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MORBIDITY AND MORTALITY PATTERN AT THE CHILDREN EMERGENCY UNIT, UNIVERSITY HOSPITAL, SEMEY, KAZAKHSTAN

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Abstract

Background: Mortality and morbidity reviews are necessary in hospitals to assess the effects of interventions and understand the context in which they occur. It was examined mortality and morbidity trends in Children Emergency Unit of University Hospital of Semey Medical University (UH SMU).

Objectives: is analysis of the mortality and morbidity structure of the children's population of Semey, admitted and hospitalized at the University Hospital of Semey Medical University.

Methods: A descriptive study of children and adolescents admissions over a 3 year period was undertaken. Information obtained included age, gender, diagnosis and outcome. Statistical processing was carried out by the program SPSS 21 version.

Results: A total of 44549 children with aged ranges between 1 month and 180 months were admitted within this period of study from January 2016 to December 2018. The analysis of admission to emergency department showed that only approximately the fourth of all enrolled patients is hospitalized. The analysis of hospital mortality composed 0.21% to 0.29% in 2016-2019, respectively. The main cause of mortality were congenital anomalies, cancer and pneumonia.

Conclusion: This analysis identified the need to improve the children care system at all levels.

Key words: *children, mortality, morbidity, emergency room.*

Резюме

СТРУКТУРА ЗАБОЛЕВАЕМОСТИ И СМЕРТНОСТИ В ПЕДИАТРИЧЕСКОМ ОТДЕЛЕНИИ НЕОТЛОЖНОЙ ПОМОЩИ УНИВЕРСИТЕТСКОГО ГОСПИТАЛЯ, СЕМЕЙ, КАЗАХСТАН

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Введение: Анализ показателей смертности и заболеваемости в больницах необходимы для оценки последствий вмешательств и понимания причин их возникновения. Изучена динамика смертности и заболеваемости в детском отделении неотложной медицины Университетского госпиталя Медицинского университета г. Семей (УГ НАО МУС).

Цель исследования: анализ структуры смертности и заболеваемости детского населения г. Семей, госпитализированного в Университетский Госпиталь Медицинского университета г. Семей.

Методы: Было проведено описательное исследование госпитализаций детей и подростков за 3-летний период. Полученная информация включала возраст, пол, диагноз и исход. Статистическую обработку проводили программой SPSS 21 версии.

Результаты: Всего за период исследования с января 2016 г. по декабрь 2018 г. было госпитализировано 44549 детей в возрасте от 1 месяца до 180 месяцев. Анализ поступления в отделение неотложной медицины показал, что только примерно четвертая часть всех включенных пациентов госпитализирована. Анализ госпитальной летальности составил от 0,21% до 0,29% в 2016-2019 гг. соответственно. Основной причиной смертности были врожденные аномалии, злокачественные опухоли и пневмония.

Заключение: Данный анализ выявил необходимость улучшения системы ухода за детьми на всех уровнях.

Ключевые слова: *дети, смертность, заболеваемость, отделение неотложной медицины.*

Түйіндеме

УНИВЕРСИТЕТТІК ГОСПИТАЛДІҢ ПЕДИАТРИЯЛЫҚ ЖЕДЕЛ ЖӘРДЕМ БӨЛІМШЕСІНІҢ СЫРҚАТТАНУШЫЛЫҚ ЖӘНЕ ӨЛІМ-ЖІТІМ ҚҰРЫЛЫМЫ, СЕМЕЙ, ҚАЗАҚСТАН

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Ауруханаларда өлім-жітім мен сырқаттанушылықты шолу емнің әсерін бағалау және өлім-жітімнің пайда себебін түсіну үшін қажет. Семей қаласының Медициналық университетінің госпиталінің балалардың жедел жәрдем бөлімшесінде өлім-жітім мен сырқаттанушылық зерттелді.

Зерттеу міндеттері: Семей қаласының медициналық университетінің университеттік госпиталіне жатқызылған және емделген Семей қаласының тұрғындарының өлім-жітім мен сырқаттанушылық құрылымын талдау.

