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ORIGINAL ARTICLE

Unrecognised orgasmic phase disorders in men presenting with new-onset erectile dysfunction—Findings from a real-life, cross-sectional study

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Abstract

Background: Orgasmic phase disorders in men worsen the burden of erectile dysfunction on sexual satisfaction.

Objectives: To investigate the prevalence of and predictors of unreported orgasmic phase disorder in a cohort of men looking for their first urological assessment for new-onset erectile dysfunction in a real-life setting.

Materials and methods: Data from 1107 heterosexual, sexually active men consecutively assessed for new-onset erectile dysfunction were analysed. Throughout a comprehensive medical and sexual history, all patients were asked to self-report any orgasmic phase disorder and to complete the International Index of Erectile Function and the Beck's Inventory for Depression (depressive symptoms scored as Beck's Inventory for Depression ≥11). Men self-reporting orgasmic phase disorder during the interview were excluded from further analyses. The median value of the International Index of Erectile Function-orgasmic function domain was arbitrarily used to categorise men with (International Index of Erectile Function-orgasmic function ≤5) and without unreported orgasmic phase disorder (International Index of Erectile Function-orgasmic function >5). Circulating hormones were measured in every patient. Descriptive statistics and logistic regression models were used to test the association between clinical variables and unreported orgasmic phase disorder.

Results: Of 1098 patients with non-self-reporting orgasmic phase disorder, 314 (28.6%) had International Index of Erectile Function-orgasmic function ≤5. Patients with erectile dysfunction + unreported orgasmic phase disorder were older (median [interquartile range]: 58 [44–66] years vs. 51 [40–60] years), had higher body mass index [25.8 (23.7–28.1) kg/m^2 vs. 25.2 (23.3–27.4) kg/m^2], higher prevalence of

type 2 diabetes (36 [11.5%] vs. 45 [5.7%]) and lower International Index of Erectile Function-erectile function scores (6 [2–10] vs. 18 [11–24]) than men with erectile dysfunction-only (all $p < 0.05$). Patients with erectile dysfunction + unreported orgasmic phase disorder depicted higher rates of severe erectile dysfunction (75.5% vs. 25%) and Beck's Inventory for Depression ≥11 (22.6% vs. 17.9%) (all $p < 0.05$). In the multivariable logistic regression analysis, older age (odds ratio: 1.02) and lower International Index of Erectile Function-erectile function scores (odds ratio: 0.83) were independently associated with unreported orgasmic phase disorder (all $p < 0.05$).

Conclusions: Almost one in three men seeking first medical help for erectile dysfunction depicted criteria suggestive of unreported orgasmic phase disorder. Men with unreported orgasmic phase disorder were older and had higher rates of severe erectile dysfunction and concomitant depressive symptoms. These real-life findings outline the clinical relevance of a comprehensive investigation of concomitant sexual dysfunction in men only complaining of erectile dysfunction to more effectively tailor patient management.

KEYWORDS
epidemiology, erectile dysfunction, orgasm, orgasmic dysfunction, risk factors

1 | INTRODUCTION

Any personal or couple's difficulty in the sexual response cycle, including sexual desire, arousal and orgasm/ejaculation, identifies male sexual dysfunction.[1,2] Of all, most men seeking medical attention for sexual dysfunction at any outpatient clinic complain of erectile dysfunction (ED).[3] In the clinical real-life setting, however, it is increasingly common to diagnose other concomitant sexual dysfunctions in men seeking first medical help only for ED.[4–7] For instance, in a cross-sectional real-life study involving a quite large sample of heterosexual men presenting for ED as their only complaint, either primary or secondary non-self-reported premature ejaculation (PE) was diagnosed in up to 25.9% of patients.[8] Likewise, in their meta-analysis of 28 studies on ED with 12,130 patients, Paduch et al.[9] reported that only 42.2% of participants had normal scores for the ejaculatory function as investigated using the International Index of Erectile Function (IIEF); likewise, only 35.6% had normal scores for the overall IIEF-orgasmic function (IIEF-OF) domain.

