Attitudes and prescribing practices on doxycycline postexposure prophylaxis (DoxyPEP) among Italian infectious diseases physicians: findings from a National SIMIT Survey

Roberto Rossotti [1], Angelo Roberto Raccagni [2], Federico D'Amico,[1] Emanuele Nicastri,[3] Giovanni Mazzola,[4] Antonio Cascio [5], Marco Falcone,[6] Ivan Gentile,[7] Andrea Giacomelli [8,9], Cristina Mussini,[10] Roberto Parrella,[11] Silvia Nozza [2,12]

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For numbered affiliations see end of article.

Correspondence to
Dr Angelo Roberto Raccagni; raccagni.angelo@hsr.it

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ABSTRACT

Objectives Doxycycline postexposure prophylaxis (DoxyPEP) has emerged as a promising tool for reducing bacterial sexually transmitted infections (bSTIs), particularly among men who have sex with men. This study aims to investigate the attitudes and prescribing practices of Italian infectious disease (ID) physicians regarding DoxyPEP for the prevention of bSTIs.

Methods This is a cross-sectional survey conducted between October 2024 and March 2025 among ID specialists registered with the Italian Society of Infectious and Tropical Diseases. An anonymous online questionnaire assessed demographics, prescribing behaviour, attitudes and concerns regarding DoxyPEP. Favourability was rated on a visual analogue scale from 0 to 100. Descriptive and non-parametric statistics were used, and a Poisson regression model for predictors of favourable attitude was weighted according to the inverse of the probability of being sampled for responding to the survey.

Results Of 132 respondents, 44.0% reported prescribing DoxyPEP, primarily in STI or pre-exposure prophylaxis clinics and urban settings. Median favourability was 70/100 and was higher among DoxyPEP prescribers (80 vs 50, p<0.001). The main reasons for prescribing were repeated STIs and specific sexual behaviour. The most frequently cited concern was antimicrobial resistance (96.2%), followed by the perceived superiority of condoms in preventing bSTIs and DoxyPEP toxicity. Informal use of DoxyPEP without medical supervision was reported by 46.2%, but counselling was significantly lower among non-prescribers. Older age was independently associated with higher favourability (p=0.005).

Conclusions This national survey shows a favourable attitude towards DoxyPEP among Italian ID physicians. DoxyPEP prescription was reported by less than half of the respondents, suggesting limited real-world use in Italy, with a variability in physicians' concerns and attitudes towards this preventive strategy for bSTIs.

KEY MESSAGES

⇒ Doxycycline post-exposure prophylaxis (DoxyPEP) has been shown in US and European studies to reduce bacterial STIs such as chlamydia and syphilis, especially among men who have sex with men (MSM).
⇒ Despite this evidence, concerns about antimicrobial resistance and the absence of uniform guidelines have limited its adoption.
⇒ Almost half of surveyed Italian ID physicians reported prescribing DoxyPEP and overall attitudes were favourable, particularly among those working in STI, HIV or PrEP clinics.
⇒ The main concerns were antimicrobial resistance, perceived condom superiority and potential toxicity; older physicians and those with broader STI/HIV practice were more likely to support DoxyPEP use.
⇒ Informal, unsupervised DoxyPEP use was suspected by almost half of respondents, highlighting a gap between patient behaviour and clinical practice.
⇒ These findings indicate a need for national guidelines and educational initiatives to support evidence-based DoxyPEP prescribing and counselling.
⇒ Antimicrobial resistance monitoring and integration of general practitioners into discussions may improve safety and uptake.
⇒ Future research should address eligibility criteria, users education and the balance between STI prevention benefits and stewardship concerns.

