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Invited Review

Child health in the first 100 years of Republic of Türkiye: a story of hope, labor and success

Canan Seren[1]

[1]*Department of Neonatology, Faculty of Medicine, Ondokuz Mayıs University, Samsun, Türkiye.*

ABSTRACT

The Republic of Türkiye commemorated its 100th year in 2023. Within one century, a battle weary, poor country has changed into a powerful, game changing leader in the world. This was accomplished by the motivation and overwork of the Turkish nation and a great leader, Mustafa Kemal Atatürk. The status of child health in 1923 can be summarized as high infant and under-five mortality rates, epidemic diseases and hardly any healthcare facilities and health-care professionals. Since a healthy, well educated workforce was one of the main requirements for the development of the young republic, child health was given a great emphasis. With the efforts of the whole nation, many children's hospitals were established, infant mortality decreased, and malaria, neonatal tetanus, polio and diphtheria were eradicated. In this article, the progression of child health in the first 100 years of the Republic of Türkiye will be reviewed.

Key words: Republic of Türkiye, child health, infant mortality rate, development, 100 years.

After the establishment of the Republic of Türkiye, the healthcare system mainly focused on child health and the eradication of infectious diseases like malaria, diphtheria, cholera and tetanus. Year by year, measures of health improved, infectious diseases were eradicated, and healthcare became widespread. Now, in the 100th Anniversary of the Republic, all Turkish children can access to free contemporary healthcare, equally. In this manuscript the breakthrough in child health in the first 100 years of the Republic of Türkiye will be reviewed in a chronological order.

Health in the beginning of the 20th century

The last years of the Ottoman Empire can be defined as a period of wars, epidemics and early deaths. During the First World War (WWI) 325,000 citizens had died and 400,000 were wounded.[1] In 1918, İstanbul had a population of 940,000 and nearly 10% of all deaths occurred due to tuberculosis. Cholera, typhus, diphtheria, influenza and rabies were also epidemic. Between 1870-1914, it was estimated that more than eight million children had died due to infectious diseases. These premature deaths due to infections touched the heart of the whole country as they were mentioned in Turkish literature: In the story named "Promise" (Ant) by Ömer Seyfettin, written in 1912, the death of a child due to rabies was described. Reşat Nuri Güntekin's well-known novel "The Wren" (Çalıkuşu) published in 1922 narrates the death of Munise due to diphteria when she was 14 years old. The malaria epidemic was jeopardizing the whole country. It was estimated that 70% of Antalya's population was infected with malaria.

There was no Ministry of Health (MoH) during the Ottoman Empire. The Quarantine Organisation (Karantina Örgütü) and "Meclis-i Tahaffuz" (Health Council, "Sıhhiye Meclisi") were established in 1840, and preventive health services were provided mainly in quarantine centers around the country.[2] In 1867, a non-military medical school "Mektep-i Tıbbiye-i Şahane" was established to train doctors. First,

✉ Canan Seren
drcananaygun@gmail.com

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the education was both in French and Turkish. In 1870, medical education began to be taught completely in Turkish.

Dr. Marko Pasha, Dr. Abdullah Bey, Kırımlı Aziz Bey and Besim Ömer Pasha established "Mecrûhîn ve Mardâyı Askeriyeye İmdât ve Muavenet Cemiyeti" in 1868 and in 1877 this community was named as "Ottoman Hilâl-i Ahmer Association" (Kızılay, Red Crescent).[3] Dr. Giovanni Battista Violi was one of the famous pediatricians at that time who worked on smallpox and cholera vaccines. He established an international children's hospital in Şişli in 1905 (Hôspital et Clinique International pour les Maladies des Enfants a Chichli), serving children free of charge. This was the first hospital in which newborns were hospitalized. He also published the first pediatric journal in the Ottoman Empire in 1909: "La Pédiatrie en Turquie"/ "Türkiye'de Emrâz¬ı Etfâl". Being the fourth pediatric journal in Europe, it was pressed both in French and Turkish, whose publication ended with the explosion of WWI in 1914.[4]

Following the declaration of Constitutional Monarchy (Meşrutiyet, sharing of the governmental powers between sultan and people's council) "Müessesat-ı Hayriye-i Sıhhiye İdaresi" (Health Administration for Charitable Enterprises"), the head organization for hospitals was established in 1909. The "Şehremaneti İdare-i Sıhhiye" ("Municipal Health Administration") was also established the same year to organize public health, to take precautions for epidemics and to serve health care in İstanbul. The Health Directorate, led by the Ministry of Interior Affairs (MOIA) was responsible for health services. Laws regarding health were generally about emergency services during times of war and about the organization of health services like "Vilayati İdare-i Sıhhiye Nizamnamesi" in 1913. In 1916, a MoH (Sıhhıye Nezareti) was established that was working with the order of MOIA.[2] Health services were mainly located in the cities, and extension to rural areas was limited due to the paucity of doctors.[2]