Normal IIEF-OF defines the ability of a man to become orgasmic, defined as an intense transient peak sensation of pleasure that is usually associated with ejaculation.[10,11] The inability to ejaculate and/or reach orgasmic feelings or climax during sexual arousal and stimulation identifies orgasmic phase disorders (OD).[12] In this context, OD is as important as the erectile function in determining sexual satisfaction in men at any age.[13] However, the current literature shows few data regarding the interrelationship between ED and OD because of difficulties in investigating such a delicate and complex problem in men.[14]

Consequently, considering that some male sexual dysfunction may often be spontaneously unreported by patients during office urological visits,[15,16] the current study aimed to (i) explore the prevalence of unreported OD (uOD) in a homogenous cohort of heterosexual sexually active men presenting at first medical assessment for ED as their only complaint; (ii) investigate and compare the baseline sociodemographic and clinical characteristics of men with solely ED versus men with ED and uOD; and (iii) investigate the predictors associated with uOD among men looking for a first medical aid for new-onset ED at a single tertiary-referral centre for sexual medicine over the last decade.

2 | MATERIALS AND METHODS

Complete data from 1107 heterosexual sexually active (arbitrarily defined as men with at least one coital sexual intercourse over the last 4 weeks), white European men with new-onset ED as their sole complaint were analysed. A detailed medical history was collected for all subjects and data on health-significant comorbidities were scored using the Charlson comorbidity index (CCI).[17] Body mass index (BMI) (kg/m^2) was measured for each patient. Likewise, a detailed sexual history was also collected for every man and patients were investigated for the potential complaint of other sexual disorder (any type) as per routine diagnostic work-up at our centre. Once excluded any literacy problems, all patients were invited to compile the IIEF at first presentation; Cappelleri's criteria were used to classify ED severity.[18–20] Moreover, all patients completed the Beck's Inventory for Depression (BDI), with depressive symptoms considered for BDI scores ≥11.[21–23]

Venous blood samples were drawn from each patient between 7 AM and 11 AM after an overnight fast. Glucose levels and glycated haemoglobin (HbA1c) were measured in every patient. Hormonal evaluation included luteinising hormone (LH), oestradiol (E_2), total testosterone (tT) and prolactin (PRL) levels. Hypogonadism was

identified by both tT ≤3 ng/mL[24] and tT ≤3.5 ng/mL[3] thresholds for normalcy.

Either during the study or in their history, none of the patients underwent prostate or pelvic surgery or had been receiving recent or current androgen deprivation therapy, testosterone therapy or any other hormonal treatment.

Data collection followed the principles outlined in the Declaration of Helsinki; all patients had signed an informed consent agreement to deliver their own anonymous information for future studies. The study was approved by the IRCCS San Raffaele Hospital Ethical Committee (Prot. 2014—Pazienti Ambulatoriali).

2.1 | Statistical analysis

According to the specific purposes of the study, patients self-reporting OD at sexual history taking were excluded from further analyses ($n = 9$). Conversely, patients self-reporting ED despite normal IIEF-erectile function (IIEF-EF) domain scores were kept for the subsequent analyses. Thus, a convenience sample of 1098 patients was finally selected for our study. Moreover, we analysed the scores of the IIEF-OF domain. In particular, the IIEF-OF domain scores range from 0 to 10 and derives from the sum of IIEF-Question 9: 'Over the past 4 weeks, when you had sexual stimulation or intercourse, how often did you ejaculate?' and IIEF-Question 10: 'Over the past 4 weeks, when you had sexual stimulation or intercourse, how often did you have the feeling of orgasm with or without ejaculation?' both scoring from 0 to 5. Based on previous analyses of self-unrecognised sexual dysfunctions in men,[16,25,26] we adopted the median value of the IIEF-OF domain score to arbitrarily define uOD. Consequently, the entire cohort was categorised into (i) patients complaining of ED and with an IIEF-OF score ≤5 (ED + uOD) and (ii) patients complaining of ED but with an IIEF-OF score >5 (ED-only).

Statistical analyses consisted of three steps. First, medians and interquartile ranges or frequencies and proportions were reported for continuous or categorical variables, respectively. To compare the statistical significance of differences in the distribution of continuous or categorical variables among the two groups (ED + uOD vs. ED-only), Mann–Whitney and chi-square tests were performed, respectively. Thereafter, univariable (UVA) and multivariable (MVA) logistic regression models identified potential predictors of uOD in men presenting at first medical assessment uniquely for self-reported ED. According to UVA, MVA was adjusted for age, CCI ≥1, IIEF-EF and BDI ≥11.

