Intensification of anxiety, symptoms of depression, and level of social support among women in pathological pregnancy – a cross-sectional preliminary study

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▌ Abstract

Introduction and Objective. Women in pathological pregnancy are a group of patients especially exposed to the risk of occurrence of psychological complications. The aim of the study was assessment of the risk of depressive and anxiety disorders, and the relationship between the intensity of symptoms and social support.
Materials and Method. The study group were 300 patients hospitalized in the Department of Pathology of Pregnancy. The study was conducted using the State-Trait Anxiety Inventory (STAI), the Hospital Anxiety and Depression Scale (HADS), the Inventory of Socially Supportive Behaviours (ISSB), and an author-constructed socio-demographic questionnaire.
Results. The level of State Anxiety (STAI) was higher in respondents from the study group, compared to the control group. The level of anxiety (HADS-A) was higher in the control group than in women from the study group. The level of social informational support was higher in those from the control group, compared to those from the study group. The level of emotional support was lower in respondents from the study group, compared to those from the control group. Instrumental support negatively correlated with the symptoms of depression among women in physiological pregnancy. The lack of evaluative support statistically significantly correlated with anxiety among women hospitalized before labour.
Conclusions. The results obtained suggest the necessity for the substantive preparation of medical and psychological staff employed in departments of pathology of pregnancy to provide proper emotional and informational support for hospitalized women.

▌ Key words

social support, depressive disorders, anxiety disorders, pregnancy complications

INTRODUCTION

Pregnancy is the period of many biological, psychological, and social changes [1, 2] and is one of the most crucial and difficult in the personal and family life of a woman. This is not only a period of joyful anticipation for the birth of a baby, but also a time of growing stress and anxiety related with childbirth, and later challenges related with maternity [3]. This situation may exceed the adaptive abilities of the body of a pregnant woman, leading to psychiatric complications. The above-mentioned symptoms occur also in physiological pregnancy; however, in the case of the occurrence of pregnancy complications they are amplified, often leading to chronic stress and long-term complications, such as behavioural and depressive disorders [4, 5].

Pathological pregnancy is defined as pregnancy in which there is threat to the life or health of the mother or the foetus. The German Society of Perinatal Medicine provides

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14 basic types of threats related with pregnancy: gestational hypertension, gestational diabetes, threatened miscarriage, threatened pre-term labour, post-term pregnancy, previous obstetric failures, advanced maternal age, haemolytic disease of the foetus, intrauterine growth restriction, abnormal position of the foetus, ischemia and organ diseases in a pregnant woman (cardiovascular, respiratory, and metabolic system diseases), overweight in pregnancy, as well as infectious diseases, e.g. syphilis, tuberculosis, toxoplasmosis, viral diseases or AIDS [6].

In the situation of pregnancy it is impossible to differentiate between physiological and pathological stress, because there is a feedback between physiological changes taking place in the body of a woman and the corresponding emotional changes [7, 8]. This relationship becomes more visible in the situation of pathological pregnancy, because somatic threat to pregnancy causes psychological changes. These changes are associated with the occurrence of such emotions as fear, anxiety and the sense of threat which, while exerting an effect on hormonal balance, may negatively affect pregnancy [9].

Anxiety is an emotional state close to fear, occurring without a clear threat or cause [10]. It is one of the core symptoms of neuroses, and its sources lie mainly in neurotic inner conflicts, when an individual is in unstable, incomprehensible situations facing conflicting requirements. Anxiety may be of a chronic character (state of anxiety), or short-term (anxiety attack), and is accompanied by psychosomatic disorders, negative mood, various concerns, deterioration of intellectual functions, and decreased resistance to stress [11]. Based on a study by Cattel and Scheier, Spielberger introduced a division of anxiety into State Anxiety and Trait Anxiety. He differentiated between anxiety understood as transitory and the situationally conditioned state of an individual, and anxiety as a relatively stable personality trait. Anxiety is understood as a state is a categorial concept, and in this form is traditionally considered in psychopathology and handled in psychiatric classifications [12, 13]. According to Spielberger, the State of Anxiety is characterized by '*subjective, consciously perceived feelings of apprehension and tension, accompanied by or associated with activation or arousal of the autonomic nervous system*'. Based on the adopted theoretical model, Spielberger et al. constructed a questionnaire for the measurement of anxiety – the State-Trait Anxiety Inventory (STAI) [11]. Typical of anxiety as a state is its high variability under the influence of threatening and stressful factors. Such factors may be pregnancy, labour, or a new role in a family and society. Anxiety as a trait is defined as a '*a motive or acquired behavioural disposition which makes an individual susceptible to perceive a wide range of objectively harmless situations as dangerous and react to them with anxiety states which are inadequately severe to the extent of objective danger*'. In the case of anxiety as a trait, it is said to be a constant feeling of tension and threat, experiencing the feeling of embarrassment and inferiority in relations with others, and certain limitations in the mode of life resulting from an excessive need for safety [14].

