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COULD PROBLEMS IN THE BEDROOM COME FROM OUR INTESTINES? A PRELIMINARY STUDY OF IBS AND ITS IMPACT ON FEMALE SEXUALITY

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SUMMARY

Introduction: *Female sexuality may be affected by many somatic and psychological factors. Somatic conditions have impact on psychological well-being. We assumed that chronic disease like Irritable Bowel Syndrome (IBS), when producing the long-term distress, may greatly influence sexual functioning.*

Aim: *The aim of this study was to determine whether the severity of IBS influences sexual functions of women and take into consideration other factors like Small Intestinal Bacterial Overgrowth (SIBO) comorbidity and duration of IBS.*

Subjects and methods: *Study patients were recruited by contacting IBS patients at Gastroenterology Ward of Clinical University Centre in Katowice. The survey consisted of 3 parts. The first part were socio-demographic questions. The second part was polish translation of Female Sexuality Functions Index (FSFI) questionnaire. The third part consisted of questions about the patient condition, pharmacotherapy and Irritable Bowel Syndrome Severity Score (IBSSS) questionnaire. 307 women were included in the study and completed the questionnaire. 143 participants were diagnosed with IBS. The mean age of participants was 27 (IQR=23-33). 29% of the patients (n=41) had severe, 47% (n=68) moderate and 24% (n=34) mild IBS.*

Results: The prevalence of sexual dysfunctions was greater in women with IBS (48%) than in healthy control group (23%) ($p<0.001$). The median of FSFI was: 30.1 (26.3-32.8) for healthy control group, 30 (23.5-32.6) for mild IBS, 26.2 (22.2-31.6) for moderate and 24.4 (20.1-28.9) for severe.

Conclusion: *IBS decreases all domains of women sexual activity. Severity of sexual dysfunctions relate to intensity of IBS symptoms. All physicians treating IBS-patients should take sexual dysfunctions into their clinical consideration.*

Key words: *irritable bowel syndrome - sexual dysfunctions - sexual health - gastrointestinal diseases*

Abbreviations: *IBS - Irritable Bowel Syndrome; FSD - Female Sexual Dysfunctions; QoL - Quality of Life; FSFI - Female Sexual Functioning Index; IBSSS - Irritable Bowel Syndrome Scoring System; IQR - Interquartile Range*

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INTRODUCTION

The amount of research on the topic of Irritable Bowel Syndrome's (IBS) impact on female sexuality is scarce. Fortunately, in the last decade female sexual dysfunctions (FSD) in chronic illnesses have become an important research topic. FSD have a tremendous influence on women's quality of life while having also a great impact on health care expenses (Verschuren et al. 2010). Sexual functions are an essential factor when it comes to quality of life and nowadays sexual health is perceived to be a human right. Despite the fact that the prevalence of female sexual dysfunctions in pre-menopausal women around the world is high and around 40%, patients and health care professionals are often uncomfortable discussing sexual health (Mc Cool et al. 2019).

Female sexual functions are affected my many various factors, from psychosocial ones, through drugs side effects, obstetric history, hormone level disorders, ending on chronic conditions such as diabetes, hypertension and hyperlipidaemia (Krakovsky & Grober 2018). Diseases that cause sexual dysfunctions usually impair body image and feeling of attractiveness, restricting patient's mobility and activity (Palacios et al. 2009).

Irritable Bowel Syndrome (IBS) is one of most common chronic gastrointestinal tract conditions. In ROME IV criteria IBS is defined by the presence of abdominal pain with altered stool frequency, its form and its relation to defecation (Soares 2014, Longstreath et al. 2016). It affects around 5-20% of world population with women being more often affected (2:1 when compared to men) (Defrees & Bailey 2017). Nonetheless, it's estimated that due to the IBS symptoms only around

35% of patients will seek medical care (Ziółkowski et al. 2012, Endo et al. 2015).

While being perceived to be a benign condition, IBS is associated with decreased quality of life (QoL) and an increase in healthcare use (Mönnikes 2011). Studies have shown that patients suffering from IBS make two to three times more health care appointments than in healthy general population. Additionally, IBS patients QoL has been shown to be lower than QoL of patients with various chronic diseases and is comparable to QoL impairment of patients with depression or GERD (Gralnek et al. 2000, El-Serag et al. 2002). Furthermore 38-100% of IBS patients suffer from anxiety disorder and clinical depression (Hausteiner-Wiehle & Henningsen 2014, Woodman et al. 2016). Moreover, IBS patients with depression have a significant decrease in QoL domains like: body image, health worry, social relations, sexual and relationship (Kopczyńska et al. 2018).