The RStudio graphical interface v.0.98 for R software environment v.3.0.2 (http://www.r-project.org) was used to perform statistical analyses. All statistical tests were two-sided with a significance level set at $p < 0.05$.

3 | RESULTS

Table 1 details descriptive statistics for the whole cohort of 1098 patients and after further segregation according to IIEF-OF median score ≤5 (ED + uOD) versus IIEF-OF >5 (ED-only). Of all, 784 (71.4%) men were ED-only and 314 (28.6%) were subsequently identified as ED + uOD. At first clinical assessment, ED + uOD patients were older ($p < 0.001$), had a greater rate of health-significant comorbidities ($p = 0.01$) and were more likely to have type 2 diabetes mellitus (DM) ($p = 0.002$) than ED-only patients. No further statistical differences were noted between the two groups (Table 1).

Similarly, ED + uOD patients more frequently self-reported an anxiety status, and depicted higher median BDI scores, thus presenting greater rates of BDI ≥11 suggestive of depressive symptoms (all $p < 0.05$). All IIEF-domain scores were lower in men with ED + uOD than in ED-only patients (all $p < 0.001$). Similarly, among ED + uOD men, severe ED was observed more frequently than among patients with only ED (all $p < 0.001$, Table 1).

Table 2 shows UVA and MVA logistic regression analysis results on variables potentially associated with uOD status. In the UVA logistic regression analysis, patients with older age (odds ratio [OR]: 1.03), higher CCI scores (OR: 1.37) and higher rates of type 2 DM (OR: 2.12) were more prone to have uOD at first assessment (all $p \leq 0.001$). Similarly, lower IIEF-EF scores (OR: 0.83) and BDI scores ≥11 (OR: 1.47) were univariably associated with uOD at baseline (all $p < 0.05$, Table 2). In the MVA logistic regression analysis, older age (OR: 1.03) and lower IIEF-EF scores (OR: 0.83) emerged to be independently associated with uOD after accounting for CCI, BMI and BDI scores (all $p < 0.001$, Table 2).

4 | DISCUSSION

The current cross-sectional study analysed real-life data from a relatively large cohort of consecutive white European heterosexual sexually active men presenting at our urological outpatient clinic over the last decade only self-complaining new-onset ED. Current results depicted that, at least in this specific cohort of men, almost one out of three patients (i.e., 28.6%) also suffered from concomitant uOD. Patients with ED and uOD were older, had higher median BMI, more comorbid conditions, including greater rates of type 2 DM, and presented with more severe ED and depressive symptoms than patients with ED only. As such, ageing and lower IIEF-EF scores at baseline appeared independently associated with uOD in men self-presenting only for ED at first assessment. Taken together, these observations are particularly relevant because they should promote a more complex tailored management work-up of ED patients in everyday clinical practice.

In this context, clinical evidence showed that men could eventually non-self-report while underreporting sexual dysfunctions, even during a dedicated andrological assessment. Indeed, as previously shown by Shabsigh et al.,[15] men suffering from ED could unrecognise their condition without bringing it to the urologist because of discomfort or embarrassment. Moreover, a recent cross-sectional real-life study involving 1197 men seeking first medical help for ED showed how an appropriate analysis of IIEF domains could reveal unreported low sexual desire/interest in almost 30% of these patients.[16] Accordingly, current findings showed that almost one out of three men seeking first medical help for self-reported ED only also

TABLE 1 Descriptive statistics and questionnaires scores of the whole cohort of patients as segregated according to International Index of Erectile Function-orgasmic function (IIEF-OF) domain scores (i.e., IIEF-OF score ≤5 vs. >5).

