

MPH/ Epidemiology and Biostatistics

Deanship of Graduate Studies

Relationship between Anemia and School Performance among School Children in Gaza Strip

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Abstract

The overall aim of this study was to assess the relationship between anemia and school performance among primary schools children in Gaza Strip, and to measure the extent of anemia among school children. A cross sectional study was carried out at seven Governmental and United Nations Relief and Work Agency (UNRWA) primary schools in Gaza Strip. The study sample included 204 pupils with ages 5-14 years old. Data was collected through direct hemoglobin test and indirect method using a structured interviewed questionnaire and reviewing school records. Children were considered anemic if they had hemoglobin concentration below 12g/dl. School performance was assessed by getting scores in Math, Arabic language and total average in the first half of scholastic year, concentration and attention, participation in class activities and attendance. Correlation and regression was used to estimate the association between anemia and school performance. Results showed that the prevalence of anemia among school children was 29.9%. Average math, Arabic and total scores were lower among anemic children than in non anemic (62.3, 60, 63.8 vs. 75, 73.8, 75.5). The correlation coefficient for the association between anemia and school performance was 0.175, $p=0.012$.

Conclusion: Anemia is prevalent among school children in Gaza Strip, There is a positive association between hemoglobin level and school performance. This association was demonstrated through lower means of scores in Math, Arabic language and total average of children in the first half of scholastic year.

Recommendations: Efforts must be done and continue to eliminate the major source of this problem which is the Israeli Occupation and Israeli collective punishments against

the civil society of Palestine. On the national level efforts should be done in order to discover risk groups of anemia and micronutrient deficiencies. Launching of a National Program of Nutritional Support to Primary Education. Addressing efforts of mass media towards public health issues other than clinical issues. Prevention of anemia among the whole population could be done through flour fortification of iron. Future researches are needed in the field of micronutrient deficiencies in Palestine. Prevalence studies are recommended to detect problems of Iodine, Zinc and vitamin A deficiencies. Follow-up studies are needed on a regular annual basis for detecting of anemia, improving the interventional methods and establishing ideas about improvement of existing methods.

ملخص الدراسة

هدفت هذه الدراسة إلى اختبار العلاقة بين فقر الدم والتحصيل الدراسي لدى تلاميذ المدارس الابتدائية في قطاع غزة
الأهداف الخاصة:

- 1- قياس مدي انتشار فقر الدم بين أطفال المدارس الابتدائية
- 2- فحص العلاقة بين فقر الدم والمتغيرات الاجتماعية والاقتصادية لدى التلاميذ وعائلاتهم
- 3- فحص العلاقة بين درجة فقر الدم ومدي التحصيل الدراسي لدى التلاميذ

منهجية الدراسة:

هذه الدراسة هي دراسة وصفية تحليلية درست تلاميذ المدارس بصورة مقطعية

عينة الدراسة:

تكونت العينة النهائية من مائتين وأربع أطفال تم اختيارهم بصورة عشوائية متعددة المراحل من سبع مدارس ابتدائية موزعة بصورة متناسبة علي مدارس وكالة غوث اللاجئين والمدارس الحكومية في جميع محافظات قطاع غزة

جمع المعلومات:

جمعت المعلومات بطريقتين، مباشرة بأخذ عينات دم لفحص اليحمور (الهيموجلوبين) لدى التلاميذ، ولقد تمت الفحوصات في المختبر المركزي للصحة العامة بعيادة شهداء الرمال، وتم التأكد من صحة النتائج ومعدلية جهاز الفحص بواسطة فحص ثان لعينة عشوائية من عينات الدم في مختبر مستشفى الأطفال بغزة. أما الطريقة الغير مباشرة فبواسطة إستبانة خاصة من إعداد الباحث لجمع المعلومات الشخصية والطبية والاجتماعية ومدي التحصيل الدراسي لدي هؤلاء الأطفال، ولقد تم فحص صدق وثبات الإستبانة من الناحية العلمية والعملية من قبل محكمين بالإضافة إلي تطبيقها علي عينة أولية.