Depression is the most common psychological disorder considered as a civilisation disease [15]. Nearly 25% of females at reproductive age suffer from affective disorders, and pregnancy and labour are among main factors favouring the occurrence of depression [16]. The prevalence of antenatal depression ranges from 15–65% [17], and an increase in the awareness in society and advance in diagnostics contributed to it being more frequently diagnosed [18]. Depression occurring in pregnancy exerts a great effect on the functioning and further development of the foetus [19]. A high cortisol level resulting from stress in the mother directly affects the development of the brain of the baby. Considering the time of brain development, this effect is the strongest at the beginning of pregnancy, and may be the cause of speech disorders and cognitive disorders in the child at older age [5, 20, 21]. Scientific studies have also shown that depression in the mother and anxiety disorders during pregnancy may be hereditary, and cause depressive and anxiety disorders in a newborn. Epigenetic studies demonstrate that a newborn not only inherits the mother's genes, but also a part of the history of her life [22, 23].

Mood swings during pregnancy may occur more often in women at advanced age, as well as those burdened with an obstetric history, such as pre-term delivery, infertility treatment, or illness of the previous child [24, 25]. Risk factors include also social factors, such as financial difficulties or raising a child alone [26]. Characteristic of depression occurring in the perinatal period is the presence of the scope of problems related with pregnancy and baby in psychopathological symptoms. Anxiety disorders associated primarily with concern about threat to pregnancy and the state of health of the baby, are equally frequent in this group of women [27].

In recent years, much attention has been devoted to the scope of problems concerning differentiation between anxiety and depression. In both classification systems, DSM-V and ICD-10 depression and anxiety disorders are considered as separate classes of psychological disorders, which meet specified diagnostic requirements. However, the demarcation of the classification between states of anxiety and depression is not obvious [28]. The diagnostics of anxiety and depression overlap with respect to the information provided by patients, clinical assessments and diagnostic criteria, as well as family and genetic factors [29]. Respondents who in self-report questionnaires demonstrate a high level of anxiety, also have high indicators in the scales of self-reported symptoms of depression. In a study by Kessler, psychological disorders occurred in more than a half of patients, and three or more disorders were diagnosed simultaneously. In approximately 95% of patients suffering from depression there occurred at least one of the symptoms of anxiety disorders, whereas in 20–65% of patients with the diagnosis of anxiety disorders, the symptoms of depression were additionally diagnosed [30].

The scope of problems concerning social support covers all stages of human life, in difficult as well as everyday situations requiring support of a third party. It usually appears in psychologically new situations, which clearly differ from those in which an individual has pursued own goals to-date, when the mobilisation of personal resources is insufficient and ineffective [31, 32]. Most popular definitions of social support have been shaped within the issues of concerning coping in stressful situations [31]. Depending on the nature of the content of social exchanges, various types of support may be distinguished, such as emotional, informational, instrumental, and evaluative.

Emotional support is the most common type and consists in conveying, in the course of interaction, emotions which are supportive, soothing, reflecting concern, and showing a positive attitude towards the supported person. Supportive behaviours are also aimed at the creation of

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a sense of belonging, care and increased self-esteem. In this way, persons who suffer and experience a crisis may free themselves from own tensions and negative feelings, may express their concerns and sadness [32]. Informational support, also called cognitive support, is an exchange of information which favours a better understanding of the situation, life situation, as well as the problem and its causes. This also includes the provision of informative feedback concerning the effectiveness of undertaking various remedial actions by the supported person [32].

