SUMMARY & CONCLUSION

Hydrocephalus is an abnormal enlargement of the ventricles due to an excessive accumulation of CSF resulting from a disturbance of its flow, absorption or, uncommonly, secretion**.**

The CSF is produced by the choroid plexus in the ventricles mainly at a rate of 0.4 ml per minute or about 500 ml in 24 hours. The public health burden of hydrocephalus is significant.

Hypothetically the condition may arise in three ways (obstruction of the CSF pathway, over secretion of CSF and impaired venous drainage). The pathologic effects of ventricular enlargement have been studied extensively.

The identified risk factors included lack of prenatal care, multiparous gestation, maternal diabetes, maternal chronic hypertension, maternal hypertension and drug use during pregnancy.

Hydrocephalus is either obstructive (non-communicating) or communicating (non-obstructive). It complicates open spina bifida in 85–90% of patients and may only become apparent following closure of the myelomeningocele.

Hydrocephalus may occur as the result of a range of infectious or inflammatory processes. Bacterial, parasitic and granulomatous infections are much more likely to lead to hydrocephalus than viral infections. The cause of the hydrocephalus is thought to be obstruction of the normal flow of cerebrospinal fluid (CSF) or overproduction of CSF.

Hydrocephalus may evolve into a chronic state in which ventricular enlargement persists, yet CSF pressure returns to normal. Enlarged head, vomiting, feeding refusal, sunset appearance of eye, convulsions, disturbed consciousness, abnormal fontanels (size, bulge and pulsation), squint, decrease motor power and presence of other congenital anomalies are the most common symptoms and signs of hydrocephalus. It can be investigated by CT brain and MRI.

Prevention of hydrocephalus includes primary (avoidance of risk factors), secondary (early detection and proper management) and tertiary (rehabilitation).

Hydrocephalus can be treated surgically by performing shunt operation (ventriculo-peritoneal, ventriculo-pleural, ventriculo-atrial and lumbar-peritoneal) or rarely medically.

This study was designed aiming to determine the epidemiological features of hydrocephalus among infants attending Benha health insurance hospital and Benha children hospital, identify risk factors associated with the pathogenesis of hydrocephalus, determine distribution, determinants and dynamics of hydrocephalus and To plane a comprehensive program of prevention and control of hydrocephalus.

This study includes 104 hydrocephalic infants attending Benha health insurance hospital and Benha children hospital of which neonates form 47.1% and 52.9% were post-neonates. Male infants (55.8%) tended to be more in percentage than females (44.2%). Their parents were interviewed

and asked about possible risk factors, symptoms, examination of infants and reviewing reports of CT and MRI.

Results of this study illustrated that consanguinity among congenitally hydrocephalic infants (**21.5%)** was slightly higher than among infants who suffer from acquired hydrocephalus **(20%).**

The percentage of hydrocephalic infants who suffered from congenital hydrocephalus and had other family history was **8.9%** in comparison with **8%** of hydrocephalic infants who suffered from acquired hydrocephalus.

Mothers below 21 years old constitute **12.7%** of mothers of hydrocephalic infants who suffered from congenital hydrocephalus, while others above 35 years old form **11.4%** of them. The percentages of mothers of acquired hydrocephalic infants and their age were below 21years old and above 35 years old were **20% & 8%** respectively.

Only **5.8%** of mothers of hydrocephalic infants didn't seek ANC which was compared with **81.7%** of mothers who sought ANC in 1^{ST} trimester. The study also illustrates that **2.5%** of them sought ANC in the 2^{nd} trimester; while **11.4%** sought ANC in the 3rd trimester.

DM of mother had small impact on hydrocephalus as only **5.1%** and **2.5%** of mothers of congenital hydrocephalic infants suffered from diabetes mellitus and hypertension respectively.

The percentage of mothers of congenital hydrocephalic infants who suffered from pregnancy induced hypertension (**5.1%**) was lower than among mothers of infants suffering from acquired hydrocephalus (**12%**).

About order of gestation, congenital hydrocephalic infants that had 1st order of gestation were **36.7%** compared to **32 %** of acquired group. On the other hand more than half (**60%**) of acquired hydrocephalic infants had below 3rd order of gestation in comparison with **41.8%** of congenital group. Congenital hydrocephalic infants that had equal to or more than 3rd order of gestation were **21.5%** compared to **8 %** of acquired group.

Mothers with history of drug abuse constituted **21.5%** of mothers of congenital hydrocephalic infants compared with **16%** of acquired group.

Mothers with history of exposure to infection during gestation constituted **16.5%** of mothers of congenital hydrocephalic infants compared with **4%** of acquired group. This was compared with **2.5%** of parents of congenitally hydrocephalic infants suffered from one of STDs, while no one among parents of infants suffering from acquired hydrocephalus.

