IDENTIFICATION OF THE RISK FACTORS FOR CEREBRAL PALSY IN YEREVAN, ARMENIA

Master of Public Health Thesis Project Utilizing Research Grant Proposal

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Abstract

The main purpose of the investigation is to explore associations between different risk factors and Cerebral Palsy (CP) and identify the most frequent conditions leading to CP in Yerevan, Armenia; to take measures to reduce exposure to these risk factors; and to provide the framework for establishing and conducting a CP prevention program.

In order to study the association between CP and various factors a case-control study will be conducted with one control per one case. The data will be obtained from medical charts of children with and without CP and from interviewer-administered questionnaires filled by their mothers. A chart extraction form is created for facilitating the data collection process. The interviewer-administered questionnaire is designed to gather information from mothers of chosen children. That questionnaire was constructed on the basis of two validated questionnaires from different studies and adapted to the Armenian population.

The estimated sample size is 440 cases and 440 controls. All 22 child polyclinics of Yerevan will be included in the study in order to reach the desired sample size. One child without CP (control) for one child with CP (case) will be chosen by simple random sampling (SRS) from the same polyclinic using the list of all registered children. After extraction of information from the medical charts, all mothers of chosen children who are willing to participate will complete an interviewer-administered questionnaire. SPSS and Stata programs will be used for data entry and analysis.

Duration of the research will last about five months. The estimated total budget is equal to $19,190.

After completion of the work, results and findings will be announced and appropriate discussions and recommendations will be done.

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Literature review

Cerebral Palsy (CP) is a term used to describe a group of nonprogressive impairments of the central nervous system. It is caused by damage to certain areas of the brain before, during, or shortly after birth. The damage disrupts the brain's ability to control movement and posture (12).

There are several types of Cerebral Palsy. Spastic Cerebral Palsy is the most common form *(appendix 1, table 1)*. In this condition, the muscles are permanently contracted and stiff. In *hemiparesis*, the arm and leg on one side of the body are affected. *Diplegia* is motor impairment of the legs (in some cases the arms are also affected to some degree). *Triplegia* is the involvement of three limbs. *Quadriplegia* involves all four limbs (12, 21). Athetoid, or dyskinetic, Cerebral Palsy leads to slow, uncontrolled writhing movements of the hands, feet, arms, legs, face or tongue (12, 21). Ataxic Cerebral Palsy is a relatively rare form and characterized by problems with balance and depth perception. Patients with ataxic CP may have coordination problems, walking difficulties, troubles with fine motor skills and a tremor. Some patients may have symptoms of more than one type of CP (mixed form) *(appendix 1, table 1).*

Burden of Cerebral Palsy

With the decline in neonatal mortality, the prevalence of Cerebral Palsy has risen significantly in most countries. In Northern California it is 1.23 per 1000 3-year-olds born between 1983-1985. In Sweden 2.17 per 1000 born between 1986-1988 were diagnosed as suffering from CP. The increase in the incidence of CP as a consequence of a drop in neonatal mortality has also been reported from Australia, England, and Ireland (12).

According to the data, presented by Zaruhi Mkrchyan, MPH, in her qualitative research "Childhood Disability Due to Cerebral Palsy and its Impact on the Family", 1999,

the crude prevalence of disabilities among children of age 0-15 is 7 (per 1,000 children).

However there are no data on absolute number of CP cases among children of age 0-15. Data on prevalence of Cerebral Palsy among children of age 0-15 is not available in the MOH of Armenia or at the Ministry of Social Security. Therefore, in order to estimate the prevalence of CP in Armenia in 1999 a pilot project was conducted in 2 out of 12 pediatric polyclinics in Yerevan and one polyclinic in one of the northern marzes of Armenia in Tavush marz. As a result of this it was concluded that the crude estimate of CP in Armenia is 2 per 1,000 children.

At present it is estimated that CP occurs between 1and 5 per 1000 live births each year (6, 11, 21).

Cerebral Palsy is not a progressive disease (the brain damage does not get worse). However, secondary problems, such as mental impairment, hyperactivity, emotional problems, seizures and epilepsy, growth problems, abnormal sensation and perception, etc., can progress and lead to many undesirable consequences. Additional sensorineural problems include speech and articulation problems, and hearing loss, as well as vision problems, such as nistagmus and strabismus (12).

Society with Cerebral Palsy

Social adaptation of children with Cerebral Palsy is a huge concern all over the world, because Cerebral Palsy creates many psychological problems in addition to physiological problems. The sick children are bound to feel frustrated, because it is difficult or impossible to make the body respond. They feel insecure and may be unattractive. The sick children are incapable of doing many things that other children do. They may be left alone, isolated, without any stimulation of love, touch or support. They are in a social risk zone and very often are denied by society (17).

Families with children with CP have to cope with greater financial stress; more frequent disruption of the family routine, more marital problems and reduced social activities outside the family (10).

Economic impact associated with Cerebral Palsy

Many people with CP need long- term services or care. In the US it is estimated that the lifetime cost for all people with CP is $11.5 billion (in 2003 dollars). This cost includes both direct and indirect costs, such as doctor visits, prescription of drugs, and impatient hospital stays, etc. Direct nonmedical expenses, such as home modifications, car modifications make up 9% of the costs (2).

These estimates do not include other expenses, such as hospital outpatient' visits, department' visits, residential care, and family out-of pocket expenses. The actual costs of CP are, therefore, even higher than what is reported (2).

Risk factors for Cerebral Palsy

The various investigations demonstrated that a given clinical neurological deficit could be caused by a cerebral malformation of gestational origin, by disruptive processes of antenatal, perinatal, or early posnatal onset affecting a previously nor mal brain, or by combination of these processes (4, 8, 11, 20).

Antenatal risk factors are those that develop during pregnancy and may have a big contribution to the future development of CP (6, 19). These factors are maternal diseases, such as thyroid abnormalities, hypotension, diabetes, cardiopulmonary disease, severe anemia, and preeclampsia. A huge role is played by maternal infectious diseases, both bacterial and viral. According to recent investigations certain substances, such as chorioamnionitis and funicitis, formed as the result of maternal and fetal inflammatory responses, lead to white matter injury and CP (6). Abuse of alcohol and smoking may also

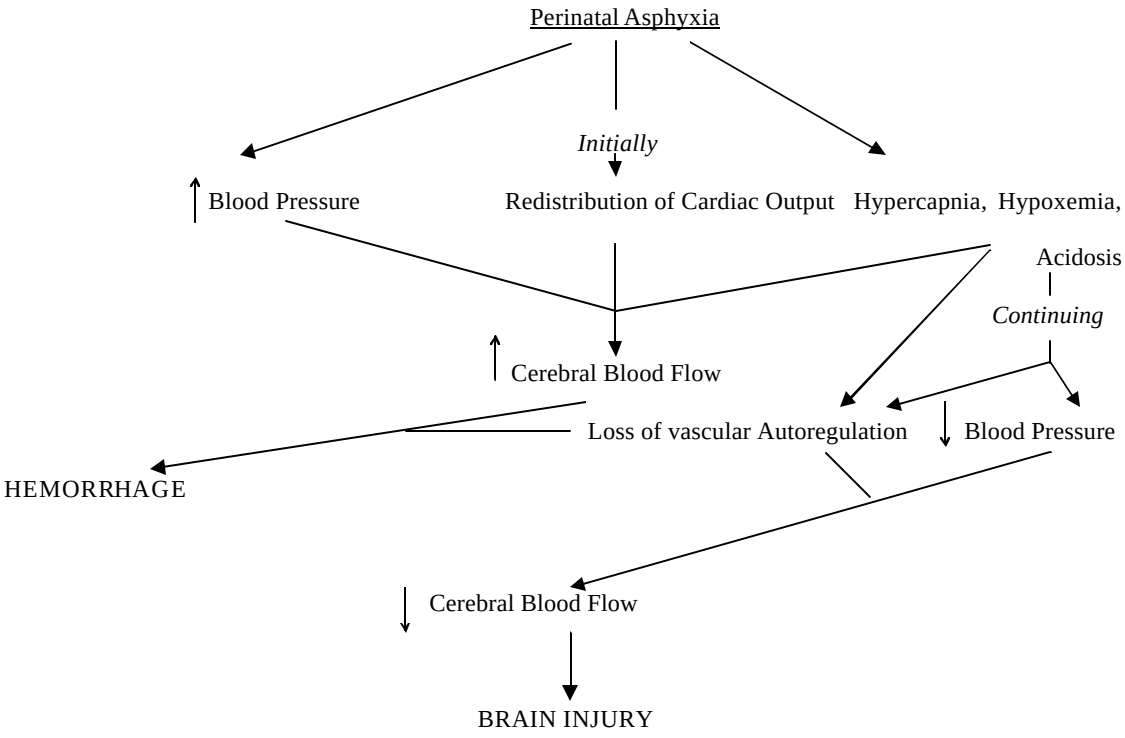
damage the normal development of the fetus brain (10). Maternal homodynamic disturbances, emboli arising from the placenta, anomalies in the fetal circulation and multiple gestations may lead to intrauterine arterial ishemic lesions (12).