Taking together all aforementioned factors: IBS being as the most common chronic GI tract condition, the proved connection between many different chronic illnesses and sexual dysfunctions and the limited research on that topic, we have decided to investigate the possible link between IBS and FSD to shed more light on the important problem. We assumed the presence of IBS symptoms entails a significant somatic stress that may influence the sexual functions of women.

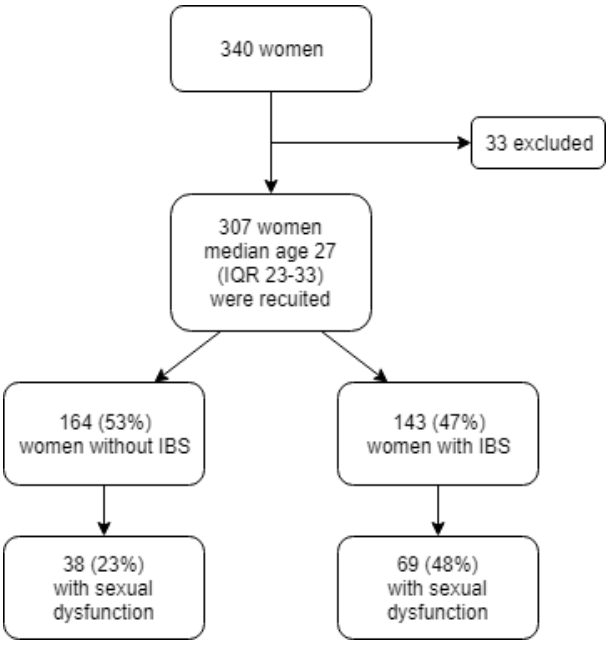

Figure 1. Patients' flow-chart

SUBJECTS AND METHODS

A cross-sectional study among Polish women diagnosed with IBS (n=164) and healthy control group (n=164), was conducted between March 2018 and April 2019 in cooperation with Gastroenterology Ward in Central University Hospital in Katowice. The fully self-administered questionnaire was given to the patients at random while waiting for their routine medical check-ups in out-patient clinic. The exclusion criteria were: age below 18 and over 50 years old, occurrence of a neoplasm and/or any severe chronic disease, lack of a sexual partner and lack of sexual activity. 33 women were excluded from the study and final study group consisted of 307 women aged 19-50 years old. The characteristics of study and control groups were statistically equal (Figure 1).

The survey consisted of 3 divisions with a total of 37 questions. The first part contained socio-demographic characteristic. The second part included polish version of Female Sexual Functioning Index (FSFI), developed by Drosdzol-Cop et al. in 2009. The original FSFI is an internationally validated questionnaire developed by Rosen et al. in 2000. It consists of 19 questions which evaluate six following domains of women's sexual functioning: desire (questions 1 and 2; score range 1-5), arousal (questions 3, 4, 5,6; score range 0-5), lubrication (questions 7, 8, 9, 10; score range 0-5), orgasm (questions 11, 12, 13; score range 0-5), satisfaction (questions 14, 15, 16; score range 1-5) and pain (questions 17, 18, 19; score range 0-5) over past 4 weeks. The total result ranges between 2-36 where lower score correlates with worse sexual functioning and the result below 27 indicates the presence of sexual dysfunctions. The third part consisted of IBS related questions (duration since IBS diagnosis, drugs taken by the patient, symptomatic reaction to alcohol consumption, comorbidity of Small Intestinal Bacterial Overgrowth (SIBO)) and Irritable Bowel Syndrome Scoring System (IBSSS). IBSSS is a self-administered, validated questionnaire created by Francis et al. in 1997 aiming to determine the severity of IBS's symptoms. The survey consists of five questions (each with a score range 0-100): presence and severity of abdominal pain, number of days with pain for every 10 days, presence and severity of abdominal distention, patient's satisfaction with bowel habit and patient's opinion on how IBS affects his/her life. The final score ranges 0-500 and divides patients into four groups: remission phase (0-74 points), mild IBS (75-174 points), moderate IBS (175-300 points) and severe IBS (>300 points).

