

## **Kolka jelitowa u noworodków – częstość występowania oraz metody postępowania przez rodziców Intestinal colic in newborn babies: incidence and methods of proceeding applied by parents**

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### **Streszczenie**

Wstęp: Kolka jelitowa to jedna z częstszych dolegliwości, z którymi spotyka się lekarz rodzinny oraz pediatra. Występuje u 10 – 40 % dzieci karmionych sztucznie oraz u 10 – 20 % karmionych naturalnie. Atak kolki zaczyna się gwałtownie, powodując bardzo szybko energiczny, piskliwy płacz, a nawet krzyk dziecka. Napady te trwają kilka minut w odstępach 2-3 godzinnych i ujawniają się szczególnie w godzinach wieczornych. Definicji określających kolkę jelitową w literaturze jest bardzo wiele. Po raz pierwszy pojęcie kolki zostało wprowadzone do podręczników pediatrii ponad 250 lat temu. Jedną z najbardziej trafnych definicji określa kolkę jako nawracające napady nasilonego płaczu i niepokoju trwające więcej niż 3 godziny dziennie przez ponad 3 dni w tygodniu przez okres 3 tygodni. Opieka nad dzieckiem z kolką jelitową stwarza bardzo wiele problemów wśród rodziców, a także

niepokoju, dlatego znajomość skutecznych metod walki z tym zaburzeniem stanowi wyzwanie współczesnej neonatologii i pediatrii

Celem pracy jest ocena częstości występowania kolki jelitowej u noworodków żywionych naturalnie i sztucznie, metod postępowania wśród rodziców oraz analiza ich skuteczności.

Materiał i metody: Badaniami objęto 100 noworodków żywionych naturalnie i 100 żywionych sztucznie oraz ich rodziców. Metodą badawczą wykorzystaną w pracy jest sondaż diagnostyczny. Do przeprowadzenia badań posłużono się techniką ankietową w formie kwestionariusza.

Wyniki: Wśród przebadanych noworodków żywionych naturalnie kolka wystąpiła wśród 43%, natomiast żywionych sztucznie u 30%. 44% stanowiły noworodki płci żeńskiej natomiast 56% płci męskiej. 52% stanowiły matki 30-34 letnie. 30% stanowiły kobiety w wieku 35-39 lat. Natomiast matki w wieku 25-29 lat stanowiły 17%. Największą grupę rodzin stanowiły osoby z dobrą sytuacją materialną 60%. Drugą grupą były rodziny z przeciętną sytuacją, które stanowiły 40%. Wszyscy badani respondenci stwierdzili, że posiadają wiedzę dotyczącą kolki jelitowej, a głównym źródłem informacji był Internet (84%). Najczęściej stosowane metody walki z kolką przez rodziców to: noszenie na rękach (78%), masowanie brzuszka (72%) oraz kąpiel (63%).

Wnioski: Najczęściej stosowane metody walki z kolką jelitową to metody behawioralne oraz farmakoterapia, które okazały się równie skuteczne. Według matek karmiących piersią dieta była najmniej skuteczną metodą eliminacji kolki.

## **Summary**

Introduction: Intestinal colic is one of the more frequent complaints that a general practitioner and paediatrician deal with in their work. 10-40% of babies formula fed and 10-20% breast fed are stricken by this complaint. A colic attack appears suddenly and very quickly causes energetic, squeaky cry or even scream. Colic attacks last for a few minutes and appear every 2-3 hours usually in the evenings. Specialist literature provides numerous definitions of intestinal colic. The concept was introduced for the first time to paediatric textbooks over 250 years ago. One of the most accurate definitions describe colic as recurring attacks of intensive cry and anxiety lasting for more than 3 hours a day, 3 days a week within 3 weeks. Care of a baby suffering from an intestinal colic causes numerous problems and anxiety among parents, therefore knowledge of effective methods to combat this complaint is a challenge for contemporary neonatology and paediatrics.

The aim of the study is to estimate the incidence of intestinal colic in newborn babies formula and breast fed as well as to assess methods of proceeding applied by parents and analyze their effectiveness.

Material and methods: The research involved 100 newborn babies breast fed and 100 formula fed, and their parents. The research method applied in the study was a diagnostic survey conducted by use of a questionnaire method.