BACKGROUND

Doxycycline postexposure prophylaxis (DoxyPEP) has recently emerged as a promising strategy for reducing the incidence of bacterial sexually transmitted infections (bSTIs), particularly in key populations such as men who have sex with men (MSM).[1–8] Randomised clinical trials in the USA and Europe have shown a reduction of bSTIs, mostly in chlamydia and syphilis, with the use of DoxyPEP in key populations, and real-life studies have confirmed similar trends.[2–8] However, concerns remain about antimicrobial resistance, environmental impact and the lack of uniform international guidelines, with challenges in the implementation and uptake of a consistent strategy.[1] To date, the clinical use of DoxyPEP in Italy remains informal and based on personal attitudes, with no national guidelines for its implementation, although it is already prescribed in various infectious diseases (ID) and STI centres. In Italy, screening and care for STIs is usually performed in dedicated STI services by ID specialists or dermatologists, while HIV and pre-exposure prophylaxis (PrEP) care are provided by ID specialists, mostly in general or university hospitals. Considering these premises, the overall uptake and implementation of DoxyPEP in Italy is limited.

This study aims to provide a snapshot of the current attitudes and prescribing practices of Italian ID specialists regarding DoxyPEP for the prevention of bSTIs, assessed through a survey conducted by the Italian Society of Infectious and Tropical Diseases (SIMIT). SIMIT is the main professional ID society in Italy, promoting research, education and clinical practice in the field. Approximately 1200 ID doctors are registered members, out of an estimated 2500 ID doctors practising in Italy.

METHODS

This cross-sectional, questionnaire-based study was conducted between October 2024 and March 2025. Eligible participants were ID physicians registered with SIMIT. A link to the online survey was distributed via the Society's mailing list and at local scientific meetings. Participation was voluntary and anonymous. The survey used closed and open-ended questions to collect demographic information, prescribing attitudes and concerns about DoxyPEP. A visual analogue scale (0–100) was used to assess favourability of DoxyPEP prescription. Physicians' concerns about DoxyPEP were assessed using a set of prespecified options, with the option of adding free text. Full survey is presented in online supplemental material.

Descriptive statistics were used to depict the data collected. Differences between DoxyPEP prescribers and non-prescribers were assessed using Mann-Whitney U test and Fisher's exact test for continuous and categorical variables, respectively. An adjusted Poisson regression model was used to identify factors associated with favourable attitudes towards DoxyPEP. To address potential collider bias, given by the selection of responders to the survey, the model was weighted according to the inverse of the probability of being sampled for responding to the survey. The propensity score model used to generate the weights was based on the geographical origin (North vs Centre-South).

Two-tailed p values were calculated and a p value <0.05 was considered statistically significant. Data management and analysis were performed using Stata, V.16 (StataCorp, College Station, Texas, USA).

RESULTS

A total of 132 ID physicians completed the survey. The median age was 41 years (IQR 33–53) and 72/132 (54.5%) were male. Most respondents worked in northern Italy (74/132, 56.1%) and in a city with >500 000 inhabitants (51/132, 38.6%). Overall, 102/132 (77.3%) were involved in HIV care, 88/132 (66.7%) in STI clinics and 88/132 (66.7%) in PrEP clinics (online supplemental figure 1). Fifty-eight respondents (58/132, 44.0%) reported prescribing DoxyPEP. Prescribers were more likely to work in STI (prescribers=45/58, 77.6% vs non-prescribers=43/74, 58.1%, p=0.025) and PrEP clinics (46/58, 79.3% vs 42/74, 56.8%, p=0.009) and in cities with a larger population (p=0.019) compared with non-prescribers. Full demographic characteristics of physicians completing the survey and comparisons by DoxyPEP prescribing are shown in table 1. Median self-reported favourability in DoxyPEP was 70 out of

Table 1 Demographic and clinical features of survey respondents according to DoxyPEP prescription