Variable	Whole cohort	IIEF-OF ≤5	IIEF-OF >5	*p*-Value
Number of patients, No. (%)	1098	314 (28.6)	784 (71.4)	
Age (years)	53 (41–62)	58 (46–66)	51 (40–60)	<0.001
BMI (kg/m^2)	25.3 (23.4–27.5)	25.8 (23.7–28.1)	25.2 (23.3–27.4)	0.01
CCI, No. (%)				<0.001
0	834 (76)	207 (65.9)	627 (80)	
≥1	263 (24)	106 (33.8)	157 (20)	
Smoking status, No. (%)				0.44
No	609 (55.5)	170 (54.1)	439 (56)	
Ex-smokers	250 (22.8)	78 (24.8)	172 (21.9)	
Current smoker	230 (20.9)	60 (19.1)	170 (21.7)	
Type 1 DM, No. (%)	25 (2.3)	7 (2.2)	18 (2.3)	0.99
Type 2 DM, No. (%)	81 (7.4)	36 (11.5)	45 (5.7)	0.002
Hb1Ac (mg/dL)	5.5 (5.2–6.2)	5.7 (5.3–6.4)	5.5 (5.2–6.1)	0.03
LH (ng/mL)	4.1 (2.8–5.6)	4.2 (3–5.9)	4.1 (2.7–5.5)	0.27
E_2 (ng/mL)	27 (21.3–35)	25.1 (21.4–32.4)	27 (21.1–35)	0.7
PRL (ng/mL)	9 (6.5–13.1)	9.5 (6.5–15.2)	8.9 (6.6–12.6)	0.16
tT (ng/mL)	4.5 (3.3–6.1)	4.4 (3.1–5.8)	4.5 (3.4–6.1)	0.12
tT ≤3 ng/mL, No. (%)	145 (13.2)	48 (15.3)	97 (12.4)	0.09
tT ≤3.5 ng/mL, No. (%)	224 (20.4)	71 (22.6)	153 (19.5)	0.08
Relational status, No. (%)				0.43
Single	339 (30.9)	91 (29)	248 (31.6)	
Stable relationship	759 (69.1)	223 (71)	536 (68.4)	
BDI	6 (2–11)	6 (3–13)	5 (2–9)	0.02
BDI ≥11, No. (%)	206 (18.8)	71 (22.6)	135 (17.2)	0.03
IIEF-EF	14 (6–22)	6 (2-10)	18 (11–24)	<0.001
IIEF-OS	4 (2–7)	2 (2–4)	6 (4–8)	<0.001
IIEF-SD	7 (6–8)	6 (4–8)	7 (6–9)	<0.001
IIEF-IS	7 (2–10)	3 (0–5)	8.5 (5–11)	<0.001
ED severity [a], No. (%)				<0.001
Normal erectile function	103 (9.4)	1 (0.3)	102 (13)	
Mild ED	205 (18.7)	15 (4.8)	190 (24.2)	
Mild-to-moderate ED	165 (15)	17 (5.4)	148 (18.9)	
Moderate ED	190 (17.3)	42 (13.4)	148 (18.9)	
Severe ED	433 (39.4)	237 (75.5)	196 (25)	

Note: Data are expressed in median (IQR), except where otherwise noted. Statistical tests used: Mann–Whitney and chi-square tests were used to compare the statistical significance of differences in the distribution of continuous or categorical variables among the two groups (IIEF-OF score ≤5 vs. >5), respectively.

Abbreviations: BDI, Beck's Depression Inventory; BMI, body mass index; CCI, Charlson comorbidity index; DM, diabetes mellitus; E_2, oestradiol; ED, erectile dysfunction; EF, erectile function domain; Hb1Ac, glycated haemoglobin; IQR, interquartile range; IS, intercourse satisfaction domain; LH, luteinising hormone; OS, overall satisfaction domain; PRL, prolactin; SD, sexual desire domain; tT, total testosterone.

[a]ED severity according to Cappelleri's criteria (defining; normal erectile function as an IIEF-EF >26; mild ED as an IIEF-EF of 26–22; mild-to-moderate ED as an IIEF-EF of 21–17; moderate ED as an IIEF-EF of 16–11; and severe ED as an IIEF-EF <11).

TABLE 2 Univariable (UVA) and multivariable (MVA) logistic regression analysis showing potential predictors of unreported orgasmic phase disorder at baseline.