Instrumental support is the provision of information about a particular course of action, and may also be the form of modelling effective remedial actions. This activity may take the form of an exchange of modes of conduct, obtaining information and material goods [32]. In turn, evaluative support consists in showing acceptance, appreciation, and confirmation of the value and importance of a given person.

The support offered and received as a result of social interactions, both direct and indirect, is not always in line with the expectations of the person in need. The greatest priority is always assigned to the family which, as a primary group being the source of strong emotional and social bonds, increases the effectiveness of the provided support. Natural, unselfish family relationships may create bonds with a strong emotional load [33]. The greatest support is usually provided by the father of the child, during pregnancy, postpartum period, and in the first moths of a child's life [34–36].

Patients in pathological pregnancy are a group of women especially exposed to psychological complications, and require the greatest support during this sensitive period. Considering many depressive and anxiety disorders observed in patients with pathological pregnancy, it was decided to investigate the frequency of their occurrence, and evaluate the relationships between the intensity of symptoms of depression and anxiety, and the required social support.

MATERIALS AND METHOD

Materials. The study included 300 women in the second and third trimesters of pregnancy -200 in the study group, and 100 in the control group. The study group were women hospitalized in the Department of Pathology of Pregnancy, at the Żelazna Medical Centre, St. Sophia's Specialist Hospital in Warsaw, Poland. The control group were women in physiological pregnancy who did not require earlier hospitalization. Inclusion criteria for study group:
1) consent to participate in the study;
2) women at the 3rd trimester of pregnancy;
3) women with diagnosed high risk pregnancy;
4) no psychiatric diseases.

Inclusion criteria for the control group:
1) consent to participate in the study;
2) women in the 3rd trimester of pregnancy
3) women without diagnosed pathology of mother or foetus;
4) no psychiatric diseases.

Exclusion criteria for study and control group:
1) no consent to participate in the study;
2) women in the 1st and 2nd trimesters of pregnancy;
3) women treated for psychiatric diseases.

Methods. The study was conducted from 1 March – 31 May, 2022, in accordance with the Declaration of Helsinki, and approved by the Institutional Bioethics Committee at the Medical University in Lublin, Poland (Approval No. KE-0254/351/2018).

The study group were women hospitalized in the Department of Pathology of Pregnancy. After being given oral instructions and providing written consent to participate in the study, the patients were asked to complete questionnaires while staying in their hospital rooms in the department. 345 sets of questionnaires were distributed, of which 300 questionnaires were correctly completed and returned.

Questionnaire. The study was conducted using the State-Trait Anxiety Inventory (STAI), the Hospital Anxiety and Depression Scale (HADS), the Inventory of Socially Supportive Behaviours (ISSB), and an author-constructed socio-demographic questionnaire.

State-Trait Anxiety Inventory (STAI). This is an adaptation of the American questionnaire State-Trait Anxiety Inventory (STAI) designed in 1970 by Spilberger, Goursach and Luschene [11], with a Polish version by Spilberger, Strelau, Tysarczyk and Wrześniewski (1987). The construction of the Inventory is based on the differentiation between anxiety understood asa transient and situationally conditioned state of an individual (State Anxiety), and anxiety understood as a relatively constant personality trait (Trait Anxiety). The questionnaire consists of two subscales: subscale X-1 for investigating State Anxiety, and subscale X-2 to examine Trait Anxiety. Raw results of both subscales may remain within the range from 20 scores (low anxiety) to 80 scores (high anxiety). The obtained results may be compared after converting raw results into stens [37]. Cronbach alpha coefficient for internal consistency for results of the STAI obtained by adult women aged 21–40 for State Anxiety is 0.89, and for Trait Anxiety – 0.85 [37].

Hospital Anxiety and Depression Scale (HADS). The scale consists of two independent subscales measuring the levels of anxiety and depression. Each of these subscales contains seven statements concerning the current state of the respondent. In the HADS, any questions which could raise such doubts as e.g. headaches, dizziness, loss of appetite, or sleep disorders, were excluded. Thus, the scale is appropriate for application to pregnant women, and may even have an advantage over other research tools which may overstate the frequency of anxiety and depression due to many somatic symptoms occurring relatively often during physiological pregnancy. The intensity of specified characteristics is assessed by the patient according to a four-point scale. Obtaining 0–7 scores in each subscale is considered normal, 8–10 scores as mild, 11–14 scores – as moderate, while 15–21 scores – as a severe disorder [38]. Cronbach's alpha for HADS-A (Anxiety) varies from 0.68 – 0.93 (mean 0.83) and for HADS-D (Depression) 0.67 – 0.90 (mean 0.82) [39].