Congenital brain anomalies, immaturity (small for gestation age), prematurity (preterm birth), antepartum (before birth) asphyxia and intrapartum, or perinatal (during birth) asphyxia are final results of the unfavorable impact of all of the above mentioned factors on the fetus, and are considered as direct causes of CP (6,13).

Perinatal risk factors. The perinatal period is defined as the period extending from the onset of labor to the end of the first week of postnatal life (12). Risk factors of this period are prolonged second stage of labor, precipitate delivery, fetal distress, mechanical trauma due to any obstetric intervention, perinatal infections, and certain perinatal metabolic conditions, such as hyperbilirubinemia and hypoglycemia, and transitional neonatal pulmonary hypertension causing critical hypoxemia (21).

Although in the past, instrument assisted delivery with mechanical damage to the brain contributed significantly to subsequent persistent neurological deficits, these deficits are now more commonly the consequences of developmental anomalies and asphyxia, acting singly or together. Asphyxia is a condition in which the brain is subjected to hypoxia, ishemia and hypercapnia, which in turn can lead to cerebral edema and various circulatory disturbances, and, as a final result, to brain injury (10, 18).

Interrelationship between perinatal asphyxia and brain damage (12)



One of the indicators of a baby's condition after birth is the Apgar test, which is used to evaluate the baby's heart rate, breathing, activity and muscle tone, grimace response and appearance. The Apgar test is usually given to the baby twice: once at 1 minute after birth, and again at 5 minutes after birth. A baby who scores a 7 or above is generally considered in good health (22).

The Apgar score is a useful indicator of the response to resuscitation in the delivery room; however, the predictive value of this score at 1 and 5 minutes is very limited (18). The longer a low score is maintained, the greater is its significance in predicting an adverse neurological outcome *(appendix 1, table 2)*.

Besides the assessment of neurological deficit by using Apgar score there is another prognostic method, based on assessment of general movements of newborns (7, 5, 15).

Early postnatal risk factors. The early postnatal period is defined as the period extending from one week to one month of life (12). Risk factors in this period may be head injury, infections of central nervous system, such as bacterial and viral meningitis and encephalitis, neurological complications after vaccinations, etc (21). According to one study (1), children with CP of post-neonatal origin have more severe symptoms than non-post-neonatal CP children.

Which risk factors are more predictive of developing Cerebral Palsy is an open question at present. Some investigators emphasize antenatal factors (6, 19); others are more prone to link perinatal factors with Cerebral Palsy (11), and yet others are concerned with the post- neonatal group of factors (1). There is no certain answer on this question.

Also, there are continuing debates, concerning whether Cesarean section is defensive against neurological complications or not. Some hypothesize that Cesarean section has a protective effect (3); others argue that Cesarean section does not reduce the risk of Cerebral Palsy (1, 16).

Taking into consideration all of the above mentioned it becomes obvious that the influence of unfavorable factors in different periods of the development of the fetus and baby may lead to subsequent development of CP.

Objective of the Study and Public Health Impact

The main purpose of the investigation is to explore associations between different risk factors and CP and identify the most frequent conditions leading to CP in Yerevan, Armenia; to take measures to reduce them and to provide the framework for establishing and conducting a CP prevention program.

Description of proposed project

Research questions

The following research questions will be addressed in the study:

1. What is the prevalence of CP in Yerevan, Armenia?
2. Is there an association between CP and antenatal status?
3. Is there an association between CP and perinatal status?
4. Is there an association between CP and postnatal status?

Rationale for choice of the study design

In order to study the association between CP and various factors a case-control study will be conducted with one control per one case. This design will be the most appropriate for answering the research questions, since CP is considered as a relatively rare disease, but information about pregnancy and delivery of mothers, and postnatal conditions of babies are available in the medical charts of polyclinics and also can be gathered from mothers by using a questionnaire. A case-control design is not as expensive and time consuming as other designs. In addition, a case control study requires comparatively few subjects and possesses no risk to them. This study design allows the study of the multiple potential causes of a disease.

Definition of disease and risk factors

Cerebral Palsy is a term used to describe a group of disabilities caused by injury or insult to the brain either before or during birth or in early infancy. CP causes the greatest amount of irreversible physical disabilities in children. The disability is non-progressive but

may become more obvious as affected infants grow older and secondary complications, such as contractures, deformities, etc (21).

Antenatal risk factors are factors developing during pregnancy, as a result of which immaturity, prematurity and antepartum asphyxia may arise (6,19).

Perinatal risk factors are factors developing at the time of delivery and during one week after birth, leading to perinatal asphyxia with possible brain injury (12, 21).

Postnatal risk factors are diseases of central nervous system, head injury, complications of vaccination, etc., developing from one week to one month of life (12, 21).

Definition of cases and controls

The target population is children aged from 1 to 15 years.

The study population is children aged from 1 to 15 years living in Yerevan city, Armenia. The children will be identified from child polyclinics' charts.

Cases are defined as children aged from 1 to 15 years with previously diagnosed CP.

Controls are children without CP aged from 1 to 15 years.

Inclusion Criteria

- Cases are children aged from 1 to15 years living in Yerevan, Armenia who were previously diagnosed CP and whose mothers are willing to participate.
- Controls are children aged from1 to 15 years living in Yerevan, Armenia who have not been diagnosed with CP and whose mothers are willing to participate.
- Available medical charts for extraction of information about ante-, peri- and postnatal periods of life.

Exclusion Criteria

- Children with any other comorbid conditions.
- Children missing medical charts from at least one of the three periods (ante-, peri- and postnatal periods).
- Children whose mothers are not willing to participate.

Data collection and description of the instruments

The data will be obtained from medical charts of children with and without Cerebral Palsy and from interviewer-administered questionnaires filled by their mothers.

A chart extraction form is created for facilitating the data collection process. Information on about 15 variables related to the different aspects of child development will be gathered from medical charts of children *(appendix 4)*.

After performing a pilot study in one of the child polyclinics of Yerevan, which involved 20 cases and 20 controls *(appendix 2)*, a second instrument was proposed after some limitations of using only medical charts were observed. An interviewer-administered questionnaire will be used in addition to the medical charts. A particular problem was the large amount of missing data mostly related to mother health and habits during pregnancy and process of delivery *(appendix 2, table 1)*. To address this issue, an additional instrument was developed.

The interviewer-administered questionnaire *(appendix 7, 8)* is designed to gather information from mothers of chosen children. That questionnaire was constructed on the basis of two validated questionnaires from different studies, including the "Pregnancy and Driving" (Alix Weekes, Dr. B.S. Acar, Loughborough University) (23), and "Developmental History Questionnaire" (Benjamin D. Garber, PhD, 1990, 1993) (24). Then, the questionnaire

was adapted to the Armenian population taking into consideration national terminology and conventions.

The interviewer-administered questionnaire consists of the questions placed in several sections: general information, pregnancy, delivery and postnatal period of life. Questions are binary, ordinal, nominal, and continuous. They are mostly close-ended, although there are few open-ended questions as well. The questionnaire was pre-tested among friends and relatives and some changes were performed to avoid misunderstanding.

Using two instruments will help to get the most valid and reliable data about pregnancy, delivery and early period of the child development. If medical charts are missing information specific items will be used from the questionnaire. Particularly, information about mother health and habits during pregnancy, which may be missed from medical charts, will be gathered from interviewer-administered questionnaire. On the contrary, information about diagnoses at discharges or certain congenital brain anomalies will be collected from medical charts.

There are certain items, information about which will be obtained both from medical charts and questionnaire. In case of disagreement, the choice will be given to the information from the medical charts as the most crucial medical document.

Main Variables

Dependent variable

Cerebral Palsy

Independent variables

- Congenital brain anomalies
- Low birth weight (prematurity, immaturity)
- Abnormal delivery (complicated, precipitate, instrument assisted, etc.)

- Birth asphyxia
- Neonatal convulsion
- Neonatal hemolytic disease
- Peri- and neonatal infections
- Postnatal head injury

Sample size calculations

Sample size calculations are performed based on the formula for case-control designs to detect a meaningful odds ratio *(appendix 3).*

Based on the results of conducted pilot study approximately 20 cases are in one polyclinic of Yerevan. Thus, by involving all 22 child polyclinics into the study it will be possible to get about 440 cases (20*22~440 cases with power 78%) and accordingly 440 controls.

Sampling methodology

Because of the rarity of CP, all 22 child polyclinics of Yerevan will be included in the study in order to reach the desired sample size. All medical records of children aged 1-15 with previously diagnosed Cerebral Palsy (cases) at all child polyclinics will be reviewed. One child without CP (controls) for one child with CP (case) will be chosen by simple random sampling (SRS) from the same polyclinic using the list of all children registered there.

There are two types of child medical charts used in Yerevan pediatric polyclinics: old and relatively new. In 3 child polyclinics new medical records were introduced from 1.5 to 3 years ago. New medical records contain more precise information about child development because they include tables and charts with data about physical and mental development of child. In old medical records there are no such developmental charts and tables and it is impossible to fully assess the development of child. Thus, it will be desirable to separately

compare results obtained from new and old medical records. However, since new medical records were introduced from 1.5 to 3 years ago, there will be few cases of CP obtained from new medical records. That is why comparison of interest will be the results from the combined old+new records to the results from old-only records.