Results: Among examined newborn babies that were breast fed, 43% have experienced intestinal colic, while among those formula fed 30% have suffered from it. The study involved 44% new born female babies and 56% male babies. 52% of mothers were 30-34 years old, 30% 35-59 years old, and 17% 25-59 years old. When it comes to families, the most numerous was a group in good financial situation (60%). The second numerous group was that in average financial situation (40%). All the respondents claimed that they had the knowledge on intestinal colic and the main source of knowledge was Internet (83.6%). The most frequent methods applied by the parents to combat colic are: carrying the baby (78%), belly massage (72%), and bath (63%).

Conclusions: The most frequent methods to combat intestinal colic are behavioural methods and pharmacotherapy that have proved to be equally effective. According to mothers who breast feed their babies, diet was the least effective method to combat the colic.

## **Introduction**

Intestinal colic is a functional disorder of the alimentary canal, most probably with heterogeneous and unclear etiology, characterised by fits of crying impossible to calm down. In pathogenesis of the disorder, one considers the influence of originally organic diseases of the alimentary canal, such as food allergy, lactose intolerance, and disorders in intestinal microflora. Among causes of intestinal colic there are also mentioned: immaturity of baby's nervous system, negative impact of cigarette smoke, incorrect feeding technique, and psychosocial factors [1,2,3]. Specialist literature provides numerous definitions of intestinal colic. The concept was introduced for the first time to paediatric textbooks over 250 years ago. In practice, the most frequently used definition of intestinal colic is the one suggested by Wessel, called as the "rule of three", described as recurring fits of crying and anxiousness lasting more than 3 hours a day, 3 days a week, within a 3 month period [1,4]. 10-40% of babies formula fed and 10-20% breast fed are stricken by this complaint. It appears between the third day and third week of baby's life. However, in 80% of newborn babies, the first symptoms appear during the second week of life and fits of crying appear usually in the evening hours. Intestinal colic usually disappears spontaneously in 3-4 month of life. However, in about 7% of babies, the complaint may continue up to 9 month of life [1,5]. Diagnosis of intestinal colic is based on parents' and doctor's observations. Parents who are concerned about excessive crying of their baby should try to find the answer if the symptoms are not a result of another disease or a symptom of pain, which may mean the beginning of infectious disease [6,7].

There are many methods of treating and relieving the symptoms of infantile colic due to a varied group of causes and risk factors. Some of the methods act directly on the cause of the colic, but there also methods that have no influence on combating the complaint. Frequently, a given method is effective in one baby, while in another it has no influence at all. So far, one specific procedure for relieving the symptoms of infantile colic has not been established. In symptomatic treatment of intestinal colic one may apply: behavioural therapy, belly massage, sucrose solution, herbal teas, trimebutine, parasympatholytic drugs and simethicone. Treatment of a baby suffering from intestinal colic has to be established individually;

additionally, it should have multidirectional effect and depend on the severity of the symptoms [1,2,3,8,9].

### **Aim of the study**

The aim of the study is to estimate the incidence of intestinal colic in newborn babies formula and breast fed as well as to assess methods of proceeding applied by parents and analyze their effectiveness.

### **Material and methods**

The research involved 100 newborn babies breast fed and 100 formula fed, and their parents. The research method applied in the study was a diagnostic survey conducted by use of a questionnaire method.

### **Results**

More than a half of the surveyed (53%) are mothers aged 30-34, 30% stands for women aged 35-39, while mothers aged 25-29 stand for 17%. Most frequently (58%) intestinal colic appeared in new born babies of mothers aged 30-34, less frequently (27%) of mothers aged 35-39, while in babies of mothers aged 25-29 in only 15% of cases. As far as family structure is concerned, marriages with one child stood for 23%, marriages with two children 57%, while marriages with three children stood for 20%. In marriages with one child, intestinal colic was diagnosed in 47% of babies, in marriages with two children, colic appeared in 53% babies, while in marriages with three children, colic was diagnosed in 40% of babies. The most numerous group of mothers has higher education (52%), while 48% have secondary education. Among fathers, the most numerous group are fathers with secondary education (45%), 43% have higher education, while 12% have vocational education. The majority of the surveyed families have good financial situation (60%), only 40% assess their situation as average. All the respondents claimed that they had knowledge on intestinal colic and methods of combating the complaints of the colic. The surveyed stated that the main source of information was Internet (84%), brochures (71%), family (67%), while medical personnel was a source of information only for 26% of the respondents. The vast majority of the surveyed (82%) described their knowledge as good, while 19% claimed that their knowledge was very good. According to data analysis, 47% of babies weighed more than 3000g, 36% had birth weight between 2600-3000g, while 17% 2000-2500g. Among the examined babies, 44% were