In 1802 the first pediatric hospital of the Western World, "Hôpital des Enfants Malades" ("Hospital for Sick Children") was established in Paris, caring only for patients up to 15 years. This was followed by pediatric hospitals in Germany, the Russian Empire, Austria and England. The first children's hospital in the United States opened in Philadelphia in 1855. The first nursery was established in our lands in1892 by Besim Ömer Pasha in İstanbul, which served for 17 years.[5,6] The first pediatric hospital in our history is Hamidiye Etfal Hospital, that opened in June 1899 and was directed by İbrahim Pasha.[5,6] It was built by the order of Abdulhamid II, as a remembrance for his daughter Hatice Sultan, who had passed away after diphtheria when she was eight months old. An in-hospital laboratory prepared serums for scarlet fever, diphtheria and smallpox vaccines. The first sanatorium for children with 24 beds was also opened in this hospital in 1904. Treatment in this hospital was free of charge.[6]

In the 1900's Pediatrics was not a separate specialty and specific pediatrics departments did not exist. Pediatric healthcare was carried out under obstetrics and internal medicine departments. Newborns and infants less than three years were generally cared by obstetricians, while internists cared for children over three.[5] The first pediatrics clinic was opened as ten beds confined in a small part of İstanbul Kadırga Obstetrics Clinic (established in 1909).

In 1909, civil and military medical schools were united and started to serve as Faculty of Medicine ("Tıbbiye"). In this school, the first theoretical lectures on diseases of children ("Emrâz¬ı Etfâl") were started by Kadri Reşit Pasha (Anday) as one hour per week. He became the first professor of pediatrics of our country in 1917 and continued his service until 1933. Later in 1920's İhsan Hilmi Bey (Alantar) started lectures on Childcare ("*Puericulture*") in the medical school.[5,6]

According to the 1885 Ottoman Census, the total fertility rate (TFR) in İstanbul was 3.5 births per

woman and it was around 6 births per woman in 1920's in Anatolia.

Health During the War of Independence (1920-1923)

Only ten days following the foundation of the Grand National Assembly in Ankara, "Sıhhiye ve Muavenet-i İçtimaiye Vekâleti" (Ministry of Health and Social Service) was established on May 2nd 1920 (Law No: 3) and the first MoH was Dr. Adnan Adıvar.[2] The main responsibilities of the first MoH were to protect (Hıfzısıhha) and to rescue (treatment). Healthcare services were delivered at governmental and municipal facilities, quarantine offices and health posts, and the main goal was to heal the wounds of war. Malaria was epidemic, infecting nearly 40% of the soldiers in the army during the War of Independence, and three million people were infected with trachoma.

In 1921, İhsan Hilmi Bey (Alantar) who had practiced pediatrics in France and Germany established the first children's dispensary in Ankara and the second in Kayseri. He wrote a textbook named ''Child Care" ("Çocuk Bakımı") for students in teacher training schools.[5,6]

Many children were homeless and there were many orphans following the losses of Çanakkale, Balkan Wars and WWI, so "Himaye-i Etfal" Association ("Child Protection Association", "Çocuk Esirgeme Kurumu") was established in 1921. Great orphanages were opened in İstanbul, caring nearly for 2,500 children.

The education of midwives continued even during the War of Independence to reduce high maternal and neonatal mortality. In 1922, four-month courses on birth, puerperal and neonatal health were given to midwives in East Anatolia and Trabzon, led by Kazım Karabekir Pasha. Women's admission to medical faculties was also approved the same year.

Breastfeeding was encouraged to reduce infection-related deaths in infants and due to limited food supply. The breastfeeding rate was 95%, which had saved many lives.

Child Health After the Proclamation of the Republic of Türkiye (1923- 1935)

During this period, there were many reforms regarding education, industry, agriculture and social life, as well as health.[1] The healthcare workforce in 1923 included only 554 physicians (mainly from military service origin), 69 pharmacists, forty nurses, 560 health officers, 136 midwives and 86 hospitals with 6,437 beds. One doctor had to serve nearly 21,000 citizens.[2] Private practice was forbidden and doctors were obliged to work for the MoH. In the "Obligatory Service Law" of 1923, medical faculty students who admitted the obligatory service in rural parts were given encouraging advantages like free dormitories and their educational expenses were covered by the government.[2,7-9]

Statistics on the population, mortality and causes of death started after the establishment of the Statistics Institute in 1926.[10] In the 1930s, life expectancy was as low as 40 years, malaria being responsible for 2.3% of all deaths.[11] The first four leading causes of death for children were diarrhea, tuberculosis, pneumonia, congenital malformations and perinatal conditions.[12] Most of the population was living in rural areas and the authorities were not informed neither about the birth nor about the death of the children.[10,12] Extracting data about infant and child deaths from the registries was not possible and survey methods were used to understand the infant mortality rate (IMR).[10] The estimated IMR for 1923 was 250/1,000 and half of the births were lost in the first two years of life. Fuat Bey (Umay), the founder of "Himaye-i Etfal Association" visited four villages, recorded 402 births and 233 losses; with a death rate of 55%. Deaths were mainly due to neglect, hygiene issues, and infectious diseases.[10,12] In 1927, Prof. Camille Jacquart, chief of the Statistics Institute, reported the rate of birth to death as 48.6% in Kalecik by survey method. When we

consider these data, the IMR might be as high as 500/1,000 or higher.[12] For comparison, the IMR in 1923 in the United States was 78/1,000 and it was 73/1,000 in London. Child deaths were so important that Fuat Bey (Umay) in December 1926 gave a motion to the National Assembly to investigate their reasons. The same year, famous journalists Yunus Nadi and Falih Rıfkı wrote articles about child mortality to attract public attention.[12]