After extraction of information from the medical charts, all mothers of chosen children willing to participate will complete an interviewer-administered questionnaire.

Data entry and cleaning

Data will be entered using SPSS program. Data will be checked for logical consistency for each of the variables. For identifying extreme values range checks will be used. Accuracy of matching will be checked by comparing cases and controls on the distribution of the matching criteria.

Data analysis

Data will be transferred to the Stata Statistical program. The initial steps of the analysis will consist of summarizing all variable to provide an exploration of the data for outliers and missing values. Unusual values will be checked against the medical chart extraction form and corrected when necessary and appropriate. Differences in distribution between cases and controls for categorical variables will be tested using the chi-squared test. Differences in proportions will be evaluated using the z-test or chi-squared test. Differences in means of continuous variables will be assessed using the t-test. Simple logistic regression will be used to assess association between covariates and case-control status. All covariates identified as statistically significant in the bivariate analysis ($p<0.05$) will be included in a multiple logistic regression analysis. Model building will be performed using Likelihood Ratio test to obtain

the most parsimonious model. Model checking will be performed using the Hosmer-Lemeshow goodness of fit test.

Potential role of alternative explanations to the association (confounding, interaction)

1.Year of birth

Taking into consideration the transitional period of the development of Armenia and its different impact on the whole health care system, and particularly among maternity hospitals, over time, the stratification by year of birth is necessary.

2.Gender

Because of certain suppositions that male gender has more tendencies for the development of Cerebral Palsy(6), the stratification by gender becomes important.

3.Births by Cesarean section

Because of disputed opinions about effect of Cesarean section on the development of CP (3, 16), stratification by births by Cesarean section will be considered during analysis.

Ethical consideration

One of the main rules of this study will be to hold all ethical norms during the entire period of the proposed work. The study proposal was reviewed by the IRB committee within AUA. Permission to perform study will be obtained from all heads of the child polyclinics of Yerevan.

Study limitations

The use of each of the two instruments may bring some limitations into the study.

Medical charts

The main limitation of the study arisen from the use of medical chart may be ***information bias*** as a result of different reasons. One of the sources of information bias may be the *use of old medical charts* in regard to content, completeness, validity and reliability of data. The validity of exposure data is usually poor in medical charts unless such data are routinely collected. Validation of information from medical charts is difficult or sometimes impossible. Indeed, the diagnosis of CP is based on the results of developmental screening and consultations and conclusions of child neurologists. Developmental screening includes 1. motor development screening, 2. language performance screening, 3. adaptive or cognitive development screening, 4. personal or social development screening (9). There is no information related to the developmental screening of child in the old medical charts. Thus, the diagnosis of CP is only based on the conclusions of pediatricians and child neurologists without appropriate validation given by standard developmental screening. This fact may lead to diagnosis bias.

Another bias may have arisen because of *difficulties with identifying the level of severity of CP*. Indeed, the severity of disease may be related to intensity and type of exposure.

The other issue revealed after the pilot study is *overstated Apgar score*. The tendency to exaggerate Apgar score inconsistently with the diagnosis at discharge was revealed *(appendix 2, table 10, 11).* All these sources of information bias may lead to the further misclassification of the cases and controls, and exposure factors.

Interviewer-administered questionnaire

The main limitation of using of the interviewer-administered questionnaire may be ***recall bias***, because mothers may not remember enough precisely the peculiarities of pregnancy and delivery flow, and early development of their babies.

In addition, since the questionnaire is interviewer- administered, there may be bias introduced because the mothers may wish to give "correct" responses.

Strength of the study

The main strength of the study is the use of two instruments, because limitations arising from the use of one instrument may be addressed by the use of the second instrument. They complement one another. For example, recall bias as a result of use of interviewer-administered questionnaire may be remedied by extraction information from medical chart of the same baby. On the other hand, information about mother health and harmful habits during the pregnancy cannot be fully gathered from the medical charts but may be provided by the child's mother.

Logistical consideration

Budget Allocation and Resources

Implementation of this research will require human and financial resources *(appendix 9).*

All staff will work 8 hours per day and 6 days per week. Project coordinator and project assistant will get $600 and $500 of salary per month respectively. Extractors will get $1 for extracting information from one medical chart, which will require 15 minutes (1 hour-4 extractions). Thus, for extracting information from 880 medical charts 220 hours will be needed (880/4). Interviewers will get $1 for each interview. They will conduct interviewer-administered questionnaire with all 880 mothers. Each interview will take about 30 minutes.

Thus, 440 hours will be needed to conduct all interviews. Data entry personnel will get $3 per hour. Entry of information from each extraction form will require 10 minutes (1 hour-6 entries), therefore for entering information from 880 extraction forms and complimentary questionnaires about 150 hours will be necessary (880/6).

The estimated total budget is $19,190. The mentioned amount is calculated to cover staff salaries, the operational costs, and the capital assets expenses. From the total budget 64.0% is allocated for staff salaries ($ 12,276). The operational cost is 14.9 % from the total budget ($ 2,850). It includes car rent, car maintenance, fuel, office rent, office supplies, communication and electricity. In addition, 15.6 % from the total budget is allocated for capital assets ($ 3,000), which include computers, copier and printer. After considering the training materials and copying expenses (1%) and unexpected expenses (5%) the total budget is equal to $19,190.

Timeframe

Duration of the research will last about five months *(appendix 10)*. During the first two weeks following activities will be carried out: staff hiring, office rent, preparation of supplies, copy of extraction forms, logistics. For project implementation the project coordinator will recruit one research assistant, one data extractor, one interviewer, one data entry person, one data analyst, one accountant, and two drivers.

During the next two weeks of the first month, training courses will be provided for each of the recruited staff by the project coordinator. After completion of these courses each of the staff members will be completely aware of his/her responsibilities related to the project implementation.

The main activities of the second and third month of the project will be selection of cases and controls, data collection and data entry. For the period of about five weeks, the data extractor will gather information from medical charts of all child polyclinics in Yerevan and

put them into specially prepared medical charts extraction forms. Simultaneously with the data extraction process, interviewing of mothers will be performed by hired interviewer over a period of about nine weeks. Then, a trained data entry person will enter collected information into the SPSS program every other week. The project coordinator and research assistant will control and manage all these processes.

On the second week of the fourth month, the data cleaning procedures will be performed. On the next two weeks of the fourth month and first two weeks of the fifth month, data analysis will be completed by the data analyst. The third and fourth weeks of the last month will be devoted to summarizing the results and writing the final reports, which will be done by the project coordinator and research assistant.

In addition, the research assistant will prepare monthly reports summarizing all activities performed during each month.

Project Feasibility

The proposed project is technically and financially feasible.

Technical consideration

A public health specialist for program coordination and trained research investigator will perform the study. The office room, rented equipment and statistical package for data entry and data analysis will be allowed.

Financial consideration

The implementation of the project depends on donor financial support. Taking into consideration the absence of similar research conducted in Armenia, it is expected that local and/or international organizations with the mission of maintaining child health will provide financial support for implementation of this project.

Administrative consideration

Having a public health specialist as a project coordinator, as well as one research assistant with necessary work experience, the accomplishment of the proposed program will be performed properly.

Political consideration

Taking into consideration financial burden associated with CP and its harmful economic impact, finding the main factors leading to the development of CP should interest policy makers and Ministry of Health of Armenia. Their assistance in study implementation and, also, facilitation its realization are very important factors in achievement the desirable results.

Results and discussions

After completion of the work, results and findings will be announced and appropriate discussions and recommendations will be done.