The university Ethics committee waived the requirement for informed consent due to anonymous and non-interventional nature of the study.

All data analyses were conducted using StatSoft Statistica version 13.0 PL software and P value <0.05 was considered as significant. Qualitative variables are presented as a percentage and/or as an absolute value. Quantitative variables are presented as a median and an interquartile range. Shapiro-Wilk test was used to verify distributions of the groups, and between-group differences were investigated using non-parametric tests (U Mann-Whitney or Kruskal-Wallis). To measure qualitative variables chi-square test was used.

RESULTS

The median age of the participant was 27 (IQR=23-33). The analysis was conducted on 307 women of which 143 suffered from IBS and served as a studied group and 164 healthy women became our control group. General characteristic of the group is presented in Table 1.

Table 1. General characteristics of the subjects

Characteristic	Number of patients	%
Age	27	IQR 23-33
Marital status		
Married	129	42
Not married	178	58
Educational status		
Primary School	6	2
High School	132	43
University and above	169	55
Accommodation		
Village	68	22
City < 50k	58	19
City > 50-200k	64	21
City > 200k-500k	43	14
City > 500k	74	24

In the study group mild IBS was observed in 34 patients (24%), moderate in 68 (47%) while 41 presented severe IBS (29%). 31 (22%) participants were diagnosed with small intestinal bacterial overgrowth (SIBO) and 112 (78%) were not. Specific characteristic of the study group is presented in Table 2.

Our data analysis revealed that IBS in women is responsible for significant decrease both in FSFI global score in its specific domains (Table 3 and Figure 2).

Table 2. General characteristics of study group

Characteristic	Number of patients	%
IBS		
Mild	34	24
Moderate	68	47
Severe	41	29
SIBO		
Yes	31	22
No	112	78
Decrease in symptoms after alcohol intake		
Yes	47	33
No	96	67
Time since IBS diagnosis (years)		
Under 1	16	11
1-3	46	32
4-5	28	20
More than 5	53	39

Furthermore, there was a significant difference (<0.001) between the number of women with sexual dysfunctions (FSFI ≤26) in the study group (n=69, 48%), comparing to the control group (n=28, 23,2%). Those results are presented in Figure 3.

The equally interesting results were observed when we compared female sexual activity versus the severity of IBS using IBSSS. We proved the significant difference in medians of FSFI's between results in women with mild IBS and severe IBS (p<0.001). The significance of the difference between mild and moderate, and moderate and severe decrease of sexual activity were respectively p<0.07 and p<0.08. Detailed results are presented in Table 4.

Table 3. Impact of IBS on female sexual activity by FSFI's domains

	Without IBS	With IBS	P
FSFI	30.1 (26.3-32.8)	26.4 (22.3-31.3)	<0.001
Desire	4.2 (3.6-5.4)	3.6 (3.0-4.8)	<0.050
Arousal	5.1 (4.2-5.7)	4.5 (3.6-5.4)	<0.001
Lubrication	5.9 (4.5-6.0)	5.1 (4.2-6.0)	<0.010
Orgasm	5.2 (4.2-5.6)	4.4 (2.8-5.6)	<0.010
Satisfaction	5.2 (4.4-6.0)	4.8 (3.6-5.6)	<0.050
Pain	5.6 (4.4-6.0)	4.4 (3.6-4.8)	<0.001

Table 4. Impact of IBS's severity on female sexual activity

	Mild	Moderate	Severe
FSFI	30 (23.5-32.6)	26.2 (22.2-31.6)	24.4 (20.1-28.9)
Desire	4.8 (3.0-4.8)	3.6 (2.7-4.8)	3.6 (3.0-4.2)
Arousal	5.1 (4.2-5.4)	4.5 (3.6-5.4)	4.5 (3.3-4.8)
Lubrication	5.1 (4.5-5.7)	5.4 (4.5-6.0)	4.8 (3.9-5.7)
Orgasm	5.6 (4.4-6.0)	4.4 (2.8-5.6)	3.6 (2.8-5.2)
Satisfaction	5.2 (4.4-6.0)	4.8 (4.0-5.6)	3.6 (3.2-4.8)
Pain	4.4 (4.0-5.6)	4.4 (3.6-4.8)	4.4 (3.6-4.8)

