

THE PROBLEM OF ANEMIA IN ARMENIA AMONG YOUNG CHILDREN

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The aim of this research was to reveal an impact of anemia on the quality of life (QL) score, as well as on different subscales of children's QL. The subjects of the research were 3 months–3 years old 100 children selected from two pediatric polyclinics of Yerevan. QL were measured by QUALIN questionnaire. A significant decrease in the total score and other domains of the QUALIN questionnaire scores were indicative for an impact of anemia on QL of the early aged children. Most affected subscale in case of anemia was «Ability to remain alone».

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Keywords: quality of life, early age children, anemia, childhood, QUALIN questionnaire.

Introduction. Anemia is a prevalent public health problem which affects about a quarter of the world population [1], but the burden of anemia is disproportionately borne among children in developing countries. In pre-school aged children the global prevalence of anemia for 0–5 year-old age group rising to 47.4% [2]. Anemia in early stages of life can adversely on the physical and behavioral growth and quality of life of children [3, 4].

Anemia in the early aged children is a problem of crucial importance of public health in Republic of Armenia. Among the blood and hematology diseases in early childhood, anemia is the predominating type [5].

Over the last few years, the quality of life has become the main issue of clinical and the socio-hygienic researches. Gradual transitions from the biomedical model of health and disease to the bio-psycho-social model prompt to consider the people's own opinion about their wellness as well. This becomes possible by means of the quality of life (QL) criteria developing [6].

Thus in modern scientific research QL is applied as a productivity evaluation instrument for the curative, rehabilitation and social effects, which means that QL evaluation method has great perspectives in the sphere of health research and evaluation in different groups of population [7]. In the last decade the number of QL as a new integrated indicator has increased, which enables us to analyze the rate of changes of main functions of human organism in case of different diseases [8]. One

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of the main scientific directions of modern medicine is examination of general pattern of organism's response to a specific disease, as well as selection of overall concept and precise criteria, which include a wider range of patient's life change [9].

In clinical practice the QL indicators are also included in a disease treatment evaluation and the standards of a research. These indicators help to perform individual monitoring, evaluate and predict a course of a disease, as well as, a productivity of therapeutic intervention [10, 11].

Many researchers examined the peculiarities of QL criteria among the practically healthy and the sick children. They investigated different age and gender groups of a population and different nosological forms [12, 13].

In pediatric practice of many European countries the QL indicators are actively applied in the population researches in general, as well as, regarding the age and gender, implementing a child monitoring in different pathologies studies, evaluating prophylactic measures' productivity and revealing of the complex impact of the chronic diseases [14].

One of the few tools available for evaluating quality of life in infants is the QUALIN (Qualite' de vie du Nourisson) questionnaire, which was specially developed for use in infants and toddlers. This questionnaire is available in various languages and has been validated in several European countries [15].

There are some literature data regarding to the special types of anemia and health in the aspect of quality of life [16, 17], while studies devoted to the influence of anemia on children QL in general are quite rare and not numerous.

The aim of this observational study conducted in Armenia was to evaluate the quality of life children under 3 years of age suffering from anemia, using the Armenian version of the QUALIN questionnaire.

Materials and Methods.

Sample and Participants. The subjects of the research were 100 children from 3 months to 3 years old selected from pediatric polyclinics No. 9 and "Arabkir" of the Yerevan City. 44 children aged from 3 months to 3 years suffering from anemia were eligible for inclusion in this observational study and created case group. 56 practically healthy children aged from 3 months to 3 years created control group. Every group composed from two subgroups; children under the age of 1 year and children from 1 to 3 years, because there were two forms for QL measuring. Children with a significant physical and psychological condition (e.g. with a major disability, or serious cognitive or psychological dysfunction) were excluded from the study based on the medical personnel decision.

Data collection took a period between 8.09.2017 and 6.02.2019. Demographic and medical data were entered by the pediatrician on a printed case report form at inclusion. Baseline demographic data included birth term, age and sex of children, type of family (small, medium and big), etc. The medical data recorded comprised type of feeding (ever breast fed, never breast fed), pregnancy complications, mother's chronic diseases, etc.

A written informed consent was sought from the parents and pediatricians. The study was conducted in accordance with the ethical principles stated in the Declaration of Helsinki. The study project was discussed and approved by the Ethics Committee of Yerevan State Medical University.