Inventory of Socially Supportive Behaviours (ISSB). The Inventory by M. Barrera, Polish adaptation by H. Sęk consists of 40 items, referring to e events which occurred within the last month [40]. The questionnaire determined subjective perception of four 4 types of special support: instrumental, informational, emotional, and evaluative. The task of the

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Table 1. Basic descriptive statistics of the measured quantitative variables, together with the Kolmogorov Smirnov test

	M	Me	SD	Sk.	Kurt.	Min.	Max.	K-S	p
State Anxiety (STAI)	40.22	39.00	11.65	0.50	0.32	20.01	72.00	0.07	0.200
Trait Anxiety (STAI)	38.95	38.50	8.73	0.37	−0.44	23.00	59.00	0.10	0.200
Anxiety (HADS-A)	18.14	18.00	2.34	0.18	−0.27	13.00	24.00	0.14	**0.005**
Depression (HADS-D)	11.96	12.00	1.91	0.98	1.08	9.00	18.00	0.19	**< 0.001**
Instrumental support (ISSB)	49.34	51.51	10.64	-0.78	0.40	16.00	65.00	0.10	0.200
Informational support (ISSB)	35.83	36.00	13.76	0.02	−1.03	12.00	59.00	0.07	0.200
Emotional support (ISSB)	20.95	21.00	8.19	0.56	0.33	9.00	44.00	0.07	0.200
Evaluative support (ISSB)	13.46	13.00	5.53	0.27	−0.74	5.00	25.00	0.08	0.200

M – mean; Me – median; SD – standard deviation; Sk. – skewness; Kurt. – kurtosis; K-S – result of Kolmogorov Smirnov test; p – significance

examined women was to indicate the scale the frequency of phenomenon occurring in the question, according to a five-point Likert scale: 5 scores – nearly every day, 4 scores – several times a week, 3 scores – once a week, 2 sores – once or twice, 1 score – never.

Statistics. Statistical analyses were performed using software IBM SPSS Statistics 24 (TIBCO Software Inc., 2021). Descriptive statistics were calculated and compliance with the normal distribution assessed by means of Kolmogorov Smirnov test (K-S), the number of correlations determined based on the Pearson correlation coefficient (r), and t-Student test performed for two independent groups. The p values p ≤ 0.05 were considered statistically significant.

Analysis of basic descriptive statistics and Kolmogorov Smirnov test (K-S) showed that for two distributions, the result of the K-S test was statistically significant, which means that these distributions significantly differed from the normal distribution. However, the absolute values of skewness for these variables were lower than one, thus the distributions were symmetrical and may be approached as approximately normal. On this basis, it was decided to use parametric tests for all variables. Table 1 presents cumulative results of all calculated descriptive statistics, together with the results of tests for normality of distribution.

In order to compare the intensity of anxiety in the study group and the control group, three t-Student tests were performed for independent variables.

RESULTS

Characteristics of the examined groups. The study group consisted of 200 patients in pathological pregnancy, hospitalized in the Department of Pathology of Pregnancy at the Żelazna Medical Centre, St. Sophia's Specialist Hospital in Warsaw, aged 26–42; mean age 32 (SD=3.87). The majority of women in the study had higher education (83%), were married (84%), and lived in cities with the population over 250,000 (43%). Only one person was unemployed (Tab. 2). The causes of hospitalization were: symptoms of threatened pre-term labour (27%), intrahepatic cholestasis of pregnancy (17%), oligohydramnion (10%), cervical incompetence (10%), placenta praevia (10%), intrauterine growth restriction (7%), gestational diabetes (7%), and arterial hypertension (3%). The remaining 9% of women were hospitalized due to causes other than those mentioned in the questionnaire.