Child survival was synonym to the republic's survival, accordingly Himaye-i Etfal Association was always supported by Mustafa Kemal (the founder of Republic of Türkiye and the first president of the Republic) and the Turkish National Assembly. Türkiye was one of the first governments to sign the "Decleration of Children's Rights" in 1924.[5] In 1925, "Children's Day" started to be celebrated and in 1927 "Children's Day" was replaced with "Children's Week", to thoroughly discuss children's' problems.[5]

Due to high IMR, the government adopted pronatalist policies. Motherhood was advocated as a noble public service and the mothers were called "Mothers of the Republic". Girls were encouraged to marry at the appropriate age and raise many healthy children to serve the country. Medals and money were offered to women having more than six children and families having more than five children were freed from "road tax". Single men aged 25-65 were required to pay a tax, effective from January 1st 1927. Children were considered as the "Nations' Children" and future citizens, so child health was at the center of the health policy, together with the war against infectious diseases. Raising healthy children was advised and healthy children contests were established. A popular journal named "Gürbüz Çocuk" ("Robust Child") was published.

In 1926, the minimum age of marriage was lowered to 17 for women and 18 for men. The same year, the Turkish Civil Code classified abortion as a crime. So, TFR peaked at 7 in 1930 (for comparison, the TFR in 2023 was 1.51).

In 1927 an obstetrician, Dr. İsmail Derviş published a book named "Fenn-i Vilade" (Doğum) in which drawings of neonatal intubation by finger, incubator care and gavage feeding of newborns were included.[5]

There was a small children's service in Kadırga Obstetrics Hospital which moved to Haydarpaşa in 1923 and served nearly 40 children, consulted by Kadri Reşit Pasha. The number of beds increased to 54 in 1927.[5,6] The pediatric ward in Haseki Women's Hospital was augmented to 40 beds, consulted by Dr. Ali Şükrü Şavlı and a new division containing 100 beds was added subsequently.[5,13,14] Dr. Raif Yesari operated another pediatric clinic at Vakıf Gureba Hospital.[6]

In 1925 Zonguldak representative Tunalı Hilmi Bey stated in his parliamentary speech that the number of pediatricians should increase to decrease infant mortality and to educate the public about childcare and hygiene.[15]

In 1928, education on pediatrics started at İstanbul University Faculty of Medicine and after the university reform in 1933, the first chair of "Clinic for Child Care and Diseases" was established, and Dr. İhsan Hilmi Alantar was appointed as the clinic director.[16]

In those times, women were not included in the healthcare workforce, and most of the nurses were men. In 1924, Besim Ömer Pasha (whose nickname was the *midwife of the midwives*), Safiye Hüseyin Elbi, Akil Muhtar and Tevfik Sağlam established the first School of Nursery in İstanbul to start formal education for midwifery and nursery.

The Republic's first MoH, Dr. Refik Saydam (mission period: 1923- 1937) constructed and organized health services. The main targets of the health care system were to increase the number of doctors and midwives, establish preventive care, open new hospitals and dispensaries, make health organizations reach villages, and eradicate highly prevalent infectious diseases.[2,17] Institutions were created to combat common communicable diseases

like malaria, trachoma, leprosy and syphilis. Starting from 1924, maternity hospitals and child care institutions and country hospitals ("Numune Hospitals") were established first in Ankara, then in Erzurum, Diyarbakır, and Sivas.[2]

Breastfeeding was encouraged as a way of preventing infant deaths. In 1924, Dr. Ali Vahit (Yaşat) published a pamphlet named "How to Feed a Suckling Baby?" ("Memedeki Çocuk Nasıl Beslenir?") giving advice for common feeding problems in babies. He advised exclusive breastfeeding for eight months and pointed to gastrointestinal infections as the most common reason for child deaths. Growth charts were included in this pamphlet for growth monitoring and weighing of the babies monthly was suggested.[18]

In the first National Turkish Medical Congress (1925) malaria, tuberculosis and child deaths were identified as the most important health problems to battle. Tracking for diphtheria was also initiated in 1925.[19] In 1928, Hıfzıssıhha Institute and School was established and vaccine production for smallpox, tuberculosis and rabies started.[2] In 1930, the first immunization program started which was against smallpox. This meant that the young republic was one of the few countries that could produce its own vaccines. The cholera vaccine produced in Hıfzısıhha was even sent to China for an epidemic in 1938 and the typhus vaccine was widely used around the world in the Second World War (WWII).