النتائج:

أظهرت الدراسة أن فقر الدم منتشرًا لدي أطفال المدارس الابتدائية، وبلغت نسبة الانتشار 29.9%، ومثل الانتشار في محافظة رفح اعلي النسب (40%) يليه في محافظة غزة (33.3%) ثم الوسطي (29.73%) فشمال غزة (29.6%) وأخيرا خانينونس (14.8%). وكان مدي الانتشار أوسع لدي الأطفال اللاجئين (33.3%) من المواطنين (25.5%)، كذلك وجدت الدراسة أن فقر الدم منتشر أكثر لدي الأطفال الذين ينحدرون من أسر معيلوها عاطلين عن العمل أو

يعملون في أعمال قليلة الإدراج للدخل. ومن المثير أن انتشار فقر الدم وجد بصورة أكثر لدى الأطفال الذين تعمل أمهاتهم (57.1%) من أطفال أمهاتهم كن ربات بيوت (28.9%).

وأظهرت الدراسة أيضا أن هناك ارتباطا إيجابيا بين قيمة الهيموجلوبين والتحصيل الدراسي حيث أن ارتفاع نسبة اليحمور (الهيموجلوبين) ارتبط بارتفاع في درجات الطالب في كل من الحساب واللغة العربية والمعدل الفصلي العلم (معامل الارتباط 0.175 ذو دلالة إحصائية عالية).

لقد كانت النتائج منسجمة مع معظم الدراسات المماثلة التي أجريت في بلدان أخرى من العالم.

التوصيات:

من أهم التوصيات التي خرجت بها هذه الدراسة هي:

- استمرار الجهود لإزالة السبب الرئيسي للمشاكل الصحية وسوء التغذية وهو الاحتلال الإسرائيلي والإجراءات القمعية والعقوبات الجماعية.
 - عمل مسوح لمعرفة مدى انتشار فقر الدم بين الفئات التي لم تحظ بمثل هذه المسوحات.
 - إطلاق برنامج غذائي وطني لدعم أطفال المدارس من الناحية الغذائية.
 - الاهتمام بالتنقيف الصحي حول الأمور الغذائية لدى تلاميذ المدارس.
 - منع انتشار سوء التغذية وفقر الدم بواسطة إغناء الدقيق بعنصر الحديد.
 - تواصل الجهود لعمل برنامج التعليم العالي في مواضيع التصنيع الغذائي
- ومن التوصيات البحثية إجراء بحوث لمعرفة مدى انتشار مسببات سوء التغذية الأخرى مثل نقص اليود ونقص فيتامينات أ ونقص الزنك، وعمل دراسات متابعة.

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Introduction:

Anemia is a health problem that occurs when the total volume of red blood cells and/or the amount of hemoglobin in these cells is reduced below normal values as defined by healthy populations (Institute of Medicine, 1993). Anemia can become a serious problem if it remains undiagnosed and untreated; it is the medical term for an abnormally low hemoglobin concentration. This has an important indication about the health status of a wide variety of a community groups. About 80% of children in the developing countries will be anemic before reaching the age of 18 (Osiki, et al 1994). Anemia is considered the most prevalent nutritional defect in the world, small children and women of the reproductive age are the most affected (Demaeyer, 1985). In Palestine there is no statistical information about the magnitude of the problem among the school age children, and no previous studies were done to assess this relation, and to evaluate its impact on the general behavior of the child as well as his/her cognitive abilities.

Anemia is one of the most common problems or disorders seen by physicians around the world and because of the easy method of detecting the problem it is discovered normally through routine blood test performed for most of people who enter a health providing facility. Anemia is not diagnosis in it self, but it is an objective sign of a disease, and directly after discovering this sign, a physician should search for the underlying cause of anemia which includes many causes.