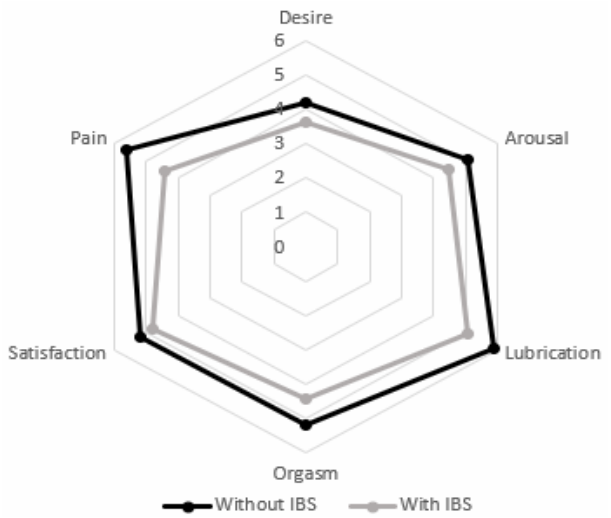

Figure 2. Impact of IBS on female sexual activity meaued by FSFI's domains

Moreover, we found a few statistically significant differences between FSFI's domains scores in each severity group of IBS (Figure 4). The most significant decrease was noted between mild and severe IBS ($p<0.001$) and mild and moderate IBS ($p<0.01$) in orgasm domain. In satisfaction domain the decline was proved between mild and severe IBS ($p<0.001$) and moderate and severe IBS ($p<0.01$), while in arousal it was only proved between mild and severe ($p<0.01$).

Likewise, the number of patients with sexual dysfunctions increased when compared to the severity of IBS symptoms and peaked at 61% in the severe disease. The results are presented in Figure 5.

SIBO comorbidity, duration of IBS and alcohol consumption didn't produce any significant associations when it comes to female sexual function, although 29% patients reported symptoms alleviation after consuming alcohol.