Dispensaries against tuberculosis was established in İstanbul and Ankara.[2] Laws on "Practice of Medicine and Medical Sciences" (1928) and "Public Hygiene"" (1930) were passed. With the "Law of Public Hygiene," preventive medicine was established and the fight against infectious diseases was organized. In the first ten years of the Republic, 51 laws and 19 decrees with power of law ("Kanun Hükmünde Kararname") were enacted mainly to combat contagious diseases and to solve current health problems.[2]

Medical museums were established first in İstanbul and then in other big cities to give health education to citizens, especially primary school students.[2]

The "Turkish Pediatric Association" ("Türk Pediatri Kurumu") was established by doctors Kadri Raşit Anday, Mehmet Kamil Berk, Ali Şükrü Şavlı, İhsan Hilmi Alantar and Niyazi Ali Özsoy as "Council of Pediatricians" in May 1930 in İstanbul; just before the establishment of the American Academy of Pediatrics in June 1930. Dr. Sezai Bedrettin Tümay, who later established Cerrahpaşa Medical Faculty Pediatrics Clinic was also on the founding team.[5,6,14]

In 1933, the Department of Pediatric Surgery and Orthopedics was established at Hamidiye Etfal Hospital by Dr. Akif Şakar, within Istanbul University.[6] The same year, Moris Şinasi International Children's Hospital was established in Manisa. In 1930, the first Turkish medical journal on pediatrics was published: "Türk Pediatri Arşivi: İstanbul Çocuk Kliniği Dergisi" (still published as "Turkish Archives of Pediatrics").

In the first census in October 1927, the population was 13,648,270; with 77.7% of citizens living in rural areas.[2,10] In the second census in 1935, the population rose to 16,158,000; with a 2.1% increase in eight years. Low population was considered a health emergency, and specific emphasis was put on this topic.[10,11]

The number of doctors increased to 1,182 in 1930 and to 1625 in 1935. In the 1930's, there were only ten pediatricians in our country, which rose to 100 in 1943.[4] In 1935, the number of hospitals were 175 with 13,000 beds, there were 400 midwives and 202 nurses.

Child Health between 1936-1945

In those years, Türkiye was also affected by the world's economic crisis. The war against infectious diseases continued within the budgetary constraints. New hospitals were

established, and the number of patient beds increased. In 1940, there were 2,387 doctors (quadrupled in 17 years) and 405 nurses.

Since nutritional deficiency was an important reason for infant mortality, studies on nutrition were carried out. Preventive medicine, pre and post-birth hygiene and vaccination were given significance.[1,17] The economic constraints of WWII impacted the entire populace through poverty and food scarcity. Accordingly, the IMR which was 273/ 1,000 live births in 1935–1940 rose to 306/ 1,000 live births in 1940–1945.

Childcare was considered the whole nations' duty, but widespread traditional practices had to change to reduce infant mortality such as lying the babies on turd or soil ("höllük") which could lead to neonatal tetanus (NT). In 1938, the first Turkish Pediatrics Congress assembled during the 7th National Turkish Medical Congress in Ankara, 26 years after the first International Congress of Pediatrics (1912).[14] In this congress, Dr. İhsan Hilmi Alantar's lecture reflected the attitude toward children at that time: "Neither the mother nor the father alone can ensure that a child is raised properly. The government, cities, and charitable societies, the ones busy with health will do this".[16]

During that period, it is important to acknowledge the contributions of Dr. Albert Eckstein, a renowned German pediatrician who dedicated his services to the welfare of Turkish children. Dr Eckstein, being Jewish was exiled from Germany, accepted an invitation to establish the pediatrics clinic in Ankara Numune Hospital in 1935. During the two years following his arrival, his team (including Dr. İhsan Doğramacı) visited 188 villages in 25 provinces, interviewing almost 25,000 women in Anatolia. In his dairy, he wrote: "*Malaria holds the first place. We can also state that other diseases such as typhoid, typhus, whooping cough, measles, kala azar, leukemia and sarcoma also prepare the ground for noma by decreasing the organism's resistance. One-third of the babies born die before they reach one year of age. It is possible to decrease these deaths by some simple measures. However, we need educated people to spread these measures across Anatolia.*"[20] He worked for 14 years in Ankara and established Ankara University Medical Faculty Pediatrics Clinic in 1945. After working here between 1945- 1949, he left the chair to Dr. Bahtiyar Demirağ, who led the clinic until 1981.[5,6,21]

In 1945, the "Extraordinary Law on Malaria Prevention" was passed and a comprehensive campaign was launched to combat malaria. Pamphlets, radio programs, and short movies were distributed, aiming to raise awareness about the transmission of malaria by mosquitos.[2] As a result of sustained efforts over several years, Türkiye has successfully eliminated local malaria cases since 2010.