breast fed, 31% were formula fed, while 25% of the babies were breast fed and sometimes additionally formula fed. According to the newborn babies' parents, intestinal colic appeared in 43% of babies breast fed and in 30% of those formula fed. 45% stood for female babies and 54% for male babies. All the surveyed parents heard about the intestinal colic being diagnosed in their babies from a paediatrician. Most frequently mentioned symptoms are: loud cry (100%), bloated belly (89%), tucking legs up (68%), constipation (26%), flushing (28%) and frequent gas passing (9%). Symptoms of colic in the evening hours appeared in more than a half of the examined babies (51%), in 35% in afternoon hours, while in 15% at night. In 68% of babies, colic appeared in the second week of life, in 18% in the third week, in 12% in the fourth week, while in 7% in the first week (fig. 1, 2).

Figure 1. Age of the child, which observed the emergence of the first attacks infantile colic.

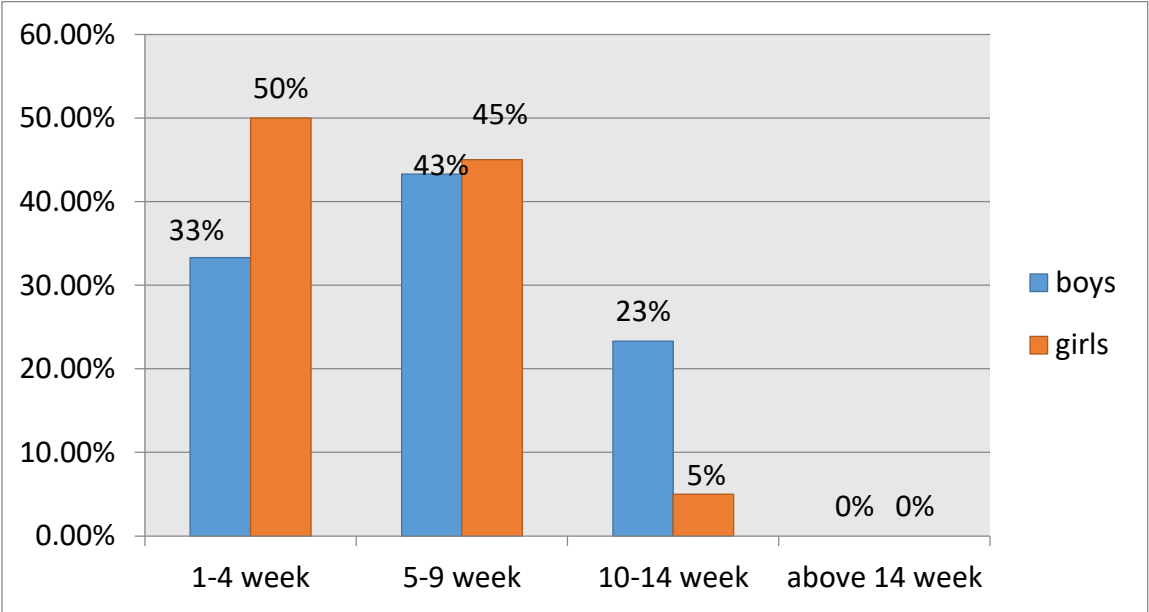
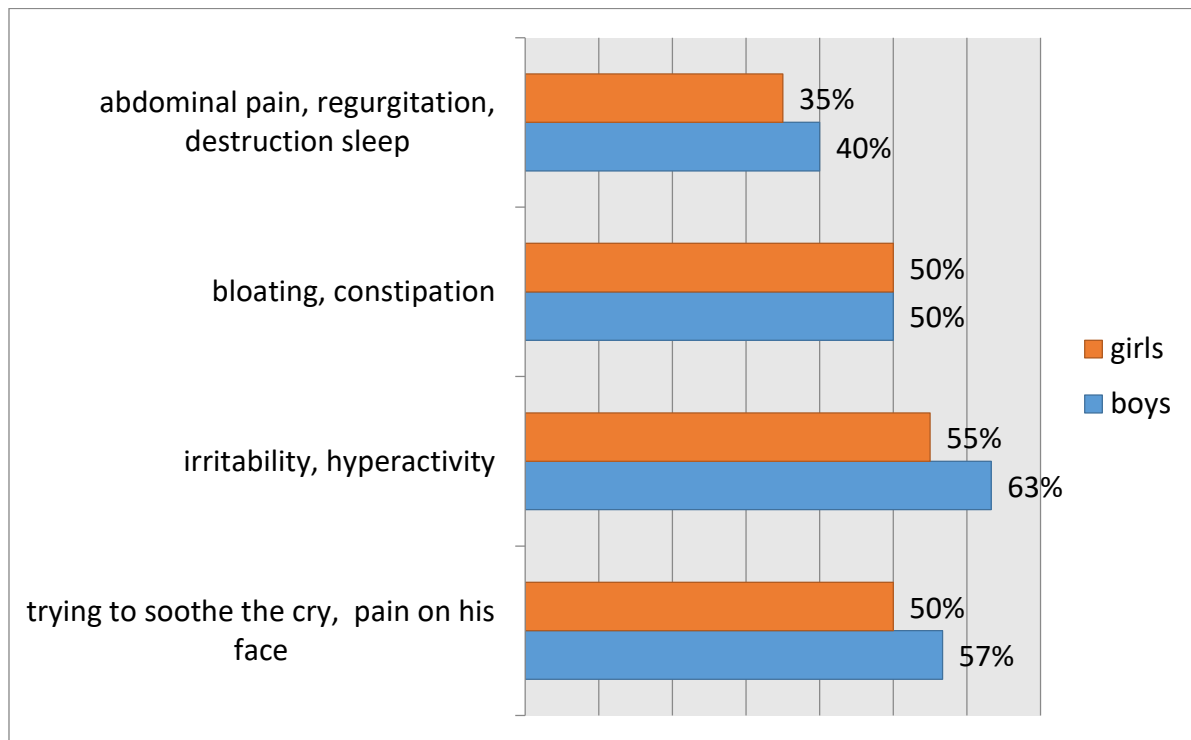
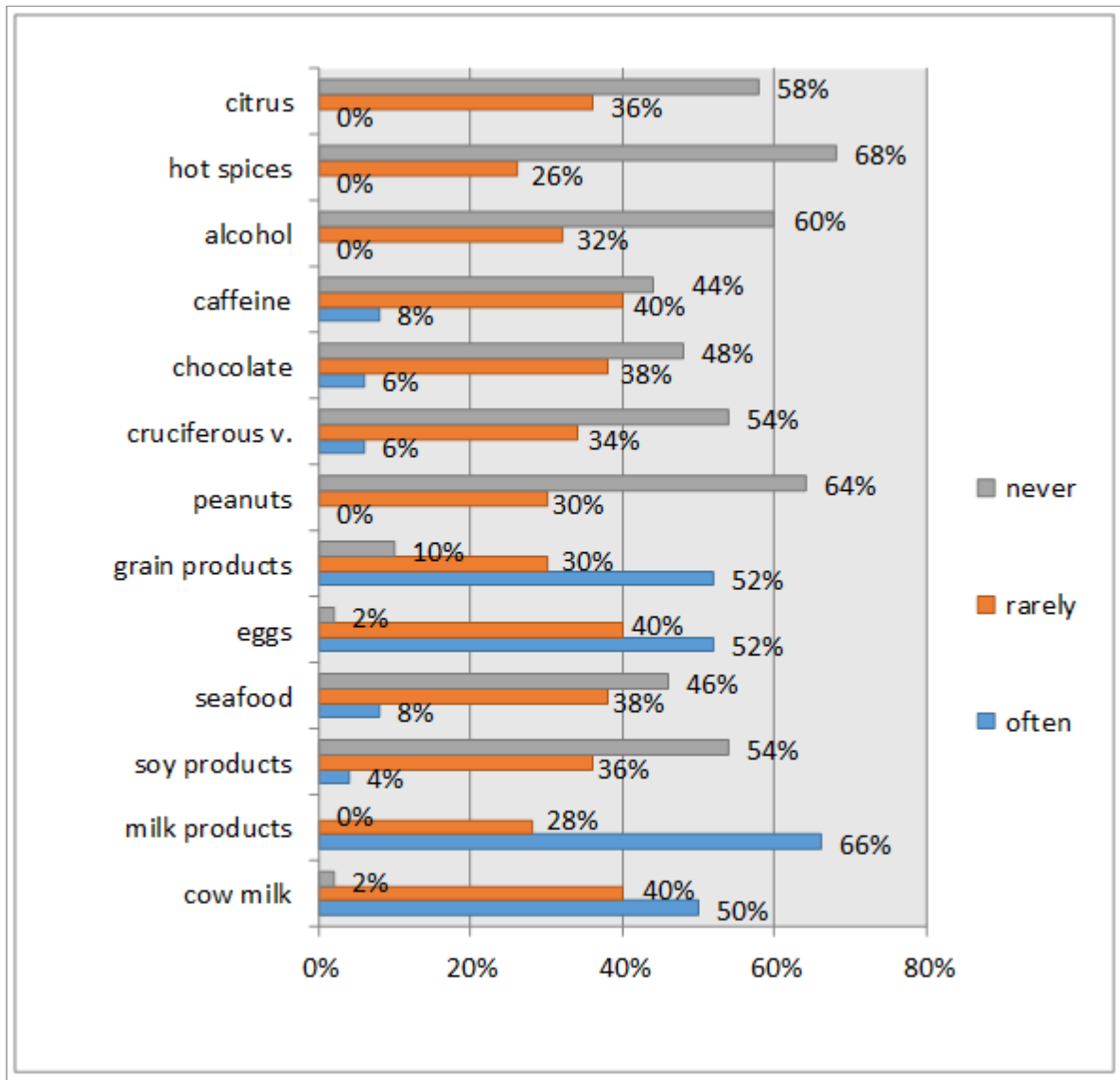