Measurements. The definitions of anemia according to age and gender-specific thresholds were used based on standards established by the World Health Organization (WHO) [1]. Anemia was defined as an hemoglobin concentration (Hgb) below 11 g/dL or an hematocrit level (Hct) value below 33% for children aged 3 months–3 years.

The QL evaluation of children at early age was performed with the help of QUALIN international questionnaire, which was applicable for the both practically healthy and the sick children [15]. In many European countries it was used to carry out the polycentric research, as a result of which the psychometric character of the questionnaire was verified [18]. The questionnaire includes 34 items with 6 possible answers, scored from 0 (quite false) to +5 (entirely true). Thus, the mean score ranges from 0 (poor QL) to +5 (excellent QL). Four topics are addressed: behavior and communication (BC), ability to remain alone (ARA), family environment (FE), psychological and somatic well-being (PSWB). The total score (TS) of all 34 questions was calculated finally. There were two forms of questionnaire. One form is designed for children under the age of 1 year whilst a slightly different one is designed for children between the ages of 1 and 3 years. Questionnaire completed by parents and pediatricians at inclusion.

Statistical Analysis. The statistical analysis has been done with the help of the SPSS 14.0 (Statistical Package for the Social Sciences Inc., USA). The quantitative numbers describing the observation unit were converted to average arithmetic (M), for average veracity evaluation the arithmetic's average error was calculated (m). Parametric ($M \pm m$) and non-parametric (Me, Q25–Q75, $M \pm m$) statistical methods have been applied for evaluating the changes of quality of life. Differences in proportions were compared by the Chi-square test or the Fisher Exact Test and differences of means were compared by the Student's t -test. Module t was equal to 2 (CL=95%, $p < 0.05$).

Results and Discussion. In case group 25 children were under 1 year and 19 children 1–3 years old. In control group 25 children were under 1 year and 31 children 1–3 years old. In case group 30 children were male and 15 females. In case group 33 children were never breast fed. Some peculiarities of the demographic and risk factors in the mentioned groups are brought in Tab. 1.

According to the research (Tab. 2), the total score of QL of children suffering from anemia by the parents' evaluation was 3.7 ± 0.03 (for the healthy children it was 4.1 ± 0.08), and that by pediatricians – 3.3 ± 0.03 (for the healthy children it was 4.1 ± 0.09). In comparison with the maximal value of QL's scale of assessment the QL indicator by the parents' evaluation in case of anemia was 74% (for the healthy children it was 82%) and that by the pediatricians – 66% (for the healthy children it was 82%). Therefore, the QL's total score loss in case of anemia was 26% according to the parents' evaluation and 34% – according to pediatricians.

It is worth mentioning that anemia among the children at early childhood mainly affected on the ARA subscale. According to the evaluation by the parents it made up 2.6 ± 0.02 (for the healthy children it was 3.5 ± 0.03) points, according to pediatricians – 2.4 ± 0.02 (for the healthy children it was 3.0 ± 0.03) points.

Table 1

The demographic and the risk factors of the early aged Armenian children with and without anemia

| Characteristics | Total Sample (%) | Case (%) | Control (%) | p value (with vs without anemia) |
|---|------------------|-----------|-------------|----------------------------------|
| N (%) | 100 | 44 | 56 | <0.001 |
| Sex (Male) | 56 | 30 (68.2) | 29 (51.8) | >0.05 |
| Age group | | | | |
| Under 1 year | 52 | 25 (56.8) | 27 (48.2) | |
| 1–3 years | 48 | 19 (43.2) | 29 (51.8) | |
| Premature infants ¹ | 40 | 39 (88.6) | 1 (1.8) | <0.001 |
| Pregnancy complications | 52 | 41 (93.2) | 11 (19.6) | <0.001 |
| Never breast fed | 36 | 33 (75.0) | 3 (5.4) | <0.001 |
| Smoking mothers | 2 | 32 (72.7) | 5 (8.9) | <0.001 |
| Mother's chronic diseases | 34 | 29 (65.9) | 5 (8.9) | <0.001 |
| Inadequate living conditions | 56 | 34 (77.3) | 12 (21.4) | <0.001 |
| Inadequate feeding regimen | 41 | 31 (70.5) | 10 (17.9) | <0.001 |
| Families with a high frequency of illnesses | 55 | 42 (95.5) | 13 (23.2) | <0.001 |
| Big families ² | 21 | 17 (38.6) | 4 (7.1) | <0.05 |

Note: ¹ – gestational age < 37 weeks;

² – big families include ≥ 6 persons.

