9.270	1.515
	No	97	97	98	98	195	97.5			
Total		100	100	100	100	200	100			
Keeping tooth brush with each other	Yes	29	29	59	59	88	44	.000	.158-5.11	2.84
	No	71	71	41	41	112	56			
Total		100	100	100	100	200	100			

The above table shows the relationship between familial infections, familial relationship with the infected one & the home habits with HBV infection which clarified that familial infection, familial sharing with nail cutter & the family habit of keeping tooth brush with each other were statistically significant which means that those variables will be considered as risk factors while the familial sharing of the toothbrush & no difference of any one to be infection with HBV to infect others were statistically not significant.

About the familial infection in the first table clarifies that 51% of the cases have familial history of HBV infection, 42% have it & 7% they do not know about it while most of the controls 85% have no familial history of this infection, 9% have it & 6% do not know & the difference between two groups reached the statistical significance level (P value < 0.01).

This means that there is a relationship between HBV infection & the history of HBV infection, so the familial history of HBV infection considered as risk factor to cause HBV infection, which confirmed and supported by different studies, Kuru et al. (1996) in their study showed that 59.1% of family member contact to infected women have serological evidence of previous or ongoing HBV infection and 27.1% of family member were positive for HBsAg (Kuru et al., 1996), also Guven et al. (2006) stated that 73.7% of positive workers for HBV have at least one infected in the family and 36.8% their wives were positive for HBV.

From the second this table we conclude that the relationship between HBV infection & the infected contact one did not differ from one to one which seemed that most of the cases -(17 from 51)- 33.3% the mothers were the infected contacts, 31.8% were brothers or sisters, 23.5% were the husbands & 11.8 were the fathers while the most of the controls 50% -(5 from total of 10)- the husbands were the contacts and this difference did not reach statistical significance level (P value 0.59).

This result shows that there is no difference to anyone to be the contact which may lead to the infection so this will not be considered as risk factor to cause HBV infection; I think the rational can be due to little number of cases which distributed among the familial member, any way this result differs from another results in different studies which clarified the member of the family who may be the responsible for the infection.

From the third table we can shows the relationship between familial sharing of nail cutter and HBV

infection which clarifies that 56% of the cases did not sharing the family with nail cutter & 44% did sharing with it while most of the controls 77% did sharing the family with nail cutter & 23% did not sharing & the difference between two groups reached the statistical significance level (P value < 0.01).

The conclusion can be that there is relationship between HBV infection & the familial sharing of nail cutter, so the familial sharing of nail cutter with HBV will be considered as risk factor to increase the chance of getting HBV infection, in which the nail cutter source of blood which may be contaminated with infected blood it can be discussed that very little amount of blood can be source of infection and HBV can survive in the environment for long periods.

The forth table shows the relationship between familial sharing of tooth brush and HBV infection which clarifies that 97% of the cases did not sharing the family with tooth brush & 3% did sharing with it while most of the controls 98% did not sharing the family with nail cutter & 2% did sharing with it & the difference between two groups did not reach the statistical significance level (P value 0.50).

By this result it seemed well that familial sharing with tooth brush not cause of HBV infection so it will not be considered as risk factor to cause HBV infection; according to this result I can rationalize that this result due to the very little number of cases sharing the family members with tooth brush and the awareness about this public health problem.

And the last table shows the relationship between the habit of keeping tooth brush with each other and HBV infection which clarifies that 71% of the cases did not tooth brush with each other & 29% did keeping it with each other while 59% of the controls did keeping it with each other & 41% did not & the difference between two groups reached the statistical significance level (P value < 0.01).

This means that there is relationship between HBV infection & the habit of keeping tooth brush with each other, so it will be considers as risk factor to cause HBV infection; the conclusion can be due to the very little amount of the virus in the saliva (Palestinian Guidelines for Diagnosis and Management of Viral Hepatitis, 2004), no family member having diseased gum this according to a question in the questionnaire and the socio-economical status of the families living in village or camp may contributed to this result.

Table 12 *HBV infection and Cueffaire visiting*

Variable		Case		Control		Total		P value	CI	Odds ratio
		No.	%	No.	%					
visiting cueffaire	**Yes**	88	88	87	87	175	87.5			
	No	12	12	13	13	25	12.5	.500	.474-2.533	1.096
Total		100	100	100	100	200	100			
Having injury in cueffaire	**Yes**	7	7.9	4	4.8	11	6.2			
	No	81	92.1	83	95.2	164	93.8	.029	1.020-23.028	4.846
Total		88	100	87	100	175	100			

This table shows the relationship between visiting cueffaire and HBV infection which clarifies in the first table that most of the cases 88% were visiting cueffaire & 12% were not while most of the controls 87% were visiting & 13% were not visiting & the difference between two groups did not reach the statistical significance level (P value 0.50).