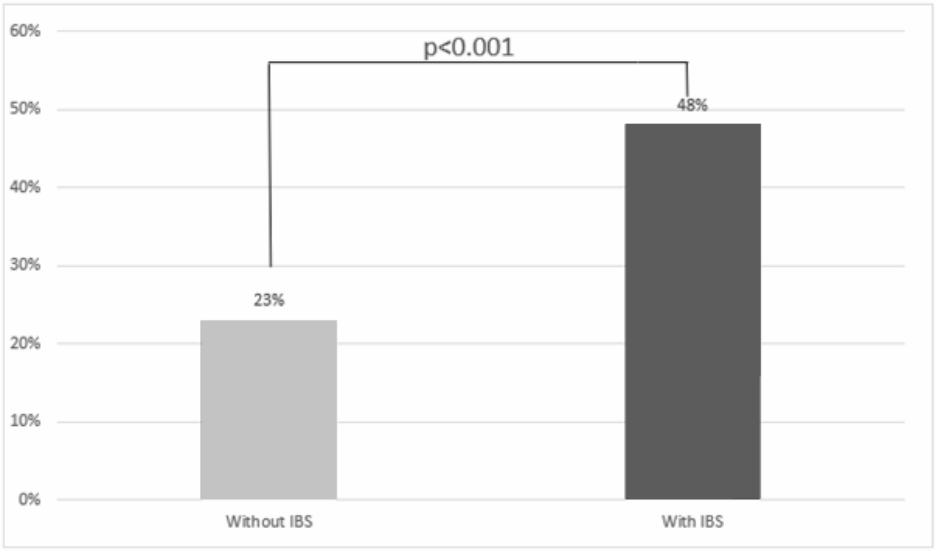

Figure 3. Occurrence of sexual dysfunctions in women with IBS and without IBS

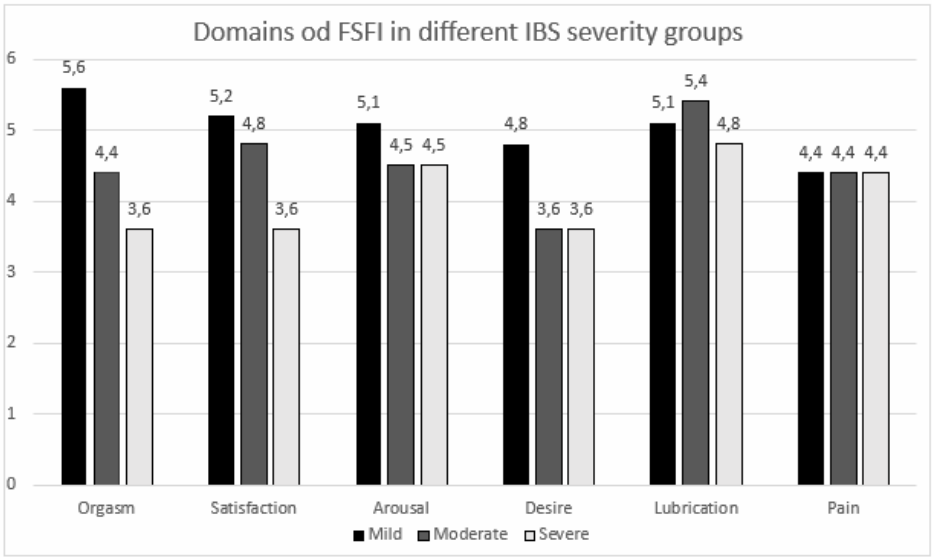

Figure 4. Changes in domains of FSFI in each severity group of IBS

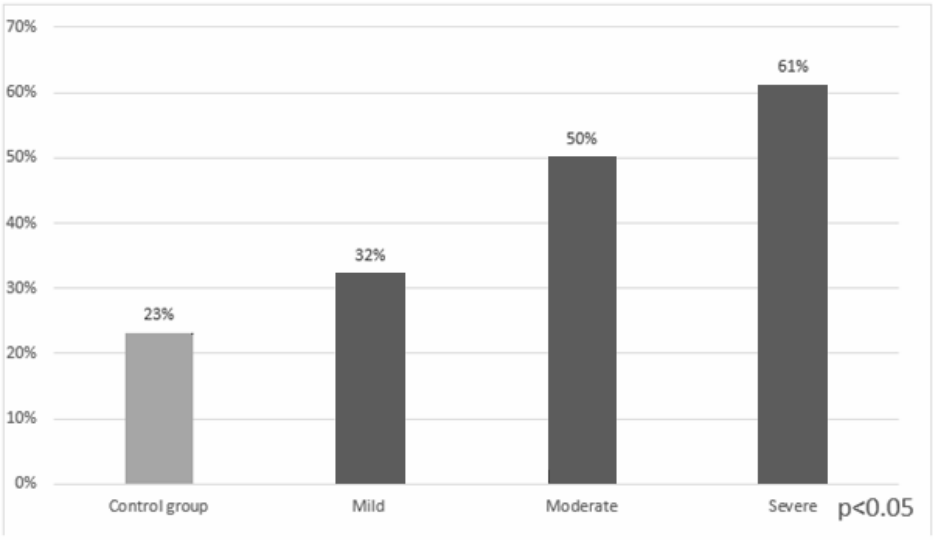

Figure 5. Impact of IBS's severity on prevalence of female sexual dysfunction

DISCUSSION

Irritable bowel syndrome's impact on female sexual functions is still poorly researched. Most of the available research was conducted in the last century and usually referred to a broader spectrum of symptoms. Our work focused on sexual functions and tried to establish the prevalence of FSD in IBS and alleged negative effect of IBS on sexual life.

The prevalence of IBS in general population is around 5-20% and it's symptoms like pain, diarrhoea, constipation and bloating may produce a great psychological distress to the patient. IBS influences on perception of attractiveness, health worry, and other domains of life including psychosocial interactions and sexual relationships, which is shown by IBS-patients' decrease in QoL. Moreover, 38-100% IBS patients have a comorbidity of anxiety or major depressive disorder.

The frequency of sexual dysfunctions in IBS ranges from 14.3-43.3% and up 45.2% in constipation-predominant IBS. Our results were close to those observations with the prevalence of 48% (Corney & Stanton 1990, Fass et al. 1998, Schmulson et al. 1999), although we didn't take into consideration the subtypes of IBS. When prevalence of sexual dysfunctions was compared with the IBSSS, the occurrence of FSD increased with the severity of the disease. Unfortunately, we couldn't find any reports on that topic.