	UVA		MVA	
Variable	OR (95% CI)	*p*-Value	OR (95% CI)	*p*-Value
Age	1.03 (1.02–1.04)	<0.001	1.03 (1.02–1.04)	<0.001
BMI (kg/m^2)	1.03 (0.99–1.07)	0.06	–	–
CCI ≥1	1.37 (1.20–1.58)	<0.001	1.01 (0.8–1.26)	0.95
Type 2 DM	2.12 (1.33–3.35)	0.001	1.24 (0.63–2.44)	0.53
IIEF-EF	0.83 (0.82–0.86)	<0.001	0.83 (0.81–0.85)	<0.001
BDI	1.02 (0.99–1.04)	0.06	–	–
BDI ≥11	1.47 (1.04–2.06)	0.03	1.19 (0.8–1.76)	0.39

Abbreviations: BDI, Beck's Depression Inventory; BMI, body mass index; CCI, Charlson comorbidity index; CI, confidence interval; DM, diabetes mellitus; IIEF-EF, International Index of Erectile Function-erectile function domain; OR, odds ratio.

presented uOD. Therefore, on the one hand, that may outline the lack of self-awareness of such a delicate disorder in men being able to self-report only their ED complaints; on the other hand, self-reporting ED only may be 'much easier' for patients and perhaps even more accepted from a lay public consideration standpoint. Therefore, sexual medicine experts should investigate those patients apparently presenting with a 'single' distressful condition even more comprehensively in order to detect possible concomitant unrecognised sexual dysfunctions that may eventually impair the effectiveness of any therapeutic work-up, mostly according to misinterpreted patients' expectations.

Pre-disposition to or a full-blown DM is one of the risk factors associated with the concomitance of ED and OD, as previously disclosed in a review by Boeri et al.[27] Accordingly, Agochukwu-Mmonu et al.[12] showed that men with ED and concomitant OD portray a more severe diabetes phenotype than men not presenting both concomitant sexual dysfunctions. Indeed, DM and poor glycaemic control could lead to macro/microvascular complications with consequent degeneration of small penile nerves and penile hyposensitivity.[28] Moreover, diabetic patients could face psychological and emotional pressure related to their chronic condition decreasing the overall quality of their sexual functions.[29,30] In this context, our findings depict that among men presenting with ED as their only complaint, higher rates of type 2 DM and higher levels of Hb1Ac were depicted in patients with ED and uOD, suggesting a worse glycaemic control in this specific category.

Moreover, the National Social Life, Health and Aging Project reported that 26.1% of elderly men seeking medical help for ED with diagnosed DM reported an inability to climax; likewise, same data suggested that 15.9% of same-aged men without diabetes presented both of these sexual dysfunctions.[31] Indeed, ageing has been recognised as a further possible risk factor in the degeneration of the afferent penile nerves leading to penile hypoesthesia; this phenomenon is more frequent in men who never or occasionally achieve orgasm and ejaculation.[10] Accordingly, the Diagnostic and Statistical Manual of Mental Disorders—fifth edition (DSM-5) reported an increasing prevalence of OD with ageing, as men in their 80s complained of OD twice as much as men under age 59 years.[32] Hence, our findings substantiate this previous observation, depicting that advancing age is related to a higher likelihood of detecting uOD in men seeking medical attention for new-onset ED as their only complaint.

Furthermore, in a study involving 718 men with a median age of 61.7 years and aiming at analysing the impact of ageing on male sexual satisfaction, García-Gómez et al.[33] showed that OD was present in 23.4% and 21.8% of men with and without comorbidities, respectively. Similarly, in our analysis, a higher rate of comorbidities was noted in men with new-onset ED who were subsequently diagnosed also with uOD. Thus, because comorbidities are commonly associated with sexual dysfunctions,[34] their assessment could be useful as an approach to men's overall health.

Last, sexual dysfunctions have a detrimental negative impact on emotional status, as well as depressive symptoms and anxiety are listed as risk factors for sexual dysfunctions.[3,35–37] Trovão and Serefoglu[36] showed that OD in depressed men could be a consequence of a disrupted desire and/or arousal phase; once sexual arousal is impeded, orgasm and ejaculation will not be initiated. Accordingly, sexual dysfunctions could lead to anxious status, which can increase the likelihood of future sexual failure, creating a vicious circle.[38] Consequently, it is not surprising that in our analysis men presenting with concomitant ED and uOD, with respect to ED-only patients, more frequently reported anxiety and had higher rates of depressive symptoms and lower scores in all IIEF domains, thus indicating the potential disruption of the overall sexual response cycle.[1] This emerges to be of particular importance in the clinical practice because the combination of embarrassment and mood deflection leaves men even more fragile, with different expectations and probably less prone to follow further physicians' suggestions.[39,40]

As a first strength point, our study could alert sexual medicine practitioners to better investigate aspects of sexual functioning other than self-reported ED. Indeed, in the general population, a lack of awareness that orgasm can be achieved without erections has been noted.[12] Second, this relatively large cohort of patients was enrolled at the same outpatient clinic, thus representing a typical real-life scenario.