Зерттеу әдістері: 3 жыл ішінде балалар мен жасөспірімдерді қабылдауды сипаттайтын зерттеу жүргізілді. Алынған ақпарат жас, жыныс, диагноз және нәтижені қамтиды. Статистикалық өңдеу SPSS 21 нұсқасы бағдарламасымен жүзеге асырылды.

Нәтижелер: Осы зерттеу кезеңінде 2016 жылдың қаңтарынан 2018 жылдың желтоқсанына дейін жасы 1 айдан 180 айға дейінгі барлығы 44549 бала қабылданды. Жедел жәрдем бөліміне жатқызуды талдау барлық тіркелген науқастардың төрттен бір бөлігі ғана ауруханаға жатқызылғанын көрсетті. 2016-2019 жж. стационар өлімінің талдауы тиісінше 0,21%-дан 0,29%-ға дейін құрады. Өлімнің негізгі себебі туа біткен ауытқулар, қатерлі ісік және пневмония болды.

Қорытынды: Бұл талдау барлық деңгейде балаларды күту жүйесін жетілдіру қажеттілігін анықтады.

Түйін сөздер*: балалар, өлім-жітім, аурушаңдық, жедел жәрдем.*

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Background

Analysis of the level and structure of hospital morbidity is the most important component of a comprehensive assessment of the health of the child population. Morbidity analysis is necessary for making management decisions at all levels of the health care system. Only on its basis is it possible to correctly plan and forecast the development of the network of medical organizations, assess the need for various types of resources. Incidence rates serve as one of the criteria for assessing the quality of work of medical organizations, the health care system as a whole [1,6,8].

Children emergency room is the first point of contact for children which provides 24 hours urgent medical care. The knowledge of the pattern of admissibility and hospitalization helps in evaluating and improving the existing facilities and proper management of the common ailments presenting in children in emergency room [11,2,5].

On the other hand, published information about the causes and contributing factors of pediatric mortality and morbidity, particularly in pediatric emergency departments, is exceedingly rare in our country.

The aim was to analyse of the mortality and morbidity structure of the children's population of Semey, admitted and hospitalized at the University Hospital of Semey Medical University in 2016-2018.

Materials and methods

This research was designed as the retrospective cohort study. A descriptive study of children and adolescents admissions over a 3 year period was undertaken. A total of 44549 children with aged ranges between 1 month and 180 months were admitted within this period of study from January 2016 to December 2018. The analysis took into account the following indicators: the sex of the child, age, clinical diagnosis, month of admission and outcome. Statistical processing was carried out by the program SPSS 21 version. To carry out the research, the materials provided by the statistical department of the UH SMU were used. The study was carried out at Pediatric Department of the university hospital of Semey medical university.

Results

The analysis of admission to emergency department of the university hospital in 2016-2018 shows that only 29.9%, 22.4% and 21% of emergency patients were hospitalized in 2016, 2017, 2018 respectively (table 1). As the result about 57-76% of emergency patients were served on an outpatient basis in an emergency department. 10.8-12.6% of patients were referred to other hospitals and 4.4-5.6% of patients refused hospitalization. It should be noted most emergency patients are delivered to the emergency room by ambulance.

When analyzing the attendance by bed profile, it should be noted that most of emergency patients were hospitalized in the neurological department (table 2).

Table 1.

Outcome of children emergency room admissions for 2016-2018

	2016	2017	2018
Hospitalized	3678 (29,91%)	3511 (22,4%)	3489 (21%)
Treated ambulatory or sent to GP	7073 (57,52%)	9345 (59,64%)	10593 (63,87%)
Direction to another hospital	1545 (12,56%)	2140 (13,65%)	1792 (10,80%)
Refusals of hospitalization	684 9 (5,56%)	672 (4,28%)	717 (4,32%)
Total	12296	15668	16585

Table 2.

Frequency of circulation and hospitalization in the emergency unit of UH SMU.