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Appendix 1. Background information

Table 1.The percentage distribution of forms of CP (12)

Classification	**The percentage distribution (Grether, 1992)**
Spastic	82%
Quadriplegia	22%
Diplegia	41%
Hemiplegia	18%
Monoplegia	0.5%
Triplegia	0.5%
Extrapyramidal (atetoid and ataxic)	5%
Mixed	13%

Table 2.The percentage of infants with death and CP by minutes based on Apgar score (10)

APGAR score 0 to 3	**% of Death**	**% of CP**
1 min	**3**	**1**
5 min	**8**	**1**
10 min	**18**	**5**
15 min	**48**	**9**
20 min	**59**	**57**

Appendix 2. Results of the pilot study (07/01/05-08/01/05, PC #17, Yerevan)

Table 1. The Most Noticeable Missing Data

Maternal Age	23 **(57.5%)**
Antenatal period (mother health and harmful habits, fetus state, etc.)	23 **(57.5%)**
Parity	15 (37.5%)
Apgar Score	15 (37.5%)
Birth Weight	6 (15.0%)
Birth Height	7 (17.5%)
Gestational Age	8 (20.0%)

Table 2. Place of Birth

	Cases	**Controls**
Erebuni Medical Center	5 (31.3%)	5 (26.4%)
"Malatia" Maternity Hospital	3 (18.8%)	4 (21.1%)
#2 Maternity Hospital	3 (18.8%)	2 (10.5%)
Other Hospitals of Armenia	2 (12.5%)	8 (42.0%)
Russian Hospitals	3 (18.8%)	0 (0.0%)

Table 3. Gender distribution

	Male	***Female***
Cases	12 (60%)	8 (40%)
Controls	13 (65%)	7 (35%)

Table 4. Age of Child

	Min	***Max***	***Mean***
Cases	2	15	8.4
Controls	1	15	7.8

Table 5. Parity

	1	***2***	***More than 2***
Cases	5 (38.5%)	3 (23.0%)	5 (38.5%)
Controls	7 (58.3%)	3 (25.0%)	2 (16.7%)

Table 6. Process of Delivery

	Precipitate delivery	*Perinatal Asphyxia*	*Cesarean Section*	*Premature Pouring out*	*Belated Delivery*
Cases	2	4	2	1	-
Controls	-	-	-	-	1

Table 7. Congenital anomalies of nervous system

	Microcephaly	*Hydrocephaly*	*West syndrom*	*Cerebellum hypogenesis*	*Shtrumpel disease*
Cases	1	1	1	1	2
Controls	-	-	-	-	-

Table 8. Type of CP

Tetraparesis	5 (31.3%)
Inferior paraparesis	5 (31.3%)
Hemiparesis	2 (12.5%)
Monoparesis	2 (12.5%)
Mixed form(tetraparesis, hyperkinesis)	1 (6.3%)

Table 9. Diagnoses at discharge*

	Cases	*Controls*
Perinatal encephalopathy	11 (**64.7%**)	-
DBC	6 **(35.2%)**	-
SRD	3 **(17.6%)**	-
Prematurity Iº	5 **(27.8%)**	2 (10%)
Prematurity IIº, IIIº	4 **(22.2%)**	-
Immaturity	2 **(11.1%)**	-
Fetal chronic hypoxia and hypotrophy	3 (17.6%)	**4 (23.5%)**
Fetal infection	2 **(11.8%)**	-
Severe pneumonia	1 **(5.9%)**	-
Neonatal jaundice	2 **(11.8%)**	-
Mature baby	1 (5.9%)	12 **(70.6%)**

DBC- disturbance of brain blood circulation
SRD- syndrome of respiratory disorders

Table 10. Crosstabulation
Diagnoses at discharge and Apgar score at 1 min

		Apgar score at 1 min			
		3	4	7	8
Diagnoses at discharge	Chronic fetal hypotrophy, DBC, prematurity, two-sided flat feet, arm paresis, perinatal encephalopathy	-	-	-	V
	DBC	-	-	-	V
	Fetal hypotrophy	-	-	V	V
	Fetal infection,immaturity,DBC, SRD	-	-	V	-
	Perinatal encephalopathy	-	-	V	V
	Perinatal encephalopathy, prematurity	-	V	-	V
	Prematurity	-	-	V	-
	Prematurity, perinatal encephalopathy	-	-	-	V
	Prematurity, perinatal encephalopathy, DBC	V	-	-	-
	Prematurity, perinatal encephalopathy, SRD, DBC	-	-	V	-
	Risk group II, hypoxia	-	-	V	-

Table 11. Crosstabulation
Diagnoses at discharge and Apgar score at 5 min

		Apgar score at 5 min			
		5	7	8	9
Diagnoses at discharge	Chronic fetal hypotrophy, DBC, prematurity, two-sided flat feet, arm paresis, perinatal encephalopathy	-	-	V	-
	DBC	-	-	V	-
	Fetal hypotrophy	-	-	V	V
	Fetal infection,immaturity,DBC, SRD	-	V	-	-
	Perinatal encephalopathy	-	V	V	-
	Perinatal encephalopathy, prematurity	V	-	V	-
	Prematurity	-	V	-	-
	Prematurity, perinatal encephalopathy	-	-	V	-
	Prematurity, perinatal encephalopathy, DBC	V	-	-	-
	Prematurity, perinatal encephalopathy, SRD, DBC	-	V	-	-
	Risk group II, hypoxia	-	V	-	-

Appendix 3. Sample size calculations

Formula for sample size calculation (9)

$$n = \frac{\left\{z_{1-\alpha/2}\sqrt{2P_2(1-P_2)} + z_{1-b}\sqrt{P_1(1-P_1)+P_2(1-P_2)}\right\}^2}{(P_1-P_2)^2}$$

$$P_1 = \frac{(OR)P_2}{(OR)P_2 + (1-P_2)} \quad \text{(proportion exposed in cases)}$$

$P_2 =$ proportion exposed in controls

Power to Detect ORs of Varying Magnitudes, n=100 in each group, alpha= -0.05 (two-sided)

Proportion Exposed in CP Group	OR=1.50	OR=1.75	OR=2.0	OR=2.5
0.10	1422	771	474	316
0.15	726	493	353	264
0.20	647	405	275	178

Assumptions:

Z1-a/2=1.96 with confidence interval 95 %(significance level= 0.05, 2-sided)
Z1-b=0.842 with power 80%

Appendix 4. Medical chart extraction form

Medical Chart Extraction Form

Extractor _____

ID number _____

Data of extraction _____

1. Age of child _____ years

2. Place of birth

1."Erebuni Medical Center" []
2. "Malatia" maternity hospital []
3. Maternity hospital #2 []
4. Other(specify) _____

3. Gender

M []
F []

4. Maternal age _____ years

5. Parity

1 []
2 []
3 []
4 []
more than 5 []

6. Mother diseases during pregnancy (check all that apply):

1. Hyperemesis []
2. Infectious diseases []
3. Blood hypertension (including preeclampsia or toxemia) []
4. Rhesus incompatibility []
5. Diabetes []
6. Hematological diseases []
7. Vaginal bleeding []
8. Problems with the placenta (such as abruptio placentae, placenta previa) []
9. Severe nausea, vomiting, or dehydration []

10. Other (specify) _____

7. Congenital brain anomalies:

1. Microcephaly []
2. Hydrocephaly []
3. Hemicephaly []
4. Other (specify) _____

8. Type of delivery (check all that apply*):*

1. Vaginal delivery []
2. Cesarean section []
3. Precipitate delivery []
4. Prolonged delivery []
5. Instrument assisted delivery []
6. General anesthetic use []
7. Epidural anesthetic use []
8. Other (specify) _____

9. Complications during delivery:

Yes []
No []

10. If yes, type of complication (check all that apply):

1. Mechanical trauma []
2. Cephalematoma []
3. Perinatal asphyxia []
4. Fetal distress of baby []
5. Other (specify) _____

11. Apgar score

_____ at 1 minute of birth _____ at 5 minute of birth

12. Birth weight_____ *gr*

13. Birth height _____ *sm*

14. Gestational age _____ weeks

15. Antituberculosis Vaccination (carry out in maternity hospital)

Was performed []
Was not performed []

16. Medical complications of child following delivery (check all that apply):

1. Sepsis []
2. Meningitis []
3. Encephalitis []
4. Head injury []
5. Neonatal convulsion []
6. Neonatal hemolytic disease []
7. Other (specify) _____

17. Diagnosis at discharge from maternity hospital (specify) _____

Appendix 5. English version of consent form

American University of Armenia
Master of Public Health Program

Consent form

Title of Research Project

The title of the project is identification of the risk factors for Cerebral Palsy in Yerevan, Armenia.

Purpose of the Project

A purpose of this project is to determine factors, which may contribute to the development of Cerebral Palsy in Yerevan, Armenia.

Risk/Benefits

You will not be exposed to any risk for a while participating in this study. You will not receive any benefits as well; however your input may be very necessary for further establishment of the educational program aimed to decrease the number of children suffering from Cerebral Palsy.

Confidentiality

Please, rest assured that the information from filled questionnaire will be used for the research project and your names and names of your children will not be reported, published or disseminated. Identification information will be destroyed after completion of the research.

Rules for the Participation

All, which will be needed to do, is completion of the questionnaire, which will take approximately 20-30 minutes.

Your participation is voluntary. In case you will want to stop the filling any time after starting, you are free to do so.

There are no disagreeable and unpleasant questions in the questionnaire. The questions are about your pregnancy and delivery.

We will appreciate your willingness for participation in this study.

Thank you in advance for contribution.

Contact Information

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B. Grace Sullivan, APRN, PhD
e-mail: sullivan@aua.am

Appendix 6 . Armenian version of consent form

Ð³Û³ëï³ÝÇ²Ù»ñÇÏÛ³ÝÐ³Ù³Éë³ñ³Ý
Ð³Ýñ³ÛÇÝ²éáÕç³å³ÑáõÃÛ³ÝÍñ³·Çñ

Ð³Ù³Ó³ÛÝ³·Çñ

äñáÛ»ÏïÇí»ñÝ³·ÇñÁ

äñáÛ»ÏïÇí»ñÝ³·Çñ??³ÝÏ³Ï³ÝáõÕ»Õ³ÛÇÝÏ³Ãí³ÍÇéÇëÏÇ ý³Ïï áñÝ»ñÇ

Ñ³Ûï Ý³µ»ñáõÙÁ.