Child Health during 1946-1960

In 1946, "First 10-Year National Health Plan", the first written health plan of the Republic was adopted in which maternal and child health were given priority. In 1950, the number of physicians rose to 3020, nurses to 721 and midwives to 1295. Since the average life-expectancy at birth was 43.6 years in 1950–1955, the governments continued pro-natalist policies. The biopolitics perspective in these years aimed at maintaining the TFR and ensuring child survival. Accordingly, Dr. İhsan Hilmi Alantar stated that every child was a social capital that belonged both to the parents and to the country.[16]

In 1947, Behçet Uz Children's Hospital with 150 beds was opened with the benefaction of Dr. Behçet Uz, who was the major of İzmir at the time. In 1941, Dr. Ziyaeddin Akbay had set up a children's unit in Zeynep Kamil Hospital. The mothers and babies were kept together in the nursery, with rooming-in philosophy, which was ahead of the time. In 1953, he established the first neonatal care unit at Zeynep Kamil Hospital, named as the "Preterm Child Care Center" and he also performed the first exchange transfusion for indirect hyperbilirubinemia in Türkiye. With the establishment of the "Preterm

Child Care Center", a reduction in the preterm death rate was observed.[22]

In 1952, the Maternal and Child Health Section was established at the MoH. In 1953, the "Maternal and Child Health Development Center" was inaugurated in Ankara with assistance from the United Nations International Children's Emergency Fund and the World Health Organization (WHO). Mother and child health centers were set up to provide prenatal and postnatal care. Ankara Children's Hospital (later named as Dr. Sami Ulus Children's Hospital) was established in 1956.[4]

The progress in child health in the 1950's is marked by the endeavors of Prof. Dr. İhsan Doğramacı.[23] While working at the university's Pediatrics Clinic, Prof. Doğramacı organized the constitution of the "Institute of Child Health" at Ankara University in 1955 and established Hacettepe University Children's Hospital with 150 beds in 1958. The same year he started the publication of "Journal of Child Health and Diseases" ("Çocuk Sağlığı ve Hastalıkları Dergisi") and "Turkish Journal of Pediatrics" (indexed in Science Citation Index Expanded), both of which are still published by Hacettepe University Institute of Child Health. The "Turkish National Pediatric Association" ("Milli Pediatri Derneği") was also established the same year by his initiatives. After the destruction of the first building of Hacettepe University Children's Hospital in 1961 by fire, a new hospital with 250 beds (both for children and adults) was built within six months. This hospital became the core of Hacettepe University Faculty of Medicine.[5,23]

In 1958 the first pediatric cardiac catheterization was performed by Prof. Dr. Ali Ertuğrul.

In 1959, the "School Nutrition Project" started, and milk powder and other foods were distributed to school children by the Ministry of National Education.

Universal BCG vaccination started in 1952. There was a big struggle against tuberculosis with mobile tuberculosis battle teams and dispanseries. The fight against smallpox was also successful, as the last case was diagnosed in 1957 and it was eradicated.[24]

Child Health during 1961-1980

This was the period of "Socialization of Health Services". The Nationalization of Health Care Delivery Law (Law No: 224) was passed in January 1961, and primary care based health services were given importance. Prof. Nusret Fişek was the mind behind this healthcare system philosophy. The aim was to extend health care, including preventive and environmental health services and health education to the whole country and to make it easily and equally accessible for every citizen. Health care services were organized to be delivered continuously and in accordance with the population's priorities, in a staged way. Twenty- six "Maternal and Child Health Centers" were opened. Health care for pregnant women and 0-6 age children were free of charge. The MoH worked together with Turkish Radio and Television for health education, especially by radio programs.

Türkiye's population was 27.8 million in 1960 and rose to 31.3 million in 1965, increasing 12.6% in five years. Accordingly, with the "Population Planning Law" enacted in 1965, the governmental policy shifted from pronatalist to antinatalist manner and family planning services were started. As a result, TFR, which was 5- 5.9 in 1960's, decreased to 4- 4.9 in 1970's.

Infant mortality rate decreased rather slowly. It was 200/1,000 in 1961 and 0- 4 year old children incurred 40% of all deaths. Contagious diseases like measles were still epidemic, prematurity and neonatal deaths were common. In 1960, a preterm and neonatal emergency care service was established at Zekai Tahir Burak Maternity Hospital, which was followed by the establishment of a "Preterm Ward" at Hacettepe University.[22]

In 1974 the first pediatric hemodialysis and in 1975 the first pediatric kidney transplant (by

Prof. Dr. Mehmet Haberal, Prof. Dr. Ümit Saatçi and their team) were performed at Hacettepe University Faculty of Medicine.[5]

Child Health during 1981-2000

During these years, Türkiye implemented many child survival activities to decrease IMR and to promote healthy growth of children, such as:

- Growth monitorization programs
- Expanded immunization programs: The elimination of polio and NT, reducing morbidity and mortality of measles and diphtheria
- Control of diarrheal diseases and oral rehydration therapy
- Prevention of deaths from pneumonia
- Safe motherhood projects: Family planning, nutrition and education of mothers
- Neonatal resuscitation program (NRP)
- The baby-friendly hospitals initiative and promotion of breast-feeding
- Salt iodization programs: In 1994, a strategy for developing a salt iodization program was initiated and iodization of table salts started in 1998.
- Elimination of vitamin A, D and iron deficiencies
- Neonatal screening programs: The first neonatal screening program was initiated by Prof. Dr. İmran Özalp for phenylketonuria in Hacettepe University (Table I).