Figure 2. Clinical symptoms indicating the occurrence of infantile colic.



The most numerous was a group of babies crying for 4 hours a day (25%), 18% stood for babies crying for 3 hours, while 17% stood for babies crying for 6 hours a day. Crying for 1-2 hours occurred in 13% of babies, 5 hours lasting crying of baby was experienced by 4% of parents, while 8 hours occurred in 10%. When it comes to risk factors that had an influence on appearing of intestinal colic, it was proved that 14% were exposed to nicotine in foetal life, 12% while being breast fed, 40% of parents admitted to have nervous atmosphere at home, 16% of mothers did not eliminate out of their diet flatulence causing vegetables, 32% hot spices, 47% fried food, 52% milk products, 60% sour products, and 71% citrus and stone fruit (fig. 3).

Figure 3. Products consumed by the mother during breastfeeding



Among parents who applied diet limitations during breast feeding, 26% claim that it is difficult to say if elimination of products had a positive influence on baby's behaviour, 21% noticed big influence on baby's behaviour, 13% very big, while 26% noticed small influence. Most frequently, in formula feeding, parents used hypoallergic formulas (65%) and cow's milk formulas 35%. Among examined babies formula fed, in only 26% one could notice a positive effect, while the vast majority of parents (74%) did not notice positive changes. As many as 71% of parents used anti colic bottles to feed their babies and their effectiveness was noticed by 45% of parents. Pharmacotherapy was applied in 94% of babies and most frequently: Espumisan (44%), Debridat (27%), Biogaia (27%), Esputicon (23%) and Infacol (23%). In a half of the newborn babies (50%), pharmacotherapy applied was highly effective

in relieving the symptoms of the colic; low effectiveness was noticed by 17% of parents and lack of effectiveness by 17%. In 72% of cases, both of the parents participated in relieving the symptoms of the colic, however, the majority of them (62%) did not notice any influence of such practice. Another method applied by parents was putting a baby in a particular position during feeding. Among 49% of the newborn babies, feeding position had a small influence on reducing symptoms, lack of effectiveness was noticed by 36%, 11% of parents noticed big influence on reducing symptoms, while in 3% of cases feeding position had a very big influence on baby's behaviour. Behavioural methods applied by parents are: carrying the baby until it burps any extra air (78%), belly massage (73%), warm bath (64%), putting the baby down on their belly (36%), turning on the silent and calm music (33%), lulling a baby (31%), and slow feeding (25%). The effectiveness of behavioural methods was admitted by 82% of the surveyed parents.