Table 2

The QL scores in under 1 year age group, stratified by report (Mean (SE))

| QL scores | Case group | | Control group | | p value (case vs control) |
|------------------------------------|------------|----------|---------------|----------|---------------------------|
| | Mean (SE) | M/5·100% | Mean (SE) | M/5·100% | |
| According to the parents' report | | | | | |
| BC | 4.0±0.08 | 80% | 4.5±0.08 | 90% | <0.001 |
| ARA | 2.6±0.02 | 52% | 3.5±0.03 | 70% | <0.001 |
| FE | 3.9±0.03 | 78% | 4.5±0.08 | 90% | <0.001 |
| PSWB | 3.1±0.03 | 62% | 4.0±0.07 | 80% | <0.001 |
| TS | 3.7±0.03 | 74% | 4.1±0.08 | 82% | <0.001 |
| According to pediatricians' report | | | | | |
| BC | 3.9±0.07 | 78% | 4.5±0.07 | 90% | <0.001 |
| ARA | 2.4±0.02 | 48% | 3.0±0.03 | 60% | <0.001 |
| FE | 3.9±0.03 | 78% | 4.6±0.07 | 92% | <0.001 |
| PSWB | 3.0±0.03 | 60% | 3.9±0.07 | 78% | <0.001 |
| TS | 3.3±0.03 | 66% | 4.1±0.09 | 82% | <0.001 |

The criterion “ability to stay alone” had 48% loss according to the parents' evaluation and 52% loss according to the pediatricians' evaluation (52% and 48%, respectively).

The criterion “Neuropsychological development and physical health” among the children suffering from anemia was 3.1 ± 0.03 according to the parents' evaluation (for the healthy children it was 4.0 ± 0.07) and 3.0 ± 0.03 points – according to pediatricians (for the healthy children – 4.1 ± 0.09).

In comparison with the maximal value of the QL's scale of assessment a loss of this QL criterion was 38% according to the parents' evaluation, and 40% – according to pediatricians.

Table 3

The QL scores in 1-3 years old age group, stratified by report (Mean(SE))

| QL scores | Case group | | Control group | | p value (case vs control) |
|------------------------------------|------------|----------|---------------|----------|---------------------------|
| | Mean (SE) | M/5·100% | Mean (SE) | M/5·100% | |
| According to the parents' report | | | | | |
| BC | 4.0±0.05 | 80% | 4.5±0.07 | 90% | <0.001 |
| ARA | 2.4±0.05 | 48% | 3.5±0.03 | 70% | <0.001 |
| FE | 3.2±0.05 | 64% | 4.4±0.08 | 88% | <0.001 |
| PSWB | 3.4±0.04 | 68% | 3.9±0.03 | 78% | <0.001 |
| TS | 3.3±0.4 | 66% | 4.1±0.6 | 82% | <0.001 |
| According to pediatricians' report | | | | | |
| BC | 3.4±0.05 | 68% | 4.4±0.07 | 88% | <0.001 |
| ARA | 2.0±0.06 | 40% | 3.4±0.02 | 68% | <0.001 |
| FE | 3.2±0.04 | 64% | 4.3±0.07 | 86% | <0.001 |
| PSWB | 3.0±0.04 | 60% | 4.0±0.07 | 80% | <0.001 |
| TS | 2.8±0.04 | 56% | 3.9±0.03 | 78% | <0.001 |

In the 1–3 age group the QL total score (Tab. 2) according to the parents' evaluation made up 3.3 ± 0.4 and according to the pediatricians – 2.8 ± 0.04 . As compared with the highest value of QL assessment scale it was 66% according to the parents' evaluation (34% loss) and 56% according to the pediatricians (44% loss).

In the 1–3 age group ARA was the most affected subscale of the children suffering from anemia. According to the of parents' evaluation it was 2.4 ± 0.05 and according to pediatricians it made up 2.0 ± 0.06 points. As compared with the highest value of the QL assessment scale the result was 48% (52% loss) according to the parents' evaluation and 40% (60% loss) – according to the pediatricians. According to the parents' report FE subscale was also affected (3.2 ± 0.05 points). Moreover, a loss of this subscale was 36%. According to the pediatricians' report PSWB was more affected subscale. It was 3.0 ± 0.04 points with a loss of 40%.