On the other hand, learning disability is a broad term that covers a pool of possible causes, symptoms, treatments, and outcomes. Partly because learning disabilities can show up in so many forms, it is difficult to diagnose or to pinpoint the causes and no one knows of a pill or remedy that will cure him or her.

Learning ability is one of the indicative clues, which reflects the cognitive abilities of a child, and it may be affected by many conditions. In this essay the researcher intends to test a hypothetical prediction about the relationship between anemia and school performance among primary school children in Gaza Strip.

The study was carried out in a difficult period, where the political situation of the area was unstable. The economic situation of people in Gaza Strip became miserable after a long period of Israeli aggression and collective punishment against the population of Gaza Strip in particular and the whole Palestinian territories in general. Therefore, the nutritional status of people of the area seemed to be affected

Justification of the study:

The purpose of the study is to assess the possible relationship between anemia and school performance among primary school children in Gaza Strip. Given that anemia is not only a medical problem, but it is also a social, political and economical problem. This is the first study that looks into the social aspect of health, and study such a health problem in a holistic approach. This study will help in planning a better management for both the problem of anemia and the low school performance. This study will also highlighten the way for more research studies to find possible effects of anemia on the cognitive abilities of children. It may also help in developing theories about possible relations between physiological disturbances and low school performance.

The researcher deemed that it is necessary to explore such a possible relationship, in-order to put an appropriate intervention plan for correction of nutritional deficiencies and nutritional status of children including anemia, which may help in improving their learning abilities. This

research aims also to explore a part of primary screening of anemia among school children as well as possible effects of nutritional status on their learning abilities.

Objectives:

General objective

To assess the relationship between anemia and the school performance as an indicative clue for cognitive abilities among primary schools children in the Gaza Strip.

Specific objectives:

- 1- To measure the extent of anemia among primary school children in the Gaza Strip
- 2- To examine the relationship between anemia and socio-economic status of children, and their families
- 3- To assess the relationship between the severity of anemia and the degrees of school performances.
- 4- To provide recommendations and conclusions regarding the problem of anemia among school age children

Research questions:

The study addresses the following questions.

- 1- What is the prevalence of anemia among primary school children in the Gaza Strip?
- 2- Is there an association between anemia and low school performance?

Conclusion:

The purpose of this study was to assess a possible relationship between anemia and school performance among primary school children and to measure the prevalence of anemia in the Gaza Strip. This study aims also to explore a part of primary screening of anemia among school children. A cross sectional design was used for its easy and simple implementation and immediate results which could be achieved. The study was conducted in both governmental and UNRWA primary schools in the five governorates of Gaza Strip. The tool of the study was structured interview questionnaire with mothers of pupils who were invited to the schools, academic records of pupils in schools and measurement of hemoglobin level for pupils. It is worth noting that this study is one of the first studies in the region that investigated such a health problem in holistic approach. Given that anemia is not only a health problem, but also a political, economic and social problem.

The total sample who was invited to participate in the study was 447, from which 204 responded to participation and involved in the study with response rate of 45.6%. This response rate was expected due to the difficult political and security situation during the period of the data collection in April 2002.

A comprehensive review of the literature was done and demonstrated about the problem of anemia either from the medical point of view, or the epidemiological point of view. The relationship between anemia and school performance was also reviewed, and there have been a considerable number of articles which touched this issue in different parts of the world.