## **Discussion**

Infantile colic is one of the more frequent complaints that a general practitioner and paediatrician deal with in their work. Infantile colic, according to different authors, appear in 3.3-40% of the new born babies. In England this complaint is defined as "three month's colic" or "evening colic", while among Chinese clinicists as "100 days of crying" [10]. Cry is an important ability for a baby that enables them to communicate with the surrounding world. A baby cries when they are unhappy, when they are cold, hungry or in pain. Intensity of cry and its duration depend on baby's temperament as well as their sensitivity to unpleasant stimuli that cause anxiousness. Brazelton et. al. presented their research on cry, anxiousness in healthy, non-colicky baby aged 1-12 months. According to the research, average time of crying a day in a 2 week's old healthy new born baby is 1.75 hour, in 6 week's old it increases to 2.75 hours, and in 12 week's old it is 1 hour. About sixth week of life, some of the babies may cry due to unknown reason even up to 6 hours a day [11]. A colic attack appears suddenly and very quickly causes energetic, squeaky cry or even scream. These attacks last a few minutes every 2-3 hour and are particularly observed in the evening hours [12]. In their research, Crowcroft and Strachan claim that intestinal colic in babies appears most frequently between 2 and 12 week of life and in the majority of babies in the afternoon and evening hours. However, in 8% of babies colic attacks appeared regardless of the time of the day [13]. In Lamch' research, in more than 97% of babies, symptoms of colic appeared between 1 and 12 week of life. The vast majority of the researched observed the symptoms everyday (59%) or a few times a day (27%). 45% of the surveyed stated that the symptoms lasted more than 4



hours and that they were more intense in the afternoon and evening hours (49%). In the majority of cases, symptoms of colic lasted from 5 to 8 weeks (40%) or from 12 to 24 weeks (34%) [14]. However, according to this research, symptoms of colic in the evening hours appeared in more than half of the examined babies (51%), in 61.8% colic appeared in the second week of their life, in 18.2% in the third week, in 12.7% in the fourth week, while in 7.3% in the first week.

According to the existing research, intestinal colic appears more frequently in the first baby, but also tends to be a “family feature”. About 50% of babies with symptoms of colic have siblings that suffered from the same complaint. It has not been proved that incidence of colic or lack of colic in newborn babies depends on baby’s sex. Symptoms of colic may be much more frequently observed in premature babies and babies with low birth weight (<2500g). It has also been noticed that more frequently the symptoms of colic appear in babies of mothers aged 30-34 and more responsible mothers. Colic is also typical of babies from families with higher economic status and from so called white-collar families [10]. According to this research, most frequently (58%) intestinal colic appeared in babies of mothers aged 30-34 and in marriages with one (46%) and two children (53%), which proves other results.

Despite many researches and studies on intestinal colic, one specified etiopathogenetic factor has not been discovered yet. At present, the following theories are taken into consideration: psychological, gastroenterological, allergological, and neurological. Neurological theory explains appearance of intestinal colic attacks by immature nervous system of a baby and oversensitivity to external and internal stimuli. Functioning of brain-intestine axis is disrupted, which results in excessive reaction of sensory nerves and subliminal response to pain. According to the research conducted, malfunction concerns both central and autonomic nervous system. This leads to uncoordinated functioning of gastrointestinal sphincter [20]. Researchers examined also the influence of passive smoking on more frequent incidence of intestinal colic. It has been proved that milk of a mother exposed to a cigarette smoke contains metabolites of nicotine. Said et al. proved that the concentration of components of cigarette smoke in mother’s breast milk was three times higher than in her serum. Nicotine may have a negative impact on alimentary canal’s motor activity and may intensify symptoms of the colic [21]. In psychological theory, the attention is given mostly to psychological relationship between parents and baby. Babies can feel parents’ emotional state and parents’ behaviour has an influence on babies’ emotional state. Parents’ negative emotions lead to increased anxiousness in baby that is shown by intensified screaming. Carey observed intestinal colic more frequently in those babies, whose mothers immediately after labour suffered from