With application of these strategies, the IMR which was 134/1,000 in 1978, declined to 67/1,000 between 1985- 1990, and further declined to 53/1,000 between 1988-1993, according to the State Planning Organization.[25] In 1993, the neonatal death rate was 29/1,000 live births (8/1,000 in developed, 36/1,000 in developing countries), post-neonatal death rate was 23/1,000, and under five-year mortality rate was 60.9/1,000.[26]

Table I. Neonatal screening programs in Türkiye

Start Year	Screening Program
1987	Phenylketonuria
2000: Regional 2004: National	Hearing screening
2006	Congenital hypothyroidism
2008	Biotidinase deficiency
2015	Cystic fibrosis
2017: Regional 2022: National	Congenital adrenal hyperplasia
2019	Ophtalmological screening • Neonatal: Red reflex, pupil reflex, asymmetry, cataracts • 36-48 months: LEA symbol test • 7 years: LEA symbol test
2022	Spinal muscular atrophy

Maternal-child health services were considered an integral part of primary health care by the governments and special effort was put into preventing and treating the common health problems for mothers and children. The ratio of lower respiratory tract infections as a reason for post neonatal deaths decreased from 35% in 1988 to 12.2% in 1991.[25] In 1996, the major causes of infant deaths were perinatal causes, meningococcal infections, and heart diseases.

The decline in IMR can be largely attributed to the implementation of NRP which started in 1991 with the collaboration of Hacettepe University, Ege University, İzmir Medical Chamber, the Turkish Neonatal Society and the MoH. First NRP courses were conducted in Ankara (Hacettepe University) and İzmir in 1991 and 1992.[22] Accordingly, perinatal mortality due to birth traumas and perinatal asphyxia decreased. Between 1990- 1995, the percentage of women receiving antenatal care increased from 43% to 63%.[22,26]

In 1989, the first pediatric continuous peritoneal hemodialysis was performed at Ankara University Faculty of Medicine. In 1994, Prof. Dr. Metin Karaböcüoğlu established the first pediatric intensive care unit (PICU), at İstanbul University Faculty of Medicine Emergency

Department with four beds. As of 2021, there are 878 PICU beds in Türkiye, 841 tertiary and 37 secondary level.[27]

In 1988 the first pediatric bone marrow transplantation (by Prof. Dr. Gündüz Gedikoğlu, Prof. Dr. Sema Anak and their team) and in 1990 the first pediatric living-related segmental liver transplantation (by Prof. Dr. Mehmet Haberal and his team, Ankara Başkent University) were performed.[6]

The Childhood National Immunization Program (NIP) by itself is a great endavour: In 1981, the Extended Immunization Program started to immunize population groups sensitive to vaccine-preventable diseases. The aim was to get a 90% vaccination rate for every infection, make 80% of 0-11-month-old children fully vaccinated and immunize all pregnant women against tetanus. In 1985, the Turkish National Immunization Campaign was launched and carried out in three rounds: September, October, and November-December. The aim was to immunize all 0- 60 month-old unvaccinated or under-vaccinated children against diphtheria, pertussis, tetanus, polio, and measles and to increase vaccination coverage. For poliomyelitis eradication, national immunization days were conducted in 1989 and 1995. In 1997, a polio mop-up program was implemented. The last case of poliomyelitis was recorded in 1998, and Türkiye was certified polio-free by WHO in 2002. A timeline of advances in pediatric healthcare is summarized in Table II.

Child Health in the 2000's and beyond

The population continued to increase and rose to 76,667,864 in 2013. Maternal and child health were given priority by the governments. Eventually, between 2003 and 2010, the ratio of pregnant women having four antenatal care visits increased from 54% to 82%.

From 2007 to 2012, Türkiye showed remarkable improvements in reducing infant and neonatal mortality rates (NMR): Infant and neonatal mortality rates, which were 16.4 and 12.2 in 2007 respectively, declined to 9.7 and 6.3 in 2012, with regional differences.[28] Prematurity, congenital abnormalities and congenital heart diseases were the three most common causes of infant deaths, which were in parallel with the developed countries. In 2009, 71% of infant deaths were of newborns. Dilli et al. reported that IMR and NMR significantly increased with the number of infants per pediatrician, doctor and midwife, while decreasing with the increased rate of hospital birth, antenatal care, infant follow-up, and staff with NRP certification.[28] The NRP certified health care professionals increased from 14.1/1,000 live births in 2007 to 24.0/1,000 live births in 2012. Neonatal intensive care unit (NICU) beds also doubled in that period: 2.2/1,000 in 2008 to 5.8/1,000 live births in 2012.[28]

The developments in neonatology also had a great effect on the reduction of IMR. The number of NICUs increased from 39 in 2002 to 116 in 2008, and the number of NICU beds increased from 665 to 4094 at the same period.[28]

In 2002, a special neonatal transport system was established in İzmir, which is still active.