By this result it seemed well that visiting cueffaire not cause of HBV infection so it will not be considered as risk factor to cause HBV infection.

And in the second table it shows the relationship between the injury in cueffaire and HBV infection which clarifies that 92.1% of the cases did not injure in cueffaire & 7.9% did injure there, while 95.2% of the controls did not injure in cueffaire & 4.8% did injure there & the difference between two groups reached the statistical significance level (P value < 0.05).

So there is relationship between HBV infection & the injury in cueffaire and it will be considered as risk factor to cause HBV infection; this result supported from different studies mentioned before in literature review, HBV has different mode of transmission as well as shaving and sharing razor (AlAghber, 1998; Palestinian Guidelines for Diagnosis and Management of Viral Hepatitis, 2004).

Table 13 *HBV infection and travelling abroad*

Variable		Case		Control		Total		P value	CI	Odds ratio
		No.	%	No.	%	No.	%			
Did you travel or live outside Palestine?	**Yes**	20	20	26	26	46	23	.201	.367-1.381	.712
	No	80	80	74	74	154	77			
Total		100	100	100	100	200	100			
Travelling country	**Egypt**	12	60	11	44	23	51.1	.017		
	Jordan	7	35	3	12	10	22.2			
	K.S.A.	1	5	3	12	4	8.9			
	others	0	0	9	32	9	17.8			
Total		20	100	26	100	46	100			

This table shows the relationship between travelling abroad or living outside Palestine and HBV infection which clarifies in the first table that most of the cases 80% were not traveled or lived outside Palestine & 20% travelled or lived outside Palestine while most of the controls 74% were not traveled or lived outside Palestine & 26% travelled or lived outside Palestine & the difference between two groups did not reach the statistical significance level (P value 0.201).

By this result it seemed well that travelling abroad or living outside Palestine not cause of HBV infection among the women in the childbearing age so it will not be considered as risk factor to cause HBV infection.

And in the second table it shows the relationship between the travelled country and HBV infection which clarifies that 60% - (12 case total of 46) - of the cases travelled or lived in Egypt, 35% Jordan and 5% to K.S.A., while 44% of the controls did travelled or lived in Egypt, 12% in Jordan, 12% in K.S.A. and 32% in other countries such as " Russia, Europe and Gulf countries" & the difference between two groups reached the statistical significance level (P value 0.17).

This means that there is relationship between HBV infection & the travelled country, so it will be considers as risk factor to cause HBV infection which support the study of Rushdi (2005) that travelling aboard especially Egypt could be source of getting infection there.

4. Conclusion & Recommendations:

Conclusion:

This study exempted to identify the main risk factors of HBV infection among the women in the childbearing age in north Gaza governorates in 2008, which is a part of the study in school of public health.

These study findings confirmed some of risk factors related to different previous studies in various countries and some not and the study findings might help in decreasing the prevalence of HBV among the women in childbearing age as well as their born babies.

Palestine reported prevalence rate of HBV in general population 3% which lies in the intermediate prevalence level 2% – 7% as Mediterranean region.

Dentist visit and it`s place, place of surgical intervention, familial infection, educational status, body tattooing, caring of infected patient, sharing family with nail cutter, keeping tooth brush with each other, injured in cueffaire and which country the women traveled to it considered in this study as statistically significant risk factors related to HBV infection among women in childbearing age.

All of these risk factors consider as controllable risk factors through life style modification, more correct and good sterilization, avoidance of tattooing or using sterile instrument for cupping, HB vaccination before travelling aboard and public awareness toward this public health problem.

Using unsterile injection, age of the women, type and place of delivery, surgical intervention, living area, blood transfusion, touching of infected blood, sharing familial tooth brush, needled sticking, traveling outside Palestine, visiting cueffaire and mother infected with HBV, these risk factors considered as not statistical significant among the women in childbearing age this can be rationalize through that advance laboratory diagnosis and safe strategy for blood donation and transfusion contributed for this result, public awareness toward how to deal with infected patients and using protective materials contributed for this result, and safe places for delivery also contributed to that.

In Palestine, practicing illegal sexual relations and injectable drug abuse not to be risk factors for HBV infection among this group of people because of religious and cultural factors.

Any way knowing of like these risk factors consider necessary and worthful to contribute in minimizing the prevalence of HBV infection.

Chronic infection is responsible for the majority of cases of HBV-related morbidity and mortality.