anxiety state. Another significant aspect is mother's postpartum depression, as well as meaning of both mother's and baby's temperament. According to Carey, least frequently (in only 3% of cases) colic attacks appeared in babies from little caring families. Much more frequently (in 27% of cases) colic appeared in those babies, whose parents feared for them; additionally, when mothers were over-caring, the number of suffering babies increased up to 60% [10,22]. Gastroenterological theory concentrates on stomach-intestine disorders as well as disorders of secretion of intestinal hormones. In stomach-intestine disorders, the most important role plays immature intestinal barrier. In neonatal and early infancy period, system of intestinal digestive enzymes is not yet fully developed. Temporary shortage of IgA, caused by delayed maturation of its production may be a factor leading to temporary food protein intolerance [10].

In allergological theory, the following factors play the main role: allergy and cow's milk intolerance, allergy and soy protein intolerance as well as allergy and hypersensitivity to other products consumed by mother. In 25% of babies with moderate or severe form of intestinal colic one may also observe cow's milk protein allergy. This seems to correlate with the total level of IgE and/ or IgE specific to cow's milk proteins in blood serum. In breast fed babies, the most frequently detected allergens were food allergens such as: eggs, wheat, soya, cod, maize, tomatoes, beef, caffeine, chocolate, spices, nuts [10]. Among other possible causes of intestinal colic, one may indicate incorrect feeding technique and swallowing air while crying. Results of the research conducted proved a relation between components of mother's diet in the period of breast feeding and severity of symptoms in baby. It has been proved that consumption of flatulence causing vegetables and fruit, caffeine, hot spices and chocolate has an influence on severity of symptoms of intestinal colic. Usually after 48-72 hours from elimination of these products out of the mother's diet, one may observe improvement in baby's condition. It is also suggested that there's relation between fits of crying and incorrect baby care and excessive parents' anxiety [4]. Colic attack follows a characteristic pattern; it starts with baby's anxiety that very quickly leads to crying impossible to calm down. During a colic attack, a baby usually clenches their eyes and fists, tightens up, bends their lower limbs in knees and hips joints, then straightens them rapidly that may lead even to stiffness of limbs. Skin on baby's face and neck is flushed, while grey colour may appear around lips and nose. Baby's belly is bloated and tightened due to excessive amount of gases. As a result of greedy, intensive sucking, the stomach capacity is increased, peristalsis is accelerated, which stimulates anxiety in baby and parents. During colic attacks, frequent in babies are gas passing and excreting green, mucous stools. Gas passing and sucking milk gives a baby short-

term relief. Baby exhausted after colic attack calms down and falls asleep but frequently has light sleep. Another symptoms are spitting up, even vomiting, difficulties with defecation, constipations. A baby that suffers from a colic frequently refuses to eat and even to drink. Depending on the severity of the symptoms, one may enumerate three forms of colic: mild, moderate, and severe. Symptoms associated with colic usually disappear spontaneously in 3-4 month of life, however, they may continue up to 9 month of life [6,12]. According to the research conducted, most frequently indicated symptoms are as follows: loud cry (100%), bloated belly (89.1%), tucking legs up (61.8%), constipation (23.6%), flushing (21.8%) and frequent gas passing (9.1%). In Lamch' research (Wrocław 2012), most intense symptoms are: cry (87%), flexing body's muscles (81%), bloated and tightened belly (63%), tucking legs and arms up (57%), grizzling, irritation (42%), gases (41%). Among least frequent and mild symptoms respondents enumerated diarrhoea (63%) and constipations (26%) [14]. Intestinal colic in babies is diagnosed with Wessell's rule of three as well as thanks to parents' and doctor's observations. Parents who are concerned about excessive crying of their baby should try to find the answer if the symptoms are not a result of another disease. It is also essential to see a doctor who after examination of the baby, after taking a medical history from parents and assessment of current baby's development, may exclude other more serious causes of pain such as intussusceptions, incarcerated hernia, intestinal obstruction, urinary tract infection, peritonitis, and middle ear infection. In case of doubt, there are performed laboratory tests and abdominal ultrasonography that make it possible to exclude other diseases. It should also be noted that persistence of symptoms after the typical period of colic in babies may be an indication for testing for cow's milk protein allergy. It is also important to be aware that after introduction of gluten to the baby's diet, there may appear symptoms similar to colic [6,12,15-19]. Treatment of a baby suffering from intestinal colic has to be established individually; additionally, it should have multidirectional effect and depend on the severity of the symptoms [4]. One of the therapies applied in alimentotherapy is herbal medicine ("herbalism"), applied both by the mother and a baby. The following herbs may be used in treatment: anise, fennel, and lemon balm. They have relaxant, anti-flatulence, and carminative effect thanks to which a baby may pass bigger quantity of gases which may cause colic. Mother's diet also has a significant influence on pain and discomfort in babies, especially when the baby is breast fed. In such case, mothers should eliminate out of their diet products containing cow's milk proteins, hot spices, flatulence causing vegetables, nuts, chocolate, eggs, citrus fruit, caffeine, and alcohol. If elimination of the above products brings positive results, mother should continue to follow the diet and remember to keep the adequate