In 2003, the MoH introduced the "Health Transformation Program" (HTP) in which good health and universal health coverage were considered a right and an integral part of citizenship. Preventive health care services were given weight through a family medicine system, in which every newborn child was assigned to a family medicine doctor (a general practitioner, GP) to perform well baby follow-up and childhood immunizations. Accordingly, pediatric health care changed from a mixed (both pediatrician and GP) care to a GP based system.[29]

In 2004, the "Iron Turkey Project" ("Demir gibi Türkiye Projesi") was launched to prevent iron deficiency anemia by iron supplementation for children and pregnant women.[30] In 2005, vitamin D supplementation for newborns started. Both iron and Vitamin D are given free of charge by the MoH.

Table II. Landmarks of childhealth in the first 100 years of Republic of Türkiye

Year	Landmarks
1920	Establishment of Ministry of Health and Social Service
1921	Establishment of "Himaye-i Etfal (Child Protection) Association"
1922	Women's admission to medical faculties
1923	Declaration of Republic
1924	Decleration of Children's Rights
1928	Establishment of Hıfzıssıhha Institute and School
1930	First national immunization programme (against smallpox)
	Establishment of Turkish Pediatric Association
	Publication of Türk Pediatri Arşivi (Turkish Archives of Pediatrics)
1933	First chair of Clinic for Child Care and Diseases, İstanbul University Faculty of Medicine
1938	Assembly of the first Turkish Pediatrics Congress
1945	Establishment of Ankara University Medical Faculty Pediatrics Clinic
1946	First 10-Year National Health Plan
1947	Establishment of Behçet Uz Children's Hospital, İzmir
1952	Establishment of Maternal and Child Health Section at Ministry of Health
	Universal BCG vaccination
1953	Establishment of Maternal and Child Health Development Center Preterm Child Care Center at Zeynep Kamil Hospital
	First exchange transfusion for hyperbilirubinemia
1955	Establishment of Hacettepe University Children's Hospital
	Publication of Journal of Child Health and Diseases (Çocuk Sağlığı ve Hastalıkları Dergisi) and Turkish Journal of Pediatrics
1957	Eradication of smallpox
1958	First pediatric cardiac catheterisation
1961	The Nationalization of Health Care Delivery Law
1974	First pediatric hemodialysis
1975	First pediatric kidney transplant
1981	Extended Immunization Program
1985	Turkish National Immunization Campaign
1988	First pediatric bone marrow transplantation
1990	First pediatric living-related segmental liver transplantation
1991	Neonatal Resuscitation Programme
1994	Establishment of the first pediatric intensive care unit
	Salt iodization program
2002	Polio-free certification by World Health Organization
2003	Health Transformation Programme
2004	Iron Turkey Project
2009	Elimination of neonatal tetanus
2011	Elimination of diphtheria

Due to successful immunization programs NT was eliminated in 2009 and diphtheria in 2011.[19] The measles elimination program started in 2002 and measles vaccination days were enacted at schools in 2003 and 2005. After this successful eradication program, there were nearly no

measles cases between 2007 and 2011. Following the 2011 Syrian war, an epidemic erupted in 2013 with 1,005 new cases. In 2023, there were nearly 5,000 cases of measles. Anyhow, Türkiye has been very successful regarding NIP, zero dose children decreasing from 3.1% in 1993 to 0.9 % in 2018, with regional disparities.[31] Türkiye's achievement in childhood immunization will be highlighted by stating that the percentage of zero doze children is 7.7% in 92 low and medium income nations.[32]

In 2015, there were 4025 pediatricians in Türkiye: 513 in university hospitals, 1694 in state hospitals, and 1818 in private practice. Approximately 2,000 residents were enrolled in pediatric residency programs. The ratio of pediatricians per child in Türkiye was 6.1/100,000, compared to 14.1/100,000 in European Union (EU) countries.[29]

In 2021, the first pediatric lung transplant was performed successfully in Ankara City Hospital, in a 15 year-old girl with cystic fibrosis.

Health Statistics of 2023 and Future of Turkish Children's Health

The Republic of Türkiye has experienced remarkable success in the past century in health services, but especially in children's health (Tables II and III). In 2023, 26% of the whole nation are between 0-17 years. The main reasons of death in 1-17 years group are external injuries and poisoning; not infectious diseases any more.[33] Although almost 509,6000 children younger than five years had died globally in 2021[34], IMR in 2022 had decreased to 9.2/1,000 in Türkiye and 99.7% of pregnant women received antenatal care.

BCG, hepatitis A and B, pentavalent vaccine (DTaP, inactive polio virus, Haemophilus influenzae type b), Streptococcus pneumoniae, oral polio, varicella and measles-mumps-rubella vaccines are included in the NIP, free of charge. Human papilloma virus vaccine is next in line to be included in the NIP.