Characteristics	Overall (n=132)	Never prescribed DoxyPEP (n=74)	Ever prescribed DoxyPEP (n=58)	P value
Age (years)	41 (33–53)	40 (33–55)	42 (32–51)	0.733
Male gender	72 (55.0%)	35 (48.0%)	37 (63.8%)	0.079
Inhabitants of the clinic city				
<100 k	36 (27.3%)	22 (29.7%)	14 (24.1%)	**0.019**
100k–500k	45 (34.1%)	31 (41.9%)	14 (24.1%)	
>500 k	51 (38.6%)	21 (28.4%)	30 (51.8%)	
Region of clinic				
North	74 (56.0%)	41 (55.4%)	33 (56.9%)	0.165
Centre	24 (18.2%)	10 (13.5%)	14 (24.1%)	
South/Islands	34 (25.8%)	23 (31.1%)	11 (18.0%)	
Work in a HIV Clinic	102 (77.3%)	53 (71.6%)	49 (84.5%)	0.096
Work in a STI Clinic	88 (66.7%)	43 (58.1%)	45 (77.6%)	**0.025**
Work in a PrEP Clinic	88 (66.7%)	42 (56.8%)	46 (79.3%)	**0.009**
Favourability in DoxyPEP (0–100)	70 (39–81)	50 (25–75)	80 (64–86)	**<0.001**
Major concern(s)				
Antimicrobial resistance	127 (96.2%)	72 (97.3%)	55 (94.8%)	0.654
Condom superior	31 (23.5%)	21 (28.4%)	10 (17.2%)	0.152
Toxicity	24 (18.2%)	18 (24.3%)	6 (10.3%)	0.043
Economic cost	14 (10.6%)	10 (13.5%)	4 (6.9%)	0.265
Stated≥2 concerns	60 (45.5%)	42 (56.8%)	18 (31.0%)	**0.005**
Performed DoxyPEP counselling	87 (65.9%)	31 (41.9%)	56 (96.6%)	**<0.001**
Perception of DoxyPEP use without counselling	61 (46.2%)	29 (39.2%)	32 (55.2%)	0.08

Bold: significant p-values (<0.05)
DoxyPEP, doxycycline postexposure prophylaxis; PrEP, pre-exposure prophylaxis; STI, sexually transmitted infection.

100 (IQR 39–81), which was higher among prescribers (80, IQR 64–86) compared with non-prescribers (50, IQR 25–75) (p<0.001).

Among DoxyPEP prescribers, the most common reasons for offering DoxyPEP were repeated STIs (20/58, 35.7%), number of sexual partners (15/58, 26.8%), being MSM (12/58, 21.4%) and participating in group sex (11/58, 19.6%). Other less commonly reported indications were attending cruising venues, practising chemsex, personal requests for DoxyPEP, being behaviourally at increased risk of acquiring HIV/STIs, PEP prescription, PrEP use, sexual violence and sex work. Most prescribers reported more than one indication. In total, 87/132 (65.9%) performed counselling on DoxyPEP to their clients, which was more common among prescribers compared with non-prescribers (56/58, 96.6% vs 31/74, 41.9%, p<0.001). Perceived use of DoxyPEP without medical advice was reported by 61/132 (46.2%) with no significant differences between prescribers and non-prescribers (32/58, 55.2% vs 29/74, 39.2%, p=0.08).

The most common concern of physicians regarding DoxyPEP was the development of antimicrobial resistance (127/132, 96.2%). Other concerns included the belief that condoms are more effective than DoxyPEP (31/132, 23.5%), perceived DoxyPEP toxicity (24/132, 18.2%) and cost (14/132, 10.6%). Other less common concerns were: risk compensation (5), adherence issues (2), management issues (2), lack of effectiveness (2) and uncertainty on users' selection criteria (2). Overall, 60/132 (45.5%) of all respondents reported more than two concerns about DoxyPEP, which were more common in non-prescribers (42/74, 56.8% vs 18/58, 31.0%, p=0.005) than in prescribers.

In the adjusted and weighted Poisson regression model, age was significantly associated with slightly greater favourability to DoxyPEP (per decade increase, β=+0.42, 95% CI 0.13 to 0.72, p=0.005). Working in an HIV, PrEP and STI service (70/132, 53.0%) was associated with a greater favourability to DoxyPEP (β=+0.96, 95% CI 0.19 to 1.72, p=0.014). Other variables, including gender, clinic type, number of concerns and city size, were not independently associated. After weighting for regional response imbalance, the predicted favourability score was slightly higher in the Centre-South (62, 95% CI 56 to 69) than in the North (59, 95% CI 52 to 66) (p<0.001).