Our study is not exempt from limitations. First, because of the cross-sectional retrospective nature of the current analysis, the possibility of selection biases could be raised. Nevertheless, to limit the potential heterogeneity associated with differences in the diagnostic methodology, all patients were consistently analysed over the last decade by a single expert andrologist. Second, because our studied population consisted of a relatively large cohort of same-race, sexually active patients, any potential ethnic differences were eliminated; however, the lack of ethnic diversity may emerge as a bias. Third, although every patient has been comprehensively and homogeneously investigated because of the lack of a tool specifically addressing OD, we arbitrarily set the median value of the IIEF-OF domain as a valid cut-off to define uOD in patients self-complaining only for ED. The 'arbitrary' choice should not be considered the expression of less scientific accuracy but the most reliable statistical decision to corroborate current findings

because—to the best of our current knowledge—IIEF-OF domain does not have an evaluation scale in terms of severity, as instead exists for the EF domain.[18–20] Likewise, IIEF is the most widely used tool both in terms of clinical research and day-to-day clinical settings, which is the reason for us to apply this tool, especially in a heterosexual male cohort.

Moreover, even if the adopted methodology is probably not the best available in terms of psychometric tools and questionnaires, it may guide physicians to embrace a more appropriate multimodal approach to better investigate patients' needs and sexual expectations. Indeed, although this represents a major bias of the study, it could even be considered a major strength because the IIEF-OF can be easily used in daily clinical practice. Indeed, we completely agree about the potential weakness and poor sensitivity and specificity of the questionnaire (and even more specifically on the consideration of only two questions relating to the specific IIEF-OF domain). However, the highly clinical spirit of the study must be taken into consideration, which clearly underlines how the questionnaire per se is additional to the medical and sexual history taking in each patient, and it should be used to reinforce the concept of the necessary comprehensiveness of the assessment of every patient who 'apparently' comes with an 'easy' ED-only problem. Indeed, the IIEF-OF domain score tool has been used to attempt to better understand which parameters/predictors must be taken into consideration the most throughout the management work-up of the patients presenting for the first time. Last, because of the cross-sectional setting of the current study, we analysed data from men looking for medical help self-reporting ED as their primary complaint, regardless of IIEF-EF score. Hence, this decision may seem extremely arbitrary, but we consider that it instead may take into account all patients who actually present self-complaining of ED and therefore it emerged to better represent the overall male population in the real-life outpatient setting scenario.

5 | CONCLUSIONS

In conclusion, almost one out of three men seeking first medical help for new-onset erectile dysfunction did not report concomitant orgasmic phase disorders. Orgasmic disorders may be easily investigated as a first level screening using the International Index of Erectile Function-orgasmic function domain. Men with unreported orgasmic phase disorders were older, had higher rates of type 2 diabetes mellitus and presented more severe erectile dysfunction and depressive symptoms than men with adequate orgasmic function. A comprehensive investigation of the orgasmic phase should always be included in the diagnostic work-up of men complaining solely of erectile dysfunction in order to better tailor the therapeutic management of each patient.

AUTHOR CONTRIBUTIONS

Conception and design of the study: Simone Cilio, Andrea Salonia, Luca Boeri and Federico Belladelli. *Data acquisition*: Alessandro Bertini, Alessia d'Arma and Massimiliano Raffo. *Analysis and interpretation of data*: Simone Cilio, Edoardo Pozzi, Francesco Lanzaro and Paolo Capogrosso. *Drafting the manuscript*: Giuseppe Fallara, Simone Cilio, Ciro Imbimbo and Alessandro Palmieri. *Style revision*: Ciro Imbimbo, Vincenzo Mirone and Francesco Montorsi. All the authors have read and approved the submitted version.

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CONFLICT OF INTEREST STATEMENT

The authors declare they have no conflicts of interest.

DATA AVAILABILITY STATEMENT

The data underling our conclusions could be requested from the correspondent authors with reasonable reason.

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