caloric value (feeding women: 2,600kcal a day). Sometimes, it is possible to relieve symptoms of colic in babies with lactose intolerance by expressing a few first portions of milk that is rich in lactose before feeding. However, women should not totally stop breast feeding, since it may have a negative influence of relation between mother and baby. If a formula fed baby suffers from constipations, it is necessary to check if the formula is not too thick; babies both formula and breast fed should have in their diet juice or a grated apple, while babies older than 6 weeks may be given a vegetable stock. In alimentotherapy one may use whey hydrolysates with extensively hydrolysed proteins. According to the conducted research, use of whey hydrolysates shortens the time of crying in infantile colic. In the same research effectiveness of casein hydrolysates with extensively hydrolysed proteins was determined. There were tested soya preparations as well as lactose poor formulas. According to the American Academy of Pediatrics, using such products in infantile colic is unjustified. Another tested products were herbal teas, which are probably effective, but have a negative influence on baby's growth, since longer usage of them may decrease the amount of consumed milk formula. When it comes to 12% sucrose solution, its effectiveness is difficult to assess [23]. Pharmacotherapy applied during intestinal colic in babies is very controversial and potentially dangerous due to numerous causes that may stimulate colic. That is why, according to many experts, pharmacological substances should not be used. However, many families use those with relaxant and anti-flatulence effect. There were many tests on effectiveness of pharmacological substances. There were tested anticholinergic drugs, which were effective, however 5% of babies experienced adverse drug reaction. The second tested substance was simethicone, which was proved to be ineffective. The next test was aimed at comparison of effectiveness of *Lactobacillus reuteri* and simethicone in infantile colic treatment. The test was conducted at the paediatrician department of children's hospital in Italy. According to the test, oral application of *Lactobacillus reuteri* was safe and shortened the persistence of colic in comparison to simethicone. Despite all of the pharmaceutical substances above, one may also apply homeopathy, for example: Chamomilla, drops, Belladonna and Nicotiana suppositories. It is recommended to apply only two substances that, according to parents, had a positive influence on their baby's behaviour [22,23]. According to this research, the pharmacotherapy applied was very effective in relieving the symptoms of colic in half of the babies (50%), in 49% of newborn babies feeding position had a small influence on reducing symptoms, while the most effective were behavioural methods (82%).

Specialist literature provides numerous information not only on epidemiology or treatment of intestinal colic but also on its influence on baby's development. The research of Castro-

Rodriguez et al. did not confirm the hypothesis that intestinal colic is related to development of asthma and other atopic diseases in later life. However, children aged 3-4 years that suffered from intestinal colic in their early infancy may be more emotional, lively, may suffer from sleeping disorders. One may also observe that they have a more negative attitude towards eating. Such children more frequently suffer from stomachache and find it difficult to fall asleep. Parents of such children are usually over-caring, which may have a negative influence on child's further development [22,23]. Taking into account the data above as well as the fact that colic attacks are associated with pain and stress for the baby, which may disturb external integration process, it is necessary to take all actions possible to prevent and treat colic.

### **Conclusions**

1. Intestinal colic was slightly more frequent among breast fed babies.
2. The most frequent source of information on intestinal colic in babies was Internet.
3. Pharmacotherapy applied was less effective in combating colic than behavioural methods.
4. Behavioural methods most frequently applied by parents and most effective are: carrying the baby after feed, belly massage and warm bath.
5. Following an elimination diet by breast feeding mothers has been proved to be little effective method.

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