The QL score changes in case of anemia were more expressed in the 1–3 age group, i.e. the total score of QL were lower in the 1–3 age group in comparison with the 0–1 age group. The differences were the most evident for the BC and FE subscales.

Thus, the QL score in the children with anemia were lower as compared to that of the practically healthy children. This pattern was invariable in the results of both the parents' and the pediatricians' evaluation.

Results of the study are of importance as they show that quality of life is affected in case of anemia in early childhood.

The quality of life is strongly associated with the anemia and efforts should be made toward the preventive and curative aspects of anemia, which may improve the general well-being and quality of life of a child.

The study showed that there are a lot of associations between some demographic and medical factors and anemia in Armenia, which can serve as a basis for deeper research, from the point of view of relationships.

The association between sex and children with anemia was detected only in the up to 1 year age group. The relationship between sex and children anemia was not uniform in other researches as well. According to the literature review there are some studies indicating on this association [19, 20], while others do not [21].

Results of the study are of importance as they show that there are a lot of associations between risk factors (determinants) and anemia. The study showed a relationship between premature birth and children anemia [22, 23].

Among the other determinants the maternal health condition, nutritional status of a child [24, 25] and mother's smoking were noted.

The study is important since it enriches the literature data referred to the early aged children's anemia [26–30] and their quality of life.

Strength of this study is to be one of the first studies to explore the relationship between the early aged children with anemia and QL in a country with low income.

A limitation is the observational nature of the study, which means a temporal relationship between early aged children anemia and quality of life cannot be explored. The other limitation of study is that the findings cannot be generalized to other Armenian urban populations.

Conclusion. A significant decrease in the total score and other domains of the QUALIN questionnaire scores were indicative for an impact of anemia on QL of the early aged children. Most affected subscale in case of anemia was ARA. All scores according QUALIN questionnaire in case group were significantly lower than it in control group. As showed the research some risk factors prevalence was higher in case group, which indicated that there can be a lot of associations between anemia and risk factors.

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ԱՆԵՄԻԱՅԻ ԽՆԴԻՐԸ ՀԱՅԱՍՏԱՆՈՒՄ ՄԱՆՈՒԿ ԵՐԵՒՍԱՆԵՐԻ ՇՐՋԱՆՈՒՄ

Այս հետազոտության նպատակն էր բացահայտել սակավարյունության ազդեցությունը ԿՈ (կյանքի որակ) գնահատականի վրա, ինչպես նաև երեխաների ԿՈ-ի տարբեր ենթասանդղակների վրա: Հետազոտվել են 3 ամսականից մինչ 3 տարեկան 100 երեխաներ՝ ընտրված Երևանի երկու մանկական պոլիկլինիկաներից: ԿՈ-ը չափվել է QUALIN հարցաշարով: QUALIN հարցաշարի ընդհանուր միավորի և այլ ցուցանիշների զգալի նվազումը վկայում է վաղ տարիքի երեխաների ԿՈ-ի վրա անեմիայի ազդեցության մասին: Անեմիայի դեպքում ամենից շատ տուժել է «Մենակ մնալու կարողությունը»:

С.А. МКРТЧЯН, Р.А. ДУНАМАЛЯН, М.А. МАРДИЯН,
Л.Э. ГУКАСЯН, Г. М. МИРИДЖАНЫАН

ПРОБЛЕМА АНЕМИИ В АРМЕНИИ СРЕДИ ДЕТЕЙ РАННЕГО ВОЗРАСТА

Целью данного исследования было выявить влияние анемии на показатель КЖ (качество жизни), а также на различные субшкалы КЖ детей. Объектами исследования были 100 детей в возрасте от 3 месяцев до 3 лет, отобранных из двух детских поликлиник г. Еревана. КЖ измеряли с помощью опросника QUALIN. Значительное снижение общего балла и других показателей опросника QUALIN свидетельствовало о влиянии анемии на КЖ детей раннего возраста. Наиболее затронутой субшкалой при анемии была «Способность оставаться в одиночестве».