äñáÛ»ÏïÇÝå³ï³ÏÁ

äñáÛ»ÏïÇÝå³ï³ÏÝ¿Ñ³Ûï Ý³µ»ñ»É ý³Ïï áñÝ»ñÁ, áñáÝù Ï³ñáÕ »Ý³é³ç³óÝ»É

Ù³ÝÏ³Ï³Ý áõÕ»Õ³ÛÇÝ Ï³Ãí³Í

èÇëÏ/²é³í»ÉáõÃÛáõÝ

¸ áõù ã»ù »ÝÃ³ñÏíÇ áñ¨¿ éÇëÏÇ Ñ» ï³½áï áõÃÛ³ÝÁ Ù³ëÝ³Ïó»ÉÇë:

¸ áõù ã»ù áõÝ»Ý³ áñ¨¿ß³ÑáõÛÃ Ï³Ù³é³í»ÉáõÃÛáõÝ Ù³ëÝ³Ïó»Éáí³Û¹

Ñ» ï³½áï áõÃÛ³ÝÁ, ë³Ï³ÛÝ Ó»ñ Ý»ñ¹ñáõÙÁ Ï³ñáÕ ¿ß³ï Ï³ñ¨áñ ÉÇÝ»É Ñ» ï³·³

ÏñÃ³Ï³Ý Íñ³·ñÇ ÑÇÙÝ³¹ñÙ³ÝÁ, áñÁ Ýå³ï³Ï ïáõÝ»Ý³ å³Ï³ë»óÝ»É áõÕ»Õ³ÛÇÝ

Ï³Ãí³Íáí ï³é³åáÕ »ñ»Ë³Ý»ñÇ ÃÇíÁ:

¶³Õï ÝÇáõÃÛáõÝÁ

Ð³Ùá½í³Í »Õ»ù, áñ É ñ³óí³Í Ñ³ñó³Ã»ñÃÇÏÁ Ïû·ï³·áñÍíÇ ÙÇ³ÛÝ

Ñ» ï³½áï áõÃÛ³Ý Ñ³Ù³ñ¨ »ñ»Ë³Ý»ñÇ ³ÝáõÝÝ»ñÁ ã»Ý Ñ³å³ñ³ÏíÇ Ç óáõÛó

Ñ³ÝñáõÃÛ³Ý: î³ñµ»ñ³ÏÇã ÇÝýáñÙ³óÇ³Ý ï íÛ³É ³ÝÑ³ï Ç í»ñ³µ»ñÛ³É,

Ñ» ï ³½á ï áõÃÛ³Ý ³í³ñ ï Çó Ñ» ï á ÏáãÝã³óíÇ:

Ø³ëÝ³ÏóáõÃÛ³Ý Ï³ÝáÝÝ»ñÁ.

²ÛÝ ³Ù»ÝÁ ÇÝã Ï å³Ñ³Ýç í Ç Ò»½³ÝÇóª Ñ³ñó³Ã»ñÃÇÏÇ Éñ³óáõÙÝ ¿, áñÁ Ï ï ¨Ç 20-

30 ñáå»: Ò»ñ Ù³ëÝ³ÏóáõÃÛáõÝÁ Ï³Ù³ íáñ ¿: ¸áõù Ï³ñáÕ »ù ¹³¹³ñ»óÝ»É

Ñ³ñó³Ã»ñÃÇÏÇ Éñ³óáõÙÁ, »ñµ ¸áõù Ïó³Ý Ï³Ý³ùª ëÏë»Éáõó ó³ÝÏ³ó³Í Å³Ù³Ý³Ï

Ñ» ï á: Ð³ñó³Ã»ñÃÇÏáõÙ ãÏ³Ý Ñ³ñó»ñ, áñáÝù Ï³ñáÕ³Ý³Ý Ñá·»Ï³Ý íÝ³ë

å³ï×³é»É Ò»½: Ð³ñó»ñÁ í»ñ³µ»ñíáõÙ »Ý Ò»ñ ÑÕÇáõÃÛ³ÝÁ ¨ ÍÝÝ¹³µ»ñáõÃÛ³ÝÁ:

Ø»Ýù ã³÷³½³Ýó µ³ñÓñ Ï·Ý³Ñ³ï »Ýù Ò»ñ Ù³ëÝ³ÏóáõÃÛáõÝÁ Ù»ñ

Ñ» ï ³½á ï áõÃÛáõÝáõÙ:

Î³ÝË³íÑ³Ûï ÝáõÙ »Ýù Ù»ñ ßÝáñÑ³Ï³ÉáõÃÛáõÝÁ Ñ³Ù³·áñÍ³ÏóáõÃÛ³ÝÑ³Ù³ñ:

î»Õ»ÏáõÃÛáõÝÝ»ñÇ Ñ³Ù³ñ¹ÇÙ»ùª

ÈÇ³Ý³ ø³ëÛ³Ý, MD, MPH, ·ÉË³íáñ Ñ» ï ³½á ï áÕ

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¶ñ»Ûë êáõÉÇíÇ³Ý, APRN, PhD

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Appendix 7. English version of questionnaire

Interviewer-Administered Questionnaire

Data of interview _____ (mm/dd/ yy)

Interviewer_____

ID number _____

START TIME _____

This questionnaire has been prepared to allow review of your child's early development. Please take the time to complete each of the following pages as thoroughly as possible, and feel free to add your comments and elaborations on the reverse of any page.

Thank you, in advance, for your time and effort with this form.

DEMOGRAPHICS

1. Child's full name: _____

2. Gender

Male []

Female []

3. Child's date of birth: _____ mm/dd/yy

PREGNANCY HYSTORY

1. GENERAL INFORMATION

4. How many pregnancies have you previously had? (both viable and non-viable)

Record the number _____

88. Don’t remember/Don’t know

99. Refuse to answer

5. How many children do you have aged:

1. *0 to 3 years old?*

Record the number _____

2. *4 to 7 years old?*

Record the number _____

3. *8 to 12 years old?*

Record the number _____

4. 13 and older?

Record the number _____

6. Did you have any abortion?

1. Yes []

2. No *(go to the question #8)* []

99. Refuse to answer *(go to the question #8)* []

7.How many abortions did you have?

Record the number _____

88. Don’t remember/Don’t know []

99. Refuse to answer []

8. Did you have any miscarriages?

1.Yes []

2. No *(go to the question #10)* []

88. Don't remember/Don't know *(go to the question #10)* []

99. Refuse to answer *(go to the question #10)* []

9. How many miscarriages did you have?

Record the number _____

88. Don't remember/Don't know

99. Refuse to answer

10. Have you had child/children who has/have died?

1. Yes

2. No *(go to the question #12)*

99. Refuse to answer *(go to the question #12)*

11. How many child/children have you had who has/have died?

Record the number _____

99. Refuse to answer

2. PREGNANCY

12. What was your age in the year of that pregnancy?

Record the number _____ years

99. Refuse to answer

13. Did you smoke tobacco during that pregnancy?

1. Yes []
2. No *(go to the question #15)* []

99. Refuse to answer *(go to the question #15)* []

14. How many cigarettes did you smoke on an average day during that pregnancy?

1. Less than 1 cigarette a day []
2. 1-5 cigarettes a day []
3. More than 5 cigarettes a day []

88.Don't remember/Don't know []

99.Refuse to answer []

15. Did anyone smoke in your house (husband, father-in-law, etc.) during that pregnancy?

1.Yes []

2. No (*go to the question #17)* []

88. Don't remember/Don't know (*go to the question #17)* []

99. Refuse to answer (*go to the question #17)* []

16. How many cigarettes did the member/members of your family smoke on an average day during that pregnancy?

1. Less than 1 cigarette a day []
2. 1-5 cigarettes a day []
3. More than 5 cigarettes a day []

88. Don't remember/Don't know []

99. Refuse to answer []

17. Have you had any alcoholic drinks during pregnancy? (A drink is 1 glass of wine, wine cooler, can or bottle of beer, shot of liquor, or mixed drink.)