The control group were 100 women in physiological pregnancy not requiring earlier hospitalization; mean age 32

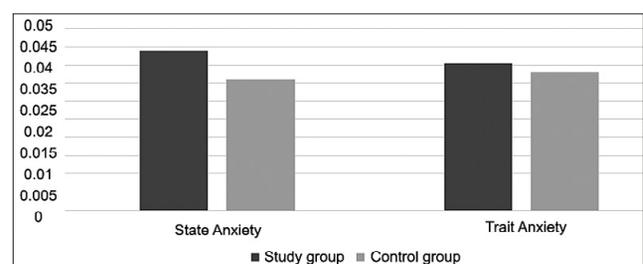**Table 2.** Respondents' socio-demographic data

Trait	Study group (n=200)	Control group (n=100)
Mean age	M=32 (SD=3.88)	M=32 (SD=0.18)
Education		
Higher, Master's degree	83%	97%
Secondary school	17%	3%
Place of residence		
rural	17%	0%
town with population below 50,000	20%	7%
town with population of 50,000–100,000	10%	7%
city with population of 100,000–250,000	10%	7%
city with population over 250,000	43%	79%
Marital status		
never-married	13%	20%
married	84%	87%
divorced	3%	3%
Occupational activity		
occupationally active	97%	90%
unemployed	3%	10%

n – number of respondents; M – mean; SD – standard deviation

(SD=0.18). Similar to the study group, only one woman had a population over 250,000. Unemployed persons constituted 10% of the women (Tab. 2).

Intensity of anxiety in the study and control groups. Results of the test $t(58)=−3.08$; $p=0.003$; $d=−0.796$) for State Anxiety (STAI) suggest that the compared mean values did not differ statistically, and the strength of the effect may be described as moderately strong. As expected, the level of Trait Anxiety (STAI) was higher in patients from the study group ($M=44.57$; $SD=11.28$) than in the control group ($M=35.90$; $SD=10.49$) (Fig. 1). In addition, the results of the test $t(58)=−1.14$; $p=0.259$ for Trait Anxiety (STAI, suggest that the compared mean values did not significantly differ statistically. In turn, the results of the test $t(58)=3.07$; $p=0.003$;


Figure 1. Mean results of State-Trait Anxiety (STAI) in women from the study and control groups

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d=0.792 for anxiety (HADS-A, suggest that the compared mean values significantly differed, and the strength of the effect may be described as moderately strong. Contrary to expectations, the level of anxiety (HADS-A) was higher in women from the control group (M=19.00; SD=2.46) than those in the study group (M=17.26; SD=1.87).

Intensity of symptoms of depression in women from the study and control groups. The results of t-Student test for the intensity of the symptoms of depression $t(58)=-0.537$; p=0.594 suggest that the mean values in both groups did not significantly differ statistically.

Informational social support among women from the study group and control groups. Results of the test $t(58)=2.64$; p=0.011; d=0.681 for the level of informational social support, suggest that the mean values did not significantly differ, and the strength of the effect may be described as moderately strong. Contrary to expectations, the level of informational social support was higher in women from the control group (M=40.30; SD=12.82) than those in the study group (M=31.37; SD=13.39) (Fig. 2).

Emotional social support in women from the study and control groups. The results of the test t(58)=2.63; p=0.011; d=0.679 for the level of emotional support demonstrated significant differences between mean values, and the strength of the effect may be described as moderately strong. The level of emotional support was lower in women from the study group (M=18.30; SD=7.91), compared to the control group (M=23.60; SD=7.70) (Fig. 2).
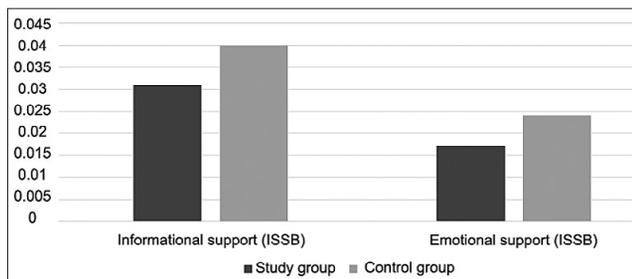
Figure 2. Mean results of informational and emotional support (ISSB) in women from the study group and the control group

Relationship between anxiety and social support. A significant, negative and moderately strong relationship was observed between anxiety (HADS-A) and evaluative support (ISSB). The higher the anxiety showed by patients, the lower the evaluative support that occurred in the study group. No significant correlations were found between State Anxiety (STAI) and Trait Anxiety (STAI), and between anxiety (HADS-A) and the dimensions of social support in the study group (Tab. 3). Similarly, no significant relationships were noted between State Anxiety (STAI) and Trait Anxiety (STAI), and between anxiety (HADS-A) and the dimensions of social support in the control group.