Only **1.3%** of mothers of congenital hydrocephalic infants had history of exposure to trauma at time of labour compared to **4%** of mothers of acquired group

Head enlargement constituted the highest percentage of mothers' complaint (**40.5%)** of congenital hydrocephalic infants compared to **52%** of acquired group. Back and scalp swelling formed **34.2%** and **6.2%** respectively of congenital hydrocephalic infants compared to no one of acquired group. Bulging of anterior fontanel was the complaint of **2.5%**of congenital hydrocephalic infants compared to **12%** of acquired group.

About third of mothers of congenital hydrocephalic infants **(36%)** complained of other causes (eye deviation, US diagnoses, vomiting,

convulsions, dilated scalp veins, delayed sitting, decrease in attention and soft areas of skull) compared to **16.5%** of acquired group.

It was found that **21.5%**of congenitally hydrocephalic infants suffered from sunset appearance of eyes, **19%** suffered from vomiting, **17.7%** suffered from feeding refuse, **7.6%** suffered from convulsions and **6.3%** suffered from disturbed consciousness**.** The percentage of hydrocephalic infants suffered from acquired hydrocephalus and from sunset appearance of eyes equal those suffered from vomiting, those suffered from feeding refuse and those suffered from disturbed consciousness equal **40%,** while **44%** suffered from convulsions**.**

Nearly half (**49.4%)** of congenital hydrocephalic infants and their head circumference percentile were normal compared to **64%** of acquired group. Only **8.9%** had below normal head circumference percentile & **12%** of acquired group. Infants having above normal head circumference percentile constituted **41.7%** of congenital hydrocephalic infants in comparison with **24%** of acquired group.

Regarding presence of other congenital anomalies, nearly half **(51.9%)** of congenitally hydrocephalic infants had congenital anomalies other than hydrocephalus**,** while **16%** of hydrocephalic infants suffering from acquired hydrocephalus did.

Fontanels were affected by hydrocephalus as about half of congenital hydrocephalic infants had above normal anterior fontanel size **(55.7%)** compared to **64%** of acquired group. On the other hand **20.3%** of the congenital group had severely increased anterior fontanel size & **16%** of the

acquired one**.** Also 24.1**%**of the congenital group had normal anterior fontanel size in comparison with **20%** of acquired one.

The highest percentage of congenital hydrocephalic infants (**69.6%)** had above normal posterior fontanel size compared to **60%** of acquired group. On the other hand **30.4%** of the congenital group & **40%** of the acquired one had normal size.

All congenital hydrocephalic infants showed bulge of anterior fontanel in comparison with **96%** of hydrocephalic infants who suffered from acquired hydrocephalus. The highest percentage of congenitally hydrocephalic infants and showing bulge of posterior fontanel was **94.9 %,** while **88%** of hydrocephalic infants suffering from acquired hydrocephalus did.

The highest percentage of congenitally hydrocephalic infants (**94.9%)** showed pulsation of anterior fontanel in comparison with **68%** of hydrocephalic infants who suffered from acquired hydrocephalus, while **91.1%** of congenitally hydrocephalic infants showed pulsation of posterior fontanel in comparison with **68%** of hydrocephalic infants who suffered from acquired hydrocephalus.

As regard squint, Presence of squint formed only **11.8%**of congenital hydrocephalic infants compared to **12%** of the acquired group**.** On the other hand **88.2%** of the congenital group didn't show squint & **88%** of the acquired one.

About half of congenital hydrocephalic infants had spina bifida **(49.4%)** compared to **20.0%** of acquired hydrocephalic infants. On the other hand **50.6%** of the congenital group didn't & **80.0%**of the acquired group.

About half of hydrocephalic infants suffering from congenital hydrocephalus **(54.4%)** had good motor power. **20.3%** had weakness in lower limb in comparison with **25.3%** that had paralysis in lower limb. The highest percentage of hydrocephalic infants suffering from acquired hydrocephalus **(88%)** had good motor power, while only **4%** have weakness in lower limb in comparison with **8%** that had paralysis in lower limb.

CT and MRI reports showed that obstructive hydrocephalus constituted **70.9%** of congenital hydrocephalic infants compared to **52%** of acquired hydrocephalic infants. On the other hand communicating hydrocephalus formed **29.1%** of the congenital group & **48%** of the acquired one.

Spinal meningiomyelocele was present among **38%** of congenital hydrocephalic infants in comparison with only **4%** of acquired hydrocephalic infants**.** On the other hand **62%** of congenital hydrocephalic infants didn't show MRI abnormalities & **96%** of the acquired group.

Hence, it could be concluded that infants could be diagnosed by identifying symptoms (enlarged head, vomiting, feeding refusal, sunset appearance of eye, convulsions and disturbed consciousness), by examination (abnormal fontanels (size, bulge and pulsation), squint, decrease motor power and presence of other congenital anomalies) and investigations by CT brain and MRI.

Also infants could be protected primarily by avoiding risk factors as lack of prenatal care, multiparous gestation, maternal diabetes, maternal chronic hypertension, maternal hypertension during gestation and drug use

during pregnancy, secondarily by early detection and proper management and tertiary prevention by good rehabilitation.