1.Yes []

2.No *(go to the question #20)* []

88. Don't remember/Don't know *(go to the question #20)* []

99. Refuse to answer *(go to the question #20)* []

18. During your pregnancy, how many alcoholic drinks did you have in an average week?

1. Less than 1 drink a week []

2. 1 to 3 drinks a week []

3. 4 to 6 drinks a week []

4. 7 to 13 drinks a week []

5. 14 drinks or more a week []

88.Don't remember/Don't know []

99.Refuse to answer []

19. During the last 3 months of your pregnancy, how many times did you drink 5 alcoholic drinks or more in one sitting?

1. Record the number _____

2. Didn't drink then []

88. Don't remember/Don't know []

99. Refuse to answer []

20. Please indicate any of these problems, which you had during your pregnancy? (Check all that apply)

1. Hyperemesis []

2. Infectious diseases []

3. Blood hypertension (including preeclampsia or toxemia) []

4. Rhesus incompatibility []

5. Diabetes []

6. Hematological diseases []

7. Vaginal bleeding []

8. Problems with the placenta (such as abruptio placentae, placenta previa) []

9. Severe nausea, vomiting, or dehydration []

10. Other (specify) _____

21. Did you experience other major stress during pregnancy?

Yes []

No *(go to the question # 23)* []

22. Please specify: _____

23. Did you use any drugs during pregnancy?

1. Yes []
2. No *(go to the question #25)* []

24. Please specify: _____

25. Please indicate any of the following things, which you did because of these problem(s)? (Check all that apply)

1. I went to the hospital or emergency room and stayed less than 1 day []
2. I went to the hospital and stayed 1 to 7 days []
3. I went to the hospital and stayed more than 7 days []
4. I stayed in bed at home more than 2 days because of my doctor's or nurse's advice []
5. None of above mentioned []

DELIVERY AND POSTNATAL PERIOD

26. Where did you deliver?

1. "Erebuni Medical Center" []
2. "Malatia" Maternity Hospital []
3. Maternity Hospital #2 []
4. Other (specify) _____

27. Please indicate which of the following was true of delivery (Check all that apply):

1. Vaginal delivery []
2. Cesarean section []
3. Precipitate delivery []
4. Prolonged delivery []
5. Instrument assisted delivery []
6. General anesthetic use []
7. Epidural anesthetic use []
8. Other (specify)

_____

28. Were there any complications of delivery?

1. Yes []

2. No *(go to the question # 32)* []

29. Please indicate them (Check all that apply):

1. Mechanical trauma []

2. Cephalematoma []

3. Perinatal asphyxia []

4. Fetal distress of baby []

5. Other (specify) _____

30. What were the child's APGAR scores?

At 1 min _____ at 5 min _____

31. Was the baby carried to term (9 months)?

1.Yes *(go to the question #33)* []
2. No []

32.Indicate gestational age _____

88. Don't remember/Don't know []

33.Birth Weight: _____ gr

88. Don't remember/Don't know []

34.Birth Height _____ sm

88. Don't remember/Don't know []

35.Were there any medical complications of your child following delivery?

1.Yes []

2. No *(go to the question #37)* []

88. Don't remember/ Don't know *(go to the question #37)* []

36.Please indicate medical complications of your child following delivery (Check all that apply):

1. Sepsis []

2. Meningitis []

3. Encephalitis []

4.Head injury []

5. Neonatal convulsion []

6. Neonatal hemolytic disease []

7.Other (specify) _____

88. Don't remember/ Don't know []

***37.You returned home at*_____** days after delivery.

88. Don't know/Don't remember []

***38. Child returned home at*_____** days after delivery

88. Don't know/Don't remember []

Please use this space for any additional comments you would like to make about your health and health of your baby.
Thank you for sharing your thoughts with us.

END TIME _____

Appendix 8. Armenian version of the questionnaire

Ð ³ ñó ³ Ã»ñÃÇÏ

Ð ³ ñóÙ ³ Ý ûñÁ _____ ³ / ³

Ð ³ ñóÝáÕ _____

Ð ³ ñó í áÕÇ Ï á ¹ Á _____

² Ûë Ñ ³ ñó ³ Ã»ñÃÇÏÁ Ý å ³ ï ³ Ï áõÝÇ Ñ ³ Û ï Ý ³ µ»ñ»Éáõ í ³ Õ ½ ³ ñ · ³ óÙ ³ Ý ÁÝÃ ³ óùÁ:

Ê Ý ¹ ñáõÙ »Ýù · ï »ù Å ³ Ù ³ Ý ³ Ï Éñ ³ óÝ»Éáõ ³ ÛÝ ÑÝ ³ ñ ³ í áñÇÝ ã ³ ÷ Ù ³ Ýñ ³ Ù ³ ëÝ ¨

ó ³ Ý Ïáõà Û ³ Ý ¹ » å ùáõÙ Ï ³ ñáÕ »ù ³ í »É ³ óÝ»É Ò»ñ Ù» Ï Ý ³ µ ³ ÝáõÃ Ûáõ ÝÝ»ñÁ

Ñ» ï ³ ¹ ³ ñÓ ¿ç»ñÇ í ñ ³ :

Î ³ ÝË ³ í ßÝáñÑ ³ Ï ³ ÉáõÃ Ûáõ Ý Ò»ñ Å ³ Ù ³ Ý ³ ÏÇ ¨ ç ³ ÝùÇ Ý»ñ ¹ ñÙ ³ Ý Ñ ³ Ù ³ ñ

² ÝÓÝ ³ Ï ³ Ý ï íÛ ³ ÉÝ»ñ

1. **º ñ»Ë ³ ÛÇ ³ ÝáõÝ, ³ ½ · ³ ÝáõÝ, Ñ ³ Ûñ ³ ÝáõÝ**
2. **ê »éÁ**

   ² ÕçÇÏ [ ]

îÕ³ [ ]

3. Ì ÝÝ¹Ù³Ý ³Ùë³ÃÇí _____ ³ÙÇë/ûñ/ ï ³ñÇ

ÐÕÇáõÃÙ³Ý å³ ïÙáõÃÙáõÝ

1.ÀÝ¹Ñ³Ýáõñ ï»Õ»ÏáõÃÙáõÝÝ»ñ

4. ø³ÝÇ ÑÕÇáõÃÙáõÝ »ù Ý³ËÏÇÝáõÙ áõÝ»ó»É (µáÉáñ ¹»åù»ñÁ)

Üß»ù ÃÇíÁ_____

88. â»Ù ÑÇßáõÙ/â·Ç ï»Ù [ ]

99. â»Ù áõ½áõÙ å³ï³ëË³Ý»É [ ]

5. ø³ÝÇ »ñ»Ë³ ¹áõù áõÝ»ù

1. 0-3 ï³ñ»Ï³Ý

Üß»ù ÃÇíÁ _____

2. 4-7 ï³ñ»Ï³Ý

Üß»ù ÃÇíÁ _____

3. 8-12 ï³ñ»Ï³Ý

Üß»ù ÃÇíÁ

_____

4. 13 ¨³í»É

Üß»ù ÃÇíÁ _____

6. àõÝ»ó»É »ù ³ ñ¹Ûáù ³ ñÑ»ë ï ³ Ï ³ Ý íÇÅáõÙÝ»ñ (³ µáñ ï)

1. ²Ûá [ ]

2. àã (³ Ýó»ù Ñ ³ ñó 8-ÇÝ) [ ]

99. â»Ù áõ½áõÙ å ³ ï ³ ëË ³ Ý»É [ ]

7. ø ³ ÝÇ ³ ñÑ»ë ï ³ Ï ³ Ý íÇÅáõÙÝ»ñ »ù ¹áõù áõÝ»ó»É

Üß»ù ÃÇ í Á _____

88. â»Ù ÑÇßáõÙ/â·Ç ï »Ù [ ]

99. â»Ù áõ½áõÙ å ³ ï ³ ëË ³ Ý»É [ ]

8. àõÝ»ó»É »ù ³ ñ¹Ûáù áñ¨¿ µÝ ³ Ï ³ Ý íÇÅáõÙ

1. ²Ûá [ ]

2. àã (³ Ýó»ù Ñ ³ ñó 10-ÇÝ) [ ]

88. â»Ù ÑÇßáõÙ/â·Ç ï »Ù (³ Ýó»ù Ñ ³ ñó 10-ÇÝ) [ ]

99. â»Ù áõ½áõÙ å ³ ï ³ ëË ³ Ý»É(³ Ýó»ù Ñ ³ ñó 10-ÇÝ) [ ]

9. ø ³ ÝÇ µÝ ³ Ï ³ Ý íÇÅáõÙ »ù áõÝ»ó»É

Üß»ù ÃÇ í Á _____

88. â»Ù ÑÇßáõÙ/â·Ç ï »Ù [ ]

99. â»Ù áõ½áõÙ å ³ ï ³ ëË ³ Ý»É [ ]

10. àõÝ»ó»É »ù ³ ñ¹Ûáù »ñ»Ë ³ (»ñ»Ë ³ Ý»ñ), áñÁ (áñáÝù) Ù ³ Ñ ³ ó»É ¿ (»Ý)

1. ²Ûá [ ]

2. àã (³ Ýó»ù Ñ ³ ñó 12-ÇÝ) [ ]

99. â»Ù áõ½áõÙ å ³ ï ³ ëË ³ Ý»É (³ Ýó»ù Ñ ³ ñó 12-ÇÝ) [ ]

11. ø ³ ÝÇ »ñ»Ë ³ (»ñ»Ë ³ Ý»ñ) »ù áõÝ»ó»É, áñÁ (áñáÝù) Ù ³ Ñ ³ ó»É ¿ (»Ý)

Üß»ù ÃÇ í Á _____

99. â»Ù áõ½áõÙ å ³ ï ³ ëË ³ Ý»É [ ]