Relationship between depression and social support. No significant correlations were found between depression (HADS-D) and the dimensions of social support in the study group. In turn, in the control group a significant, negative, and moderately strong relationship was observed between

Table 3. Correlations between anxiety and social support in the study group

		Instrumental support (ISSB)	Informational support (ISSB)	Emotional support (ISSB)	Evaluative support (ISSB)
State Anxiety (STAI)	Pearson's r	0.10	0.20	0.07	0.23
	p	0.591	0.292	0.716	0.222
Trait Anxiety (STAI)	Pearson's r	0.07	0.33	0.18	0.34
	p	0.730	0.071	0.331	0.070
Anxiety (HADS)	Pearson's r	−0.28	−0.25	0.03	**−0.37**
	p	0.132	0.180	0.887	**0.046**

p – significance; *HADS* – Hospital Anxiety and Depression Scale; *STAI* – The State-Trait Anxiety Inventory; *ISSB* – The Inventory of Socially Supportive Behaviours

depression (HADS-D) and instrumental support (ISSB). This means that the higher the level of the symptoms of depression, the lower the level of instrumental support. No further significant correlations were noted (Tab. 4).

Table 4. Correlations between depression and social support in the control group

		Instrumental support (ISSB)	Informational support (ISSB)	Emotional support (ISSB)	Evaluative support (ISSB)
Depression (HADS – D)	Pearson's r	**−0.39**	−0.22	−0.07	−0.06
	p	**0.031**	0.234	0.722	0.748

p – significance

DISCUSSION

In the presented study, women in physiological pregnancy obtained higher informational and emotional support, compared to those in pathological pregnancy. Perception of State Anxiety by women in pathological pregnancy was higher than pregnant women not requiring hospitalization. Neither group significantly differed according to the level of the experienced symptoms of depression. Instrumental support negatively correlated with the symptoms of depression in women in physiological pregnancy. Statistically significant corelations were found between evaluative support and anxiety among women hospitalized before labour. No significant correlations were observed between particular dimensions of social support, apart from evaluative support, and intensification of anxiety in women from both examined groups. Also, no significant correlations were noted between social support and the symptoms of depression, apart from the correlation between instrumental support and depression.

A study conducted among pregnant women in Australia showed a low level of social support in 7.1% of the women, and symptoms of anxiety in 2.5% of the women [41]. A study carried out in a group of women aged 18–40 with the diagnosis of endangered pregnancy showed low mood and a greater tendency towards anger and grief in this group [42]. In addition, a higher intensity of State Anxiety was observed. The assumption of this hypothesis probably resulted from higher anxiety related with the necessity for hospitalization before labour, and the potential threat to the health of the mother or foetus. In turn, in a study conducted among women in whom pregnancy was terminated by Caesarean section no significant differences were observed in the

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intensity of anxiety, compared to women who had vaginal delivery [43]. While comparing the intensity of Trait Anxiety, in both groups no statistically significant differences were found between women in pathological and physiological pregnancy.

Studies assessing the relationships between anxiety and depression, and social support are scarce [41, 44, 45, 46]. Bedaso et al. demonstrated that a low level of social support is associated with more frequent occurrence of depression and anxiety among pregnant women [41]. Similarly, a study carried out by Morikawa et al. showed a relationship between the risk of depression in pregnancy and after delivery, and low social support [47]. A study assessing the level of anxiety in pregnant women in Poland in the context of biological, medical, and socio-environmental conditioning, confirmed a statistically significant relationship between the level of anxiety and family support received [48]. The women who received support from their family showed a lower level of anxiety, whereas those who had less family support were characterized by higher State Anxiety.