DISCUSSION

This national survey shows a favourable attitude towards the use of DoxyPEP for the prevention of bSTIs among Italian ID physicians. Less than half had prescribed DoxyPEP at the time of the survey, mostly due to repeated STIs and the number of sexual partners, despite the lack of national guidelines on DoxyPEP use and despite most respondents working in an HIV, STI or PrEP clinics. Prescribers were more favourable about DoxyPEP use and more likely to work in STI, HIV or PrEP clinics, suggesting that direct exposure to key populations may influence clinical management and prescribing attitudes. The fear of antimicrobial resistance was near-universal, which is consistent with concerns seen in other European contexts and reflects the need for continued monitoring and strengthening of STI surveillance systems.[9]

The finding that older age was associated with higher favourability may indicate greater experience in treating STIs and consequent major favourability in prescribing DoxyPEP. Moreover, it may also reflect differences in antibiotic prescription practices and awareness of antimicrobial stewardship. Younger clinicians may be more cautious or awaiting formal endorsement by clinical guidelines and may be more concerned about the issue of antimicrobial stewardship. Regional differences in attitudes were noted, with slightly higher predicted favourability in the Centre-South. Moreover, those working in HIV, PrEP and STI care were found to be more favourable to DoxyPEP. This may be because clinicians working across multiple care settings encounter a broader range of individuals and prevention needs, which increases their awareness of and openness to implementing DoxyPEP.

Another notable finding is that almost half of respondents suspected or encountered informal use of DoxyPEP without medical supervision or counselling among their clients, a phenomenon already documented in other international and local studies.[10] This suggests a disconnection between clinical practice and patients' behaviour and highlights the need for better counselling. However, although both DoxyPEP prescribers and non-prescribers equally reported this phenomenon, DoxyPEP counselling was significantly lower among non-prescribers. Despite the uncertainties surrounding this prophylaxis, it is essential to discuss its existence and weigh up the pros and cons with users to avoid misuse or self-use without medical supervision. Moreover, non-ID physicians such as general practitioners also play a pivotal role, and we recognise that they should be involved in discussions surrounding DoxyPEP, as they could contribute to further research and expansion of this preventive strategy.

This study has several limitations. Most respondents worked in an HIV, STI or PrEP clinic, and the survey results may not be fully representative of the perspectives of ID physicians who are not involved in working with members of key populations. The study is also limited by the small sample size compared with the number of ID doctors practising in Italy, as well as by its cross-sectional design. Moreover, concerns regarding DoxyPEP were assessed using multiple prespecified options, as well as the option to add free text; this may have influenced survey responses.

This study provides a first insight into how DoxyPEP is perceived and used by ID physicians in Italy. Although attitudes are moderately favourable, actual DoxyPEP prescription remains limited. Concerns about resistance, unclear eligibility criteria and lack of national guidelines are major barriers. These findings pave the way for the development of national recommendations and surveillance strategies to support safe, effective and equitable use of DoxyPEP in Italy.

Author affiliations
[1]Department of Infectious Diseases, ASST Grande Ospedale Metropolitano Niguarda, Milano, Italy
[2]Università Vita Salute San Raffaele, Milano, Italy
[3]National Institute for Infectious Diseases Lazzaro Spallanzani, IRCCS, Roma, Italy
[4]Ospedale Sant'Elia, Caltanissetta, Italy
[5]Policlinico Universitario Paolo Giaccone, Palermo, Italy
[6]Infectious Diseases Unit, Department of Clinical and Experimental Medicine, Azienda Ospedaliera Universitaria Pisana, University of Pisa, Pisa, Italy
[7]Infectious Diseases Unit, Department of Clinical Medicine and Surgery, University of Naples Federico II, Napoli, Italy
[8]ASST Fatebenefratelli-Sacco, Milano, Italy
[9]Department of Biomedical and Clinical Sciences, Università degli Studi di Milano, Milano, Italy
[10]Infectious Diseases Unit, Azienda Ospedaliero-Universitaria Policlinico, Modena, Italy
[11]Respiratory Infectious Disease Unit, AORN dei Colli, Cotugno Hospital, Napoli, Italy
[12]IRCCS Ospedale San Raffaele, Milano, Italy