Department	Total	Hospitalized	Treated ambulatory	Direction to another hospital	Refusals of hospitalization
Pediatry (somatic)					
2016 y	3412	1253 (36,72%)	1635 (47,91%_	524 (15,35%)	291 (8,52%)
2017 y	4231	1257 (29,7%)	2080 (41,1%)	686 (16,21%)	208 (4,91%)
2018 y	4381	1154 (26,29%)	2409 (54,98%)	575 (13,12%)	245 (5,59%)
Pediatric neurology					
2016 y	294	189 (64,28%)	74 (25,17%)	31 (10,54%)	42 (14,28%)
2017 y	377	160 (42,44%)	133 (35,27%)	44 (11,67%)	40 (10,61%)
2018 y	340	153 (45%)	130 (38,23%)	26 (7,64%)	31 (9,1%)
Pediatric ENT					
2016 y	1716	746 (43,47%)	878 (51,16%)	92 (5,36%)	82 (4,7%)
2017 y	2980	764 (25,63%)	1966 (65,91%)	136 (4,56%)	114 (3,82%)
2018 y	2834	606 (21,3%)	2027 (71,52%)	97 (3,42%)	104 (3,67%)
Pediatric Surgery, orthopedics					
2016 y	6686	1352 (20,2%)	4458 (66,67%)	876 (13,10%)	252 (3,77%)
2017 y	8080	1330 (16,46%)	5166 (63,93%)	1274 (15,76%)	310 (3,83%)
2018 y	7896	1404 (17,78%)	5094 (64,51%)	1073 (13,59%)	325 (4,11%)

Pediatric surgeons took the greatest number of patients over the years of research (from 6686 to 8080). However, the smallest number of them were hospitalized from 16,5 to 20,2%. The smallest number of emergency calls was the neurological department, but the largest number of neurological patients were hospitalized. In 2016–2018, 64.28%, 42.44%, and 45% of emergency patients were urgently hospitalized in the neurological department.

In 2016, the percentage of hospitalized in the ENT department was almost 2 times more (43.47%) compared with 2017, 2018 year (25,6%, 21,3%, respectively).

The analysis of hospital mortality (table 3) showed that the percentage of mortality on the number discharged from the hospital slightly increased from 0.21% to 0.29% in 2016-2018, respectively. We reported a 0.7 death per 1 000 admissions to the observation area in our medical center.

Table 3.

Annual trend of admission and mortality.

Year	Number of admissions	Number of deaths	Discharged	Hospital mortality (%) to the number of discharged
2016	12296	10	4785	0,21
2017	15668	10	4698	0,21
2018	16585	13	4359	0,29

Discussion

PD of UH of SMU is a 165 bed facility and receives patients from Semey city and neighboring villages. The structure of the clinic includes the following departments: pediatric 38 beds, endocrinology-5 beds, hematology -2 beds, surgery-20, burn-3 beds, purulent surgery -5 beds, neurosurgery-10, ENT 18 beds, traumatology for children-22.

Emergency room in UH of SMU has 3 examination rooms, 1 manipulation room, 1 trauma room and 1 bandaging room. In the emergency room of the university hospital, the main diagnosis is carried out, emergency care is provided, then patients are sent to the appropriate department for further examination and treatment.

It means that inspecting for structural transformations, especially in primary medical care, the emergency medical service continues to perform functions that are not related to it, and help the doctors of outpatient facilities. Unsustainable work of ambulatory-policlinic institutions, led to the fact that the ambulance service, being one of the most expensive types of medical aid, under the conditions of limited financing, has to fulfill unimplemented functions, which indicates the imminent need for modernization of the service.

In the analysis of pediatric somatic patients (table 2), a high percentage of patients referred to outpatient treatment should be noted: 47.9%, 41% and 54.98% in 2016-2018, respectively. Such high rates are possibly associated not only with lack of primary care work, but also with strict indications for hospitalization according to treatment protocols, which do not allow to hospitalize and monitoring of patients. Considering the physiological characteristics of a child's body due to a very rapid deterioration of the condition and strict indications for hospitalization in hospitals, it is necessary to create observation wards for pediatric patients in emergency rooms.

These data are 2-3 times higher compared with hospitals of the Moscow region, but significantly lower compared with hospitals in Nigeria [2,5.11]. Relatively high hospital mortality rates show the need to improve the provision of medical care.