In the presented study the level of emotional support was lower in the group of hospitalized pregnant women than those in physiological pregnancy. This probably resulted from the fact that women who did not have to stay in hospital have an easier access to their significant others who are a natural group of support. Due to personnel constraints and lack of emotional bonds, medical staff are not able to provide the proper emotional support to patients hospitalized in the ward. A Prospective Cohort Study of Mothers in Northern Jordan demonstrated that providing pregnant women with high levels of emotional support from close social networks ($\beta=-0.08$, p=0.01) had a protective character and reduced postpartum anxiety [49].

In the study group in the current study, no significant correlations were observed between depression, and particular dimensions of social support. Thus, it may be presumed that the lack of statistically significant correlations in the group of women in pathological pregnancy may result from the fact that hospitalized patients felt safer when being aware of the possibility to receive immediate assistance in the Department of Pathology of Pregnancy. In the situation of endangered pregnancy, the possibility to obtain social support from partners was not so important. Possibly, the lack of statistically significant differences resulted also from the small size of the sample.

Instrumental support may exert a positive effect on the reduction of perception of depressive symptoms in women in physiological pregnancy. In the control group, depression negatively correlated with instrumental social support. This relationship may result from the specificity of the study group in which the majority of women attended birthing schools where they were given instructions concerning perinatal procedures. In the presented study, as well as in a study conducted in a group of patients at advanced age, a statistically significant correlation with support was observed. Evaluative support may result in the reduction of the feeling of anxiety in women hospitalized before labour. In the presented study, statistically significant negative and moderately strong correlations were found between anxiety measured using the HADS questionnaire, and evaluative support in the group of women in pathological pregnancy. Thus, it may be assumed that lower evaluative support results in the occurrence of higher anxiety in pregnant women.

With respect to informational support, the compared mean values differed statistically; however, the results of the conducted study were contrary to expectations. Women in physiological pregnancy obtained a higher mean value of informational social support than those hospitalized in the Department of Pathology of Pregnancy. There is a lack of Polish studies concerning social support in pregnant women; nevertheless, the results obtained may be related with the specificity of the control group to which belonged women who attended birthing classes, during which they had a better possibility to exchange experiences with a larger group of pregnant women in more comfortable conditions than women who stayed in two or three bedrooms in a hospital ward. It is possible that the lower informational support declared by hospitalized women was also due to the feeling of being lost, resulting from concerns about the future of their pregnancy, and the lack of information regarding the final outcome. A study by Kamali et al. indicated that the main information anticipated by pregnant women concerns care of the foetus (86%), physical and psychological complications after delivery (83%), development and growth of the foetus (82.5%), and nutrition in pregnancy (82%) [50]. Each illness is a dynamic situation which may quickly change, and may not end successfully. A study carried out among pregnant women in Jordan confirmed the protective effect of informational support on the level of postpartum anxiety [49].

Researches confirm that each type of support exerts a positive effect on the wellbeing of expectant mothers. Abdi et al. demonstrated that even neighbourhood support contributes to the reduction of stress related with pregnancy, starting from the symptoms connected with pregnancy and culminating in the state of the newborn [51].

Today, the number of patients with depression is dramatically increasing worldwide, which is associated with changes in living conditions, which include the depressions that developed after SARS-CoV-2 infection and contracting Covid-19 [52]. Therefore, it is worth mentioning that the study was conducted at the time of the pandemic; hence, some pregnant women may have experienced SARS-CoV-2 infection and contracted COVID-19 or NeuroCOVID-19, which can have both short-term and long-term sequelae [53–56]. During the COVID–19 period, the main priority in perinatal care became the health safety of women and children. Hospitals introduced a number of bans that limited the possibility to visit, or giving birth in the presence of a close person. Some women also experienced limitations to benefits during pregnancy, e.g. suspension of classes in childbirth schools, cancellation of a planned prenatal visit, or difficulty in contacting a medical facility. To a great extent, the rules introduced limited the possibility of providing support, thus increasing anxiety among birthing mothers.

A cross–sectional study by Ayaz et al. conducted on the same group of pregnant women before and during the coronavirus pandemic, found that the outbreak of the pandemic increased levels of anxiety and increased symptoms of depression. The mean total Inventory of Depression and Anxiety Symptoms–II (IDAS II) score was found to increase from 184.78 (SD=49.67) to 202.57 (SD=52.90) before and during the COVID–19 pandemic. Meta–analyses also indicated an increase in the incidence of anxiety and depression among pregnant women during the SARS–CoV–2 pandemic. Variables, such as lower level of education, lack of steady work, financial difficulties,

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and insufficient social support have been identified as the most important risk factors for depressive symptoms during pregnancy throughout the COVID–19 pandemic [57, 58, 59].