As of 2022, 96,000 specialists, 109,000 GPs, 302,000 midwives/nurses are working for the health of the citizens all around Türkiye.[35] There are 6,835 pediatricians and 3,990 residents in pediatrics: 3,440 are working for the MoH, 445 in university hospitals and 2,500 in private practice. Obligatory service exits both after medical school graduation and after pediatric residency, which makes pediatric healthcare reach to the furthest parts of the country. A new and alarming problem for child health is that pediatrics was one of the least popular residencies for medical school graduates in 2022 and 2023 (second after emergency care). The problem also exists for subspecialties like neonatal and pediatric intensive care, pediatric nephrology and hematology/oncology who serve the most serious cases, have the highest malpractice risks and longest working hours and earn the least. If precautions are not taken immediately to encourage residency in pediatrics and labor intensive subspecialties, the workforce will shrink and children with the most serious illnesses will be at the greatest risk.

In 2023 life expectancy in Türkiye is close to 77,3 years, with an aging population. Deaths are mainly due to chronic diseases and cancer.[35] In 2022, TFR was 1.62, which was below the cut-off level of 2.10 to renew the population and decreased further to 1.51 in 2023.[36] For comparison, the average TFR in 27 EU countries in 2021 and 2022 were 1.53 and 1.46, respectively.[37] The population growth rate, which was 13.5/ 1,000 in 2019 decreased to 7.1/1,000 in 2022 and declined further to 1.1/1,000 in 2023. Besides, maternal age for the first birth is increasing (27.0 in 2023).[36] So, governmental policies should find a fine-tune between pro and antinatalist policies for optimum population growth.

One of the main problems of the near future is the high preterm birth rate. In 2022, the preterm birth rate was 12.9% and 129,557 preterm babies were born (preterm birth rates of 2022 in other parts of the world are: 10.4% in the USA, 7.6% in the United Kingdom, and

Table III. Child health statistics of Republic of Türkiye: 1923- 2023[10,33,40-42]

	Population	Total fertility rate (per woman)	Perinatal mortality rate (1/1,000)	Infant mortality rate (1/1,000)	Neonatal mortality rate (1/1,000)	Post Neonatal mortality rate (1/1,000)	Under five mortality rate (1/1,000)
1923	13,000,000			250			
1927	13,648,270	7					
1950	20,947,188			233			
1961	27,754,820	6.2		176			
1965	31,391,421			163			223
1978	41,953,105	4.3		134			
1988	52,125,597	3.4		77.7			
1990	56,473,035	3.08		60			80
1993	56,713,073	2.7	42	52.6	29.2	23.4	
1996	59,442,502			42.2			
1998	61,308,204	2.61		42.7	25.8	16.9	
2001	64,100,297	2.38			17		
2002	65,022,300			31.5			40
2003	65,938,265	2.2	24	29	17	12	37
2007	70,586,256	2.08	14.8	18.7	12.2	6.5	16.8
2008	71,517,100	2.2	14.1	14.8			14.1
2009	72,561,312		13.9	13.9	8.9		17.7
2010	73,722,988	2.08	12.0	10.1	6.6	3.5	18
2011	74,724,269	2.05	12.9	12	6.1	5.9	15
2012	75,627,384	2.11	12.6	9.7	6.3	3.4	11.0
2013	76,150,000	2.3	12.6	10.8	7	2.8	13.4
2015	78,741,053	2.16	11.5	10.2	7	3.2	12.4
2019	83,154,997	1.88	10.8	9.1	5.8	3.3	11.2
2020	83,380,000	1.77	10.6	8.6	5.5	3.1	10.6
2021	84,680,273	1.71	11.0	9.3	5.9	3.4	11.3
2022	85,279,553	1.62	10.5	9.2	5.7	3.5	11.2
2023	85,372,377	1.51		10.0			14.5

22% in India).[38,39] Preterm birth and associated lifelong consequences are major concerns for both the healthcare system and families, like cerebral palsy due to intracranial hemorrhage or blindness due to retinopathy of prematurity. Another concern is the survival of children with major congenital abnormalities and rare neurological/ metabolic disorders. To reduce these issues, we must educate families before conception about the risks of consanguineous marriages and conduct prenatal and neonatal screening similar to those for spinal muscular atrophy.

The development of telemedicine and similar technologies was one of the most exciting achievements of the new millennium; accelerating during the COVID-19 pandemic lockdowns. With widespread use of this new technology, every child might be able to reach a healthcare professional, regardless of where he lives, which might bring equality in healthcare.

Besides these achievements, we still have problems like child marriages, working children, refugee children, children affected by disasters, like many other parts of the world.

The trajectory pursued by the Republic of Türkiye in the realm of child health represents a remarkable tale of achievement. On behalf of the younger generation, I want to express my gratitude for the dedicated work of healthcare professionals over the past 100 years and the unwavering support received from all those involved in championing this cause. Our younger pediatricians are ready for healthier Turkish children and children all around the world.

Author contribution

The author confirms contribution to the paper as follows: Study conception and design: CS; data collection: CS; analysis and interpretation of results: CS; draft manuscript preparation: CS. The author reviewed the results and approved the final version of the manuscript.

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