2. ÐÕÇáõÃÛáõÝ

12. ø ³ ÝÇ ï ³ ñ»Ï ³ Ý ¿Çù ï íÛ ³ É ÑÕÇáõÃÛ ³ Ý Å ³ Ù ³ Ý ³ Ï

Üß»ù ÃÇ í Á _____

99. â»Ù áõ½áõÙ å ³ ï ³ ëË ³ Ý»É [ ]

13. Ì Ë»É »ù ³ ñ¹Ûáù ï íÛ ³ É ÑÕÇáõÃÛ ³ Ý Å ³ Ù ³ Ý ³ Ï

1. ²Ûá [ ]

2. àã (³ Ýó»ù Ñ ³ ñó 15-ÇÝ) [ ]

99. â»Ù áõ½áõÙ å ³ ï ³ ëË ³ Ý»É (³ Ýó»ù Ñ ³ ñó 15-ÇÝ) [ ]

14. ø ³ ÝÇ ·É ³ Ý ³ Ï ÍË ³ Ëá ï »ù û· ï ³ ·áñÍ»É (ÙÇçÇÝ Ñ ³ ßí á í) ûñ ³ Ï ³ Ý

1. 1-Çó å ³ Ï ³ ë [ ]

2. 1-5 [ ]

3. 5-Çó ³ í»ÉÇ [ ]

88. â»Ù ÑÇßáõÙ/â·Ç ï»Ù [ ]

99. â»Ù á õ½áõÙ å ³ ï ³ ëË ³ Ý»É [ ]

15. ² ñ ¹ ÛáùÃ ï ³ Ý ³ Ý ¹ ³ ÙÝ»ñÇó áñ¨¿ Ù»ÏÁ (³ ÙáõëÇÝ, ëÏ»ëñ ³ ñ ¨ ³ ÛÉÝ) Í Ë»É »Ý Ò»ñ ÑÕÇáõÃÛ ³ Ý Å ³ Ù ³ Ý ³ Ï

1. ² Ûá [ ]

2. àã (³ Ýó»ù Ñ ³ ñó 17-ÇÝ) [ ]

88. â»Ù ÑÇßáõÙ/â·Ç ï»Ù (³ Ýó»ù Ñ ³ ñó 17-ÇÝ) [ ]

99. â»Ù á õ½áõÙ å ³ ï ³ ëË ³ Ý»É(³ Ýó»ù Ñ ³ ñó 17-ÇÝ) [ ]

16. ø ³ ÝÇ ·É ³ Ý ³ Ï ÍË ³ Ëá ï »Ý û· ï ³ ·áñÍ»É (ÙÇçÇÝ Ñ ³ ßí áí) ûñ ³ Ï ³ Ý Ò»ñ ï ³ Ý ³ Ý ¹ ³ ÙÝ»ñÁ

4. 1-Çó å ³ Ï ³ ë [ ]

5. 1-5 [ ]

6. 5-Çó ³ í»ÉÇ [ ]

88. â»Ù ÑÇßáõÙ/â·Ç ï»Ù [ ]

99. â»Ù á õ½áõÙ å ³ ï ³ ëË ³ Ý»É [ ]

17. ú· ï ³ ·áñÍ»É »ù ³ ñ ¹ Ûáù ³ ÉÏáÑáÉ ³ ÛÇÝ *ËÙÇãù* ÑÕÇáõÃÛ ³ Ý ÁÝÃ ³ óùáõÙ (*ËÙÇãù* Ýß ³ Ý ³ Ïáõ Ù ¿ 1 µ ³ Å ³ Ï ·ÇÝÇ, 1 ßÇß · ³ ñ»çáõñ ¨ ³ ÛÉÝ)

1. ² Ûá [ ]

2. àã (³ Ýó»ù Ñ ³ ñó 20-ÇÝ) [ ]

88. â»Ù ÑÇßáõÙ/â·Ç ï »Ù (³ Ýó»ù Ñ ³ ñó 20-ÇÝ) [ ]

99. â»Ù áõ½áõÙ å ³ ï ³ ëË ³ Ý»É(³ Ýó»ù Ñ ³ ñó 20-ÇÝ) [ ]

18. ØÇçÇÝ Ñ ³ ßí á í ÑÕÇáõÃÛ ³ Ý ÁÝÃ ³ óùáõÙ ß ³ µ ³ Ã ³ Ï ³ Ý áñù ³ Ý ³ ÉÏáÑáÉ ³ ÛÇÝ ***ËÙÇãù* »ù û· ï ³ ·áñÍ»É**

1. 1-Çó å ³ Ï ³ ë [ ]
2. 1-3 [ ]
3. 4-6 [ ]
4. 7-13 [ ]
5. 14-Çó ³ í »É [ ]

88. â»Ù ÑÇßáõÙ/â·Ç ï »Ù [ ]

99. â»Ù áõ½áõÙ å ³ ï ³ ëË ³ Ý»É [ ]

19. ÐÕÇáõÃÛ ³ Ý í »ñçÇÝ 3 ³ Ùë í ³ ÁÝÃ ³ óùáõÙ ù ³ ÝÇ ³ Ý· ³ Ù »ù û· ï ³ ·áñÍ»É 5 ¨ ³ í »ÉÇ ã ³ ÷á í ***ËÙÇãù* ÙÇ ³ Ý· ³ ÙÇó**

1. Üß»ù ÃÇ í Á _____

2. â»Ù ËÙ»É ³ Û¹ Å ³ Ù ³ Ý ³ Ï [ ]

88. â»Ù ÑÇßáõÙ/â·Ç ï »Ù [ ]

99. â»Ù áõ½áõÙ å ³ ï ³ ëË ³ Ý»É [ ]

20. Üß»ù µáÉáñ ³ ÛÝ ÑÇ í ³ Ý¹ ³ ·ÇÝ íÇ× ³ ÏÝ»ñÁ, áñáÝù áõÝ»ó»É »ù ÑÕÇáõÃÛ ³ Ý Å ³ Ù ³ Ý ³ Ï (Ýß»ù µáÉáñ ÑÝ ³ ñ ³ íáñ ï ³ ñµ»ñ ³ ÏÝ»ñÁ)

1. ²Ý½áõëå ÷ëËáõÙÝ»ñ (ÑÇå»ñ¿Ù»½Çë) [ ]

2. ÆÝý»ÏóÇáÝ ÑÇí ³Ý¹áõÃÛáõÝÝ»ñ [ ]

3. ²ñÛ³Ý ×ÝßÙ³Ý µ³ñÓñ³óáõÙ (Ý»ñ³éÛ³É åñ»¿ÏÉ³Ùåë Ç³ ¨ ïáÏë»ÙÇ³) [ ]

4. è»½áõë ³ÝÑ³Ù³å³ï³ëË³Ý»ÉÇáõÃÛáõÝ [ ]

5. Þ³ù³ñ³Ë ï [ ]

6. ²ñÛ³Ý ÑÇí ³Ý¹áõÃÛáõÝÝ»ñ [ ]

7. Ð»ß ï áó³ÛÇÝ ³ñÛáõÝ³ÑáëáõÃÛáõÝ [ ]

8. ÀÝÏ»ñùÇ ³Ë ï ³µ³Ý³Ï³Ý íÇ×³ÏÝ»ñ [ ]

9. Ì ³Ýñ ëñ ï Ë³éÝáó, ÷ëËáõÙ [ ]

10. ²ÛÉ (Ýß»ù) _____

21. àõÝ»ó»É»ù ³ñ¹Ûáù ³ÛÉ ë ï ñ»ëÝ»ñ ÑÕÇáõÃÛ³Ý Å³Ù³Ý³Ï

1. ²Ûá [ ]
2. àã (³Ýó»ù Ñ³ñó 23-ÇÝ) [ ]

22. Üß»ù ¹ñ³Ýù _____

23. ú·ï ³·áñÍ»É»ù ³ñ¹Ûáù áñ¨¿ ¹»Õáñ³Ûù ÑÕÇáõÃÛ³Ý ÁÝÃ³óùáõÙ

1. ²Ûá [ ]
2. àã (³Ýó»ù Ñ³ñó 25-ÇÝ) [ ]

24. Üß»ù ¹ñ³Ýù _____

25. Üß»ù ³ÍÝ ³Ù»ÝÁ ÇÝã ¹áõù ³ñ»É »ù í»ñÁ Ýßí ³ ÍÝ»ñÇ Ï ³ å ³ ÏóáõÃÍ³ Ùµ (Ýß»ù µáÉáñ ÑÝ³ñ³ íáñ ï ³ñµ»ñ³ ÏÝ»ñÁ)

1. ºë ³ÝóÏ ³óñ»É »Ù ÑÇí ³Ý¹³ÝáóáõÙ/ ÁÝ¹áõÝ³ñ³ÝáõÙ 1-Çó å ³Ï ³ë ûñ [ ]
2. ºë ³ÝóÏ ³óñ»É »Ù ÑÇí ³Ý¹³ÝáóáõÙ 1-7 ûñ [ ]
3. ºë ³ÝóÏ ³óñ»É »Ù ÑÇí ³Ý¹³ÝáóáõÙ 7-Çó ³ í»É ûñ [ ]
4. ºë ³ÝóÏ ³óñ»É ï ³ÝÁ 2-Çó ³ í»É ûñ µÅßÏÇë, Ï ³Ù µáõÅùáõÍñÇë ËáñÑñ¹á í [ ]
5. ì»ñÁ ÝßÍ³ÉÝ»ñÇó áã Ù»ÏÁ [ ]