The main cause of mortality in Children Unit of UH of Semey (table 4) are congenital anomalies (11/33), cancer (6/33) and pneumonia (6/33). Similar data are presented in foreign publications [3,4,11]. A high percentage of congenital malformations are obviously associated with the Semipalatinsk nuclear test site which have been conducted out for 40 years [5,7,12]. Our findings highlight the significance of preventing birth abnormalities through lowering newborn and child mortality, which necessitates increased efforts from a variety of sources, including those from governmental organizations. Improving early prenatal diagnosis of congenital anomalies requires government support.

The national data on pediatric mortality is rarely available in Kazakhstan. The first audit of pediatric morbidity and mortality in East Kazakhstan's region has been led by our study. The primary risk factors for pediatric death worldwide were low-income parents and living in rural areas [13]. Despite its rapidly growing economy, Kazakhstan is still regarded as a developing country. The high prevalence of child death in this category may be explained by the parents' low educational attainment, inaccessibility due to finances and geography (rural area), and other factors. Some research discovered relationships between the mother's social and economic factors and mortality, morbidity, and even congenital defects [14]. Understanding these relationships may help with interventions aimed at improving fairness in the healthcare system. On the other hand, it was discovered that a higher mortality rate was linked to a delay in the patients' transfer to emergency departments. Therefore, reducing the time that patients spend in emergency rooms and preventing delays in their transfers to intensive care units may lower the death rate [15]. Thus, cutting down on patient stays in the pediatric emergency department and avoiding any delays in their transfer to the intensive care unit (ICU) may lower mortality.

Table 4.

Major causes of mortality.

Condition/year	2016	2017	2018	Total
Congenital anomalies	3	2	6	11
Pneumonia	2	2	2	6
Septicemia	1			1
Anemia	1			1
Trauma	1	2	1	4
Burn	2	2		4
Oncology				
Leucosis		1		6
Brain tumor		1	3	
Bone tumor			1	
Total	**10**	**10**	**13**	**33**

Our data are similar to the data of hospitals in the Moscow region, according to which congenital anomalies were the most common cause of mortality [11]. However, according to our data, oncological diseases are also leading, which is not fully expressed in Moscow hospitals.

According to world statistics, 41% of deaths occur due to pneumonia, diarrhea and malaria [9,10,12]. We encountered some limitations during the study. Because our data do not include children with diarrhea, infectious diseases as there is a separate children's infectious diseases hospital and we have another hospital for pulmonology patients. Our data are not consistent with global data, possibly due to the remote effects of the

nuclear testing, study limitations as well as climatic conditions and relative crowding of the population.

Our work will generally be useful for highlighting the patient mortality in pediatric emergency departments in Kazakhstan. However, it has several drawbacks. This study was conducted in a single pediatric emergency department (PED), so it might not accurately reflect death rates in other PEDs in Kazakhstan. As a result, the findings cannot be applied to other departments.

There has been no such study in this hospital. Therefore, this study is timely as it provide data for future re-evaluation and also help in designing protocols for the proper management of the common diseases. This analysis shows the need to modernize the system of medical care at all levels, starting from primary care, emergency first aid, and hospital emergency room. Only coordinated work at all levels can reduce morbidity and mortality.

Conclusion. We have obtained new topical information about the structure of the mortality and morbidity in child population of Semey during hospitalization on the basis of a retrospective study of primary medical documentation. The analysis of morbidity and mortality in the pediatric emergency units may help in the development of practical care and prevention. The fact that our study is the first of its kind to be conducted in the pediatric emergency unit in East Kazakhstan retains all of its appeals. Modernization of existing system at all levels will reduce the mortality and morbidity of children illness.

Recommendations:

1.It is necessary to improve the work of primary health care to prevent unreasonable appeals to the emergency department.

2.It is necessary to conduct a re-design of emergency room and create observation rooms.

3. Mortality could be decreased by shortening PED stays and eliminating any transfer delays to the ICU.

Disclosure

The authors declare that they do not have conflict of interest.

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