Handling editor Adam DN Williams

Contributors RR and SN conceived the study, designed the survey and wrote the manuscript. ARR wrote the manuscript and interpreted the results. RR and FD'A conducted analyses, managed data and interpreted the results. EN, GM, AC, MF, IG, AG, CM and RP endorsed the survey, supported its circulation and contributed to

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ORCID iDs
Roberto Rossotti http://orcid.org/0000-0003-4965-8789
Angelo Roberto Raccagni http://orcid.org/0000-0001-7811-6255
Antonio Cascio http://orcid.org/0000-0002-1992-1796
Andrea Giacomelli http://orcid.org/0000-0003-3685-4289
Silvia Nozza http://orcid.org/0000-0002-2673-2731

REFERENCES

1 Gökengin D, Noori T, Alemany A, *et al*. Prevention strategies for sexually transmitted infections, HIV, and viral hepatitis in Europe. *Lancet Reg Health Eur* 2023;34:100738.
2 Bachmann LH, Barbee LA, Chan P, *et al*. CDC Clinical Guidelines on the Use of Doxycycline Postexposure Prophylaxis for Bacterial Sexually Transmitted Infection Prevention, United States, 2024. *MMWR Recomm Rep* 2024;73:1–8.
3 Luetkemeyer AF, Donnell D, Dombrowski JC, *et al*. Postexposure Doxycycline to Prevent Bacterial Sexually Transmitted Infections. *N Engl J Med* 2023;388:1296–306.
4 Molina J-M, Bercot B, Assoumou L, *et al*. Doxycycline prophylaxis and meningococcal group B vaccine to prevent bacterial sexually transmitted infections in France (ANRS 174 DOXYVAC): a multicentre, open-label, randomised trial with a 2 × 2 factorial design. *Lancet Infect Dis* 2024;24:1093–104.
5 Luetkemeyer AF, Donnell D, Cohen SE, *et al*. Doxycycline to prevent bacterial sexually transmitted infections in the USA: final results from the DoxyPEP multicentre, open-label, randomised controlled trial and open-label extension. *Lancet Infect Dis* 2025;25:873–83.
6 Raccagni AR, Diotallevi S, Lolatto R, *et al*. DoxyPEP: real-life effectiveness in a cohort of men who have sex with men in Milan, Italy. *Lancet Infect Dis* 2025;25:e1–3.
7 Traeger MW, Leyden WA, Volk JE, *et al*. Doxycycline Postexposure Prophylaxis and Bacterial Sexually Transmitted Infections Among Individuals Using HIV Preexposure Prophylaxis. *JAMA Intern Med* 2025;185:273–81.
8 Sankaran M, Glidden DV, Kohn RP, *et al*. Doxycycline Postexposure Prophylaxis and Sexually Transmitted Infection Trends. *JAMA Intern Med* 2025;185:266–72.
9 Imerlishvili E, Lake J, Todorovic S, *et al*. Doxycycline post-exposure prophylaxis for preventing bacterial sexually transmitted infections (STIs): Are clinical providers supportive? *Int J STD AIDS* 2025;36:297–303.
10 Rossotti R, Caruso E, Calzavara D, *et al*. Knowledge, Use, and Misuse of Self-Prescribed Doxycycline Postexposure Prophylaxis in a Community-Based Preexposure Prophylaxis Service. *Sex Transm Dis* 2025;52:e18–22.