Ì ÝÝ¹³ µ»ñáõÃÍáõÝ ¨ Ñ» ï ÍÝÝ¹Í³Ý ßñç³Ý

26. àñ ï »Õ »ù ÍÝÝ¹³ µ»ñ»É

1. ‘¾ñ»µáõÝÇ’ µÅßÏ³Ï³Ý Ï»Ý ï ñáÝ [ ]
2. ‘Ø³É³ÃÇ³’ µÅßÏ³Ï³Ý Ï»Ý ï ñáÝ [ ]
3. Ì ÝÝ¹³ ï áõÝ N2 [ ]
4. èõñÇß /Ýß»ù/

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27. Üß»ù ³ÍÝ ³Ù»ÝÁ ÇÝãÁ µÝáñáß ¿ Ò»ñ ÍÝÝ¹³ µ»ñáõÃÍ³ÝÁ (Ýß»ù µáÉáñ ÑÝ³ñ³ íáñ ï ³ñµ»ñ³ ÏÝ»ñÁ)

1. ´Ý³Ï³Ý ÍÝÝ¹³ µ»ñáõÃÍáõÝ [ ]
2. Î»ë³ñÍ³Ý Ñ³ ï áõÙ [ ]

3. ì ³Õ³Å³Ù ÍÝÝ¹³µ»ñáõÃÛáõÝ [ ]

4. Ò·Ó·í³Í ÍÝÝ¹³µ»ñáõÃÛáõÝ [ ]

5. ÌÝÝ¹³µ»ñáõÃÛáõÝ Ñ³ï áõÏ·áñÍÇùÝ»ñÇ ÏÇñ³éÙ³Ùµ [ ]

6. ÌÝÝ¹³µ»ñáõÃÛáõÝ ÁÝ¹Ñ³Ýáõñ ³Ý½·³Û³óÝáÕ ¹»Õ»ñÇ ³½¹»óáõÃÛ³Ý ï ³Ï [ ]

7. ¾åÇ¹áõñ³É (Ù»çùÇó ëñëÏÙ³Ý ÙÇçáóáí) ÍÝÝ¹³µ»ñáõÃÛáõÝ [ ]

8. ²ÛÉ /Ýß»ù/ _____

28. ºÕ»É»Ý ³ñ¹Ûáù ÍÝÝ¹³µ»ñáõÃÛ³Ý µ³ñ¹áõÃÛáõÝÝ»ñª Ï³åí³Í »ñ»Ë³ÛÇ Ñ» ï

1. ²Ûá [ ]

2. àã (³Ýó»ù Ñ³ñó 32-ÇÝ) [ ]

29. Üß»ù µáÉáñ ÑÝ³ñ³íáñ ï³ñµ»ñ³ÏÝ»ñÁ

1. Ø»Ë³ÝÇÏ³Ï³Ý íÝ³ëíÍùÝ»ñ [ ]

2. ¶ÉËÇ ßñç³ÝáõÙ³ñÛ³Ý»ÝÃ³Ù³ßÏ³ÛÇÝ ÏáõÏ³ÏáõÙ (Ï»ý³ÉáÑ»Ù³ï áÙ³) [ ]

3. ÂÃí³ÍÝÇ ù³Õó [ ]

4. ²ÛÉ /Üß»ù/_____

30. Üß»ù »ñ»Ë³ÛÇ ²ä¶²è (»Ã»·Ç ï »ù)

1. 1-ÇÝ ñáå»ÛÇÝ _____

2. 5 ñáå»ÇÝ _____

88. â·Ç ï »Ù [ ]

31. ²ñ¹⇩áù Å³Ù³Ý³ ÏÇÝ¿ ÍÝí»É Ò»ñµ³ÉÇÏÁ 9 ³Ùë»Ï³Ý

1. ²⇩á [ ]
2. àã (³Ýó»ù Ñ³ñó 33-ÇÝ) [ ]

32. Üß»ù å ï ÕÇ ß³µ³ÃÝ»ñÁ ÍÝí»ÉÇë _____

88. â»Ù ÑÇßáõÙ/â·Ç ï »Ù [ ]

33. ø³ßÁ ÍÝí»ÉÇë _____ ·.

88. â»Ù ÑÇßáõÙ/â·Ç ï »Ù [ ]

34. Ð³ë³ÏÁ ÍÝí»ÉÇë _____ëÙ.

88. â»Ù ÑÇßáõÙ/â·Ç ï »Ù [ ]

35. ºÕ»É »Ý ³ñ¹⇩áù »ñ»Ë³⇩Ç Ñ» ï Ï³å í³Í µ³ñ¹áõÃ⇩áõÝÝ»ñ Ñ» ï ÍÝÝ¹⇩³Ý ßñç³ÝáõÙ

1. ²⇩á [ ]
2. àã (³Ýó»ù Ñ³ñó 37-ÇÝ) [ ]

88. â»Ù ÑÇßáõÙ/â·Ç ï »Ù (³Ýó»ù Ñ³ñó 37-ÇÝ) [ ]

36. Üß»ù µáÉáñ ÑÝ³ñ³ íáñ ï ³ñµ»ñ³ ÏÝ»ñÁ

1. ê»åëÇë [ ]
2. Ø»ÝÇÝ·Ç ï [ ]

3. ¾Ýó»ý ³ÉÇ ï [ ]

4. ¶ÉËÇ íÝ³ëí ³ Íù [ ]

5. Üáñ³ ÍÝ³ÛÇÝ óÝóáõÙÝ»ñ [ ]

6. Üáñ³ ÍÝ³ÛÇÝ Ñ»ÙáÉÇ ï ÇÏ ÑÇí ³Ý¹áõÃÛáõÝ (¹»ÕÝ³ Ë ï) [ ]

7. ²ÛÉ (Ýß»ù) _____

88. â»Ù ÑÇßáõÙ/â·Ç ï »Ù [ ]

37. ì»ñ³¹³ñÓ»É»ù ï áõÝ _____ ûñÁ ÍÝÝ¹³µ»ñáõÃÛáõÝÇó Ñ» ï á

88. â»Ù ÑÇßáõÙ/â·Ç ï »Ù [ ]

38. ºñ»Ë³Ý í»ñ³¹³ñÓ»É¿ ï áõÝ _____ ûñÁ ÍÝÝ¹³µ»ñáõÃÛáõÝÇó Ñ» ï á

88. â»Ù ÑÇßáõÙ/â·Ç ï »Ù [ ]

ÊÝ¹ñáõÙ »Ýù û· ï ³ ·áñÍ»ù ³Ûë ï »ÕÁ Éñ³ óáõóÇã Ù» ÏÝ³µ³ ÝáõÃÛáõÝÝ»ñÇ Ñ³Ù³ñ Ò»ñ ¨ Ò»ñ »ñ»Ë³ÛÇ ³ éáÕçáõÃÛ³Ý í»ñ³µ»ñÛ³É.

ÞÝáñÑ³Ï³ÉáõÃÛáõÝ

Ð³ñó³Ã»ñÃÇ ÏÇ Éñ³ óÝ»ÉÁ í»ñç³ óÝ»Éáõ Å³Ù³Ý³ ÏÁ _____

Appendix 9. Budget allocation and resources

	$ Salary	**Duration**	**Total**
Personnel			
Program coordinator	$ 600/month	5 months	$ 3000
Program assistant	$ 500/month	5 months	$ 2500
Extractor	$ 1 /extraction	220 hours(~28 days)	$ 880
Interviewer	$ 1/ interview	440 hours(~55 days)	$ 880
Data entry personnel	$ 3/ hour	150 hours(~19 days)	$ 450
Data analyst	$ 300/month	2 months	$ 600
Accountant	$ 200/month	6 month	$ 1200
Driver 1	$ 120/month	3 months	$ 360
Driver 2	$ 120/month	3 months	$ 360
Sum			$ 10,230
Salary taxes Average 20% of the sum			$ 2,046
Subtotal			**$ 12,276**
Operational cost	**Price**	**Duration**	
Office rent	$ 200/month	5 months	$ 1000
Office supplies	$ 50/month	5 months	$ 250
Communication and electricity	$ 80/month	5 months	$ 400
Car rental and maintenance	$ 200/month	2 months, two cars	$ 800
Fuel cost	$100 per car/per month	2 months, two cars	$ 400
Subtotal			**$ 2,850**
Capital assets	**Price**	**Number of items**	
Computer	$ 1000	2 computers	$ 2000
Copier	$ 600	1 copier	$ 600
Printer	$ 400	1 printer	$ 400
Subtotal			**$ 3,000**
Training materials and copying	$ 75 per month	2 months	$ 150
Total cost			**$ 18,276**
Unexpected expenses	5 % of the total cost		$ 914
Total cost of the project			**$ 19,190**

Appendix 10. Timeframe (Gantt chart)