Several studies indicate that women with pathological pregnancies represent a higher level of anxiety compared to women with normal pregnancies. However, there is limited data in the literature on the impact of the coronavirus pandemic on pathological pregnancies. One of the few studies on the subject was a cross–sectional study by Smorti et al. on an Italian population. The study analyzed the impact of the COVID–19 pandemic – before and during the pandemic – and the obstetric status (low–risk/high–risk pregnancy) on depressive symptoms in women. The authors obtained results confirming that in the period before coronavirus, high–risk pregnant women obtained a higher score for depressive symptoms than women in normal pregnancy. During the COVID–19 pandemic, neither group differed significantly in depressive symptoms on the Edinburgh Postnatal Depression Scale (EPDS). Scores were close to the cut–off point in both groups. Therefore, it seems that restrictions related to coronavirus had a greater negative impact on women with normal pregnancy than on those with pathological pregnancies. The authors suggest that stressors related to their own medical problems as reported by high–risk pregnant women were prioritized over stress related to the pandemic; this may explain why there were no differences between them before and during COVID–19 [60, 61, 62].

As mentioned above, the term NeuroCOVID-19 is used to describe the neurological, neuropsychological, and neuropsychiatric (including depression) manifestations of SARS-CoV2 and COVID-19 infection [54]. Following recovery from COVID-19 or NeuroCOVID-19, an increasing proportion of individuals have reported the persistence and/or new onset of symptoms, which collectively have been identified as post-COVID-19 syndrome by the National Institute for Health and Care Excellence. As pointed out by Renaud-Charest et al., although depressive symptoms in the acute phase of COVID-19 have been well characterized, the frequency of depression following recovery of the acute phase remains unknown. The authors found 316 articles identified through a systematic search on the PubMed, Ovid Medline and Google Scholar websites for studies published between 1 January 2020 – 5 June 2021, and identified eight studies in which the authors analyzed the frequency of depressive symptoms +12 weeks following SARS-CoV-2 infection. The ranges were from 11 – 28%, and the frequency of clinically-significant depression and/or severe depressive symptoms ranged from 3 – 12%. The severity of acute COVID-19 was not associated with the frequency of depressive symptoms [56]. It is also worth mentioning that some authors have already evaluated the effectiveness of various therapy methods, for example, transcranial direct current stimulation (tDCS) for patients with depression, including post-COVID depression [52].

The direct bidirectional relationships between the COVID-19 virus and the gut and lung microbiomes is also worth disscusing. It was found that the significant indirect effects of the pandemic, such as repeated lockdowns, increased hand hygiene, and changes to mood and diet, could all lead to long standing changes to the gut microbiome at the individual and population level. Together, these changes may affect long term microbiome research, both in observational

as well as in population studies, requiring urgent attention. Increasing preclinical and clinical studies have highlighted that compositional and functional (e.g., metabolite) changes in gut microbiota, known as dysbiosis, are associated with the onset and progression of depression via regulating the gut-brain axis [63–65]. Thus, it can be assumed that the results may have been influenced by the above factors, which occurred as a post-COVID-syndrome.

Weaknesses and strengths of the study. Unlike previous research, several standardized questionnaires were used in the current study to assess multiple components of maternal health. Another strength is that the study was conducted personally by the researcher – not on-line – which enabled higher quality and efficiency of the collected data.

Some limitations of the study should also be considered. The first limitation was the sample size. Additionally, the studies were conducted in a single centre and for a limited period of time. Therefore, the obtained results should be treated as preliminary.

CONCLUSIONS

The results obtained suggest the necessity for substantial preparation of medical and psychological staff employed in pregnancy pathology departments in order to provide proper support, especially emotional and informational for hospitalized patients. Informational support plays a protective function in anxiety and depressive disorders. Appropriate support of pregnant women and young mothers may exert a beneficial effect on the intensification of anxiety or the symptoms of depression experienced by women.

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