Improving the identification and public health management of persons with chronic HBV infection can help prevent serious sequelae of chronic liver disease and complement immunization strategies to eliminate HBV transmission. Serologic testing for hepatitis B surface antigen (HBsAg) is the primary way to identify women with HBV infection, because of the availability of effective vaccine and post exposure prophylaxis to their babies.

Recommendations:

1. Screening is a basic public health tool used to identify unrecognized health conditions so routine hepatitis B virus screening for all women in childbearing age is necessary.
2. CDC recommends expanding HBV testing to include all persons born in regions with HBsAg prevalence of ≥2% (high and intermediate endemicity)
3. Efforts are needed to educate, evaluate, and refer clients for appropriate medical follow-up.
4. Supports the education and training programs that help to screen patients at risk for hepatitis B viral infection.
5. Clinical evaluations to detect the onset and progression of HBV-related liver disease.
6. Proper treatment for HBV infection which can delay or reverse the progression of liver disease.
7. Avoid tattooing and cupping or using sterile instruments for like these procedures.
8. Continuous checking of sterilization procedures done in all surgery rooms and dental clinics.
9. Vaccination against HBV before travelling aboard.
10. Health education programs toward illustration of this public health problem, transmission and prevention strategies.
11. To prevent or reduce the risk for transmission to others, HBsAg-positive persons should be advised to:
    - Notify their household contacts that they should be tested for HBV infection, vaccinated against hepatitis B virus.
    - Cover cuts and skin lesions to prevent the spread of infectious secretions or blood.
    - Clean blood spills with bleach solution.
    - Refrain from donating blood.
    - Refrain from sharing household articles (e.g., toothbrushes, razors, or personal injection equipment) that could become contaminated with blood.
    - Dispose of blood and body fluids and medical waste properly.
12. Give the newborns hepatitis B vaccine and hepatitis B immune globulin beginning at birth and to complete the hepatitis B vaccine series according to the recommended immunization schedule.
13. Routine screening of the babies at the first birth day for HBV.
14. When seeking medical or dental care, HBsAg-positive persons should be advised to inform those responsible for their care of their HBsAg status so they can be evaluated and their care managed appropriately.
15. HBV is not spread by kissing, hugging, coughing, ingesting food or water, sharing eating utensils or drinking glasses, or casual touching.
16. Persons should not be excluded from school, play, child care, work, or other settings on the basis of their HBsAg status, unless they are prone to biting.

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عوامل الخطر من عدوى فيروس التهاب الكبد البائي بين النساء في سن الإنجاب في شمال قطاع غزة للعام 2008

كلمات مفتاحية:
فيروس التهاب الكبد البائي,
سن الإنجاب,
عوامل الخطر,
شمال غزة.

تعتبر عدوى التهاب الكبد الفيروسي البائي مشكلة صحية عالمية وتقدر نسبة انتشاره 5% في جميع أنحاء العالم، 7-2٪ في دول الشرق الأوسط، و3٪ في قطاع غزة. تشير الدراسات الى أن عدوى الفيروس تؤدي إلى حوالي مليون وفاة سنويا وتشكل عامل رئيسي وخطير لتليف الكبد وسرطانه.

استخدم الباحث منهجية الحالة والضابطة للتعرف على عوامل الخطر من الفيروس بين النساء في سن الإنجاب للعام 2008 بمحافظة شمال غزة.

اشملت عينة الدراسة على 200 سيدة نصفهم يحملن العدوى والأخريات لا يحملنها.

بينت الدراسة أن عوامل الخطر ذات الدلالة الإحصائية كانت الوضع التعليمي, عمل السيدة ونوعه, التدخلات الطبية أو الجراحية للأسنان ومكان الإجراء, مكان إجراء العمليات الجراحية, الوشم بالجسم, إصابة أفراد الاسرة, العناية بالمرضى المصابين, المشاركة الأسرية لقصافة الأظافر, الحفظ المشترك لفرشاة الأسنان, جرح السيدات عند الكوافير وبلد السفر للخارج.

وأوضحت أن عوامل الخطر التالية ليست ذات دلالة إحصائية كاستخدام حقن غير معقمة، العمر، نوع الولادة ومكانها، العملية الجراحية، نقل الدم، لمس الدم الملوث، مشاركة أفراد الأسرة فرشاة الأسنان، النخز بالحقن، السفر للخارج، وزيارة الكوافير.

أوصى الباحث في دراسته بالفحص الروتيني للفيروس للنساء الحوامل، التحصين الشامل للنساء في سن الإنجاب والتمنيع السلبي والنشط للأطفال المولودين لأمهات يحملن العدوى.