Results of the study revealed that anemia is prevalent among school children in Gaza Strip; the prevalence of anemia in the period of the study in 2002 was 29.9% which is much higher than the prevalence mentioned in the nutritional survey for the same age group in 2000. The mean

hemoglobin of the study sample was 12.42gr/dl (SD .87, range 10.1gr/dl- 14.9gr/dl). Anemia was more prevalent among refugees (33.3%) than citizens, and it was highly prevalent in Rafah (40%), while in Gaza city it reached 33.3%. In khanyounis the prevalence was lower than that and reached 14.8%. Children of working mother were more anemic than those of house wives. In addition a positive relation was found between family income and prevalence of anemia, but no relation was found between prevalence of anemia and crowding index. The association between anemia and obstetric and delivery history of mothers shows that those who were delivered before reaching full term were more anemic than those who born at term. Furthermore; those who were delivered by CS were more anemic than those who were born vaginally. Low birth weight was also associated with low hemoglobin level, which means that those who were born with low birth weight continue to be anemic in older ages. The study revealed that there is an association between anemia and low school performance. Anemic children show lower scores in Math, language and in the average of total scores. The school performance score included variable other than marks, which were attention and concentration, attendance and class participation. The relation between school performance as a whole and anemia was positive and highly significant. The study tried to estimate the confound effect of some socio-economic factors and health problems on the correlation between anemia and school performance, these factors which were studied are age of mothers, mothers' education, number of siblings, Crowding index, family income, birth weight, presence of vision problem, presence of speech problems and presence of physical punishment. The confounding effect of these factors did not reduce the effect of anemia on low school performance.

Recommendations:

- 1- It is quiet obvious from this study and other studies and surveys done during the last 2 years in the Palestinian territories that there is a major nutritional problem, particularly among children as well other population categories, and this problem is worsen during Intifadat Al-Aqsa. So on the light of these results efforts must be done and continue to eliminate the major source of this problem which is the Israeli Occupation and Israeli collective punishments against the civil society of Palestine.
- 2- On the national level efforts should be done in order to discover risk groups of anemia and micronutrient deficiencies. Especially in population groups other than infants and pregnant women who receive a good attention from the health policy makers. School children and adolescents are an example of these groups. Discovering of high risk group could be done through screening program on schools. One method of screening could be to ask parents of newly admitted pupils to have a hemoglobin or CBC test upon registering the pupil for school.
- 3- Launching of a National Program of Nutritional Support to Primary Education. Setting of objective of this program to improve nutritional status of school children through health education campaigns which is likely to have a major impact on nutritional status of school children. However, much more needs to be done to address the issue of school children and adolescent mal-nutrition at the national level.
- 4- Health education in schools for pupils about the healthy diet and the importance of improving their nutritional habits on their achievement at schools. Health education must be also targeted towards adolescent girls since they are one of the high risk groups of being anemic and they are also mothers of future who will have to improve the health and

- educational status of the future generations. Health education program for teachers and education personnel about the nutritional issues is also needed
- 5- Addressing efforts of mass media towards public health issues other than clinical issues. Nutritional issues is one of these major public health concerns and need to get more attention from the responsible on mass media specially on the T.V and Radio.
 - 6- Prevention of anemia among the whole population could be done through flour fortification of iron. Wheat flour has been fortified with iron in many industrialized countries and contributed to a reduction in anemia in the United States of America (USA), Canada and the United Kingdom (UK) (Stoltzfus, R.J. and Dreyfus M.D.1998).
 - 7- Since there is an important role of improving the food industry of the nation, promoting of the food industry program in the master degree of school of public health is needed. Efforts should be continued to put this program into practice.
 - 8- Primary prevention also should be started in the early infancy, since it was concluded that anemic infants continue to be anemic in the school age. Primary prevention in this area is well established in Palestine. Empowerment of this issue is needed to get more successful results. Encouraging mothers to breastfeed their infants and advising parents to include iron-enriched foods in the diet of infants and young children is recommended for the primary prevention of iron deficiency anemia

Recommendations for further researches:

- 1- Future researches are needed in the field of micronutrient deficiencies in Palestine. Prevalence studies are recommended to detect problems of Iodine, Zinc and vitamin A deficiencies.
- 2- Follow-up studies are needed on a regular annual basis for detecting of anemia, improving the interventional methods and establishing ideas about improvement of existing methods.