In our research FSFI was used to measure sexual functioning. We've managed to prove the decrease of the median score when compared our research group with control group and in each more severe group. Fass et al. 1998 reported decrease of sexual drive as the most common sexual dysfunction and in his study pain was more often observed in women than in men. In our study we demonstrated the significant decrease in each domain of woman sexual functioning: desire, arousal, lubrication, orgasm, satisfaction and pain. Whorwell et al. 1986 listed dyspareunia as a crucial component of IBS with 63% of patients being affected by it with none in his control group, while Fass et al. 1998 proposed decreased libido to be the most common sexual dysfunction in IBS (Whorwell 1986, Fass et al. 1998).

Pain accompanying sexual activity may relate to anatomy of innervation of sexual organs. Pelvic hyperalgesia through similar innervation as a GI tract was thought to be important in development of hypersensitivity. Splanchnic afferent nerves are the same for female inner reproductive system and distal parts of GI tract (Rapkin & Mayer 1993). In turn, a mechanism of decreased libido is abundant in a group of chronic diseases and may reflect psychological stress related to the patient's situation and its impact on his functioning (Campbell et al. 1989).

Our results seem close to both Fass's and Whorwell's findings and though we are unable to state the prevalence of specific sexual dysfunctions our research showed that the incidence of pain and decreased sexual desire was bigger in IBS women, comparing to the control group. Although, pain sensitivity did not change in proportion to the severity of IBS. In the light of previous and present research covering visceral hypersensitivity it seems that IBS patients may be more susceptible to other chronic pain disorders, including dyspareunia.

Furthermore IBS patients present higher levels of anxiety and depression, and the comorbidity between IBS and stress-induced psychiatric disorders is considered to be between 30 and 50%. Those psychiatric long-lasting conditions result in low grade inflammation, causing an increase in intestinal permeability and affect the neuroimmunological response (Popa & Dumitrascu 2015). Moving forward this impairment of mental health may lead to decrease in arousal and desire resulting in impaired sexual satisfaction and FSD. In fact, Forbes et.al postulated that sexual dysfunctions,

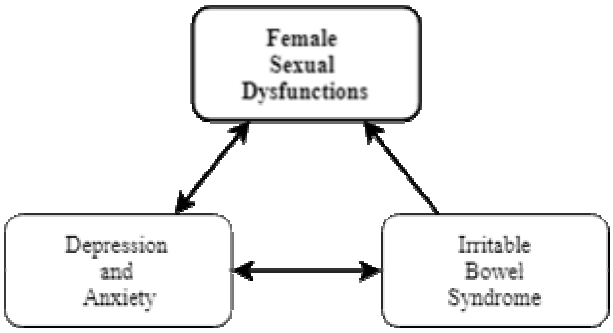

Figure 6. Proposed vicious cycle of IBS, depressive/ anxiety disorders and FSD

anxiety and depression share the same underlying latent psychological vulnerability (Luftey et al. 2009, Forbes et al. 2016, Basson & Gilks 2018). IBS, anxiety and/or depression and sexual disfunction may create a vicious cycle of conditions that potentiate each other (Figure 6).

Primary care physicians and gastroenterologists should take into account a great possibility of developing sexual dysfunctions in their IBS female patients. Physicians should inquire them, educate and when sexual dysfunctions occur refer them to a sexologist to maintain their good quality of sexual life.

The limitations of our study should be underlined. The study group should be bigger and consist from subtypes of IBS. The impact of pharmacotherapy on IBS and sexual symptoms should be considered, too.

CONCLUSIONS

IBS decreases all domains of women sexual activity. Severity of sexual dysfunctions relate to intensity of IBS symptoms.

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Conflict of interest: *None to declare.*

Contribution of individual authors:

Piotr Sławik: design of the study, literature research and analysis, data interpretation, manuscript writing.

Mateusz Szul: design of the study, literature research and analysis, data interpretation, statistical analysis.

Marek Krzystanek: data interpretation and manuscript redaction.

Marek Waluga: design of the study.

Anna Fuchs: data interpretation.

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