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Sexual Health

Supplementary Material

Prevalence of bacterial vaginosis in postmenopausal women: a systematic review and meta-analysis

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Supplementary Table S1 Search Strategy

Database	Search Terms/Query	Filters	Last Run	Results
PubMed	(((prevalence OR survey OR proportion))) AND (“1981”[Date – Publication] : “2020”[Date – Publication]) AND “bacterial vaginosis”	*English publications *Since 1981 *Based in humans	20.7.2020	1,501
EMBASE	(((prevalence OR survey OR proportion))) AND (“1981”[Date – Publication] : “2020”[Date – Publication]) AND “bacterial vaginosis”	*English publications *Since 1981 *Based in humans	20.7.2020	2,100
Cochrane	(prevalence OR survey OR proportion) AND “bacterial vaginosis”	*English publications *Since 1981 *Based in humans	20.7.2020	165
Web of Science	((prevalence OR survey OR proportion) AND “bacterial vaginosis”)	*English publications *Since 1981 *Based in humans	20.7.2020	1,923
Hand searching references	Citation lists were examined for additional relevant references	*English publications *Since 1981 *Based in humans	20.7.2020	4

Supplementary Table S2 Assessment of study quality and bias

NR = Not reported

Author, Year, Title		
Area of bias	**Criteria**	**Assessment of risk of bias**
Selection	a) Setting and source population appropriate and well defined? b) Inclusion/Exclusion criteria reported? c) Sample representative of source population? Consecutive sample? *Reported: low risk of bias; Not reported: moderate risk of bias* d) Response fraction? e) Missing Data?	Abbreviations: +low risk of bias ++ moderate risk of bias +++high risk of bias
Measurement	a) Appropriate diagnostic method? *Recognised, established method: low risk of bias. Modification to method: Moderate risk of bias* b) Experience with the diagnostic method?	Abbreviations: +low risk of bias ++ moderate risk of bias +++high risk of bias
Statistical	a) Sample size large enough? *<50 participants= High risk; 50 to 100 participants = Moderate risk; >100 Participants = Low risk* b) Sample size calculation reported? *If not reported and sample > 50: low risk of bias. If sample <50: high risk of bias*	Abbreviations: +low risk of bias ++ moderate risk of bias +++high risk of bias
Benedito de Castro 2019 **Does the Vaginal Flora Modify When a Synthetic Mesh is Used for Genital Prolapse Repair in Postmenopausal Women? A Pilot, randomized Controlled Study**		
Area of bias	Criteria	**Assessment of risk of bias**
Selection	**a)** Women participating in an inpatient elective surgery trial	+++ (compared to the

	b) Inclusion criteria: "Included were postmenopausal women older than 55 years with no previous/current hormone therapy, with uterine prolapse stages 3 and 4 (with no present ulcerations/infections), and no previous gynecological surgery or gynecological cancer" Exclusion criteria NR **c)** All meeting the inclusion criteria were invited to participate **d)** 100% **e)** "10 *(of original 60)* patients were excluded for not having collected the second sample of the vaginal sampling…."	general population) + (for the study population)
Measurement	**a)** Nugent Scoring **b)** 'The slide was interpreted by a single biologist who specialized in microbiology, with vast experience....'	+
Statistical	**a)** 50 **b)** NR	++
Brown, 2013 **Intravaginal Practices and Risk of Bacterial Vaginosis and Candidiasis Infection Among a Cohort of Women in the United States**		
Area of bias	**Criteria**	**Assessment of risk of bias**
Selection	**a)** Women recruited from the community **b)** NR **c)** Convenience Sample **d)** 141/150 (94%) **e)** 99/141 returned at 12months (70.2%)	+++ (compared to the general population) ++ (for the study population)
Measurement	**a)** Nugent Scoring **b)** A single technician	+
Statistical	**a)** 21 **b)** NR	+++
Cauci, 2002 **Prevalence of Bacterial Vaginosis and Vaginal Flora Changes in Peri- and Postmenopausal Women**		
Area of bias	**Criteria**	**Assessment of risk of bias**
Selection	a) Women presenting for routine pap smears b) Extensive inclusion/exclusion criteria reported. "women included were eligible for the Pap test (no bleeding or major vaginal inflammatory signs) and had no malignancies or severe medical illnesses. None had overt yeast vaginitis, and none was positive for *Neisseria gonorrhoeae i*nfection. Women with positive *Trichomonas vaginalis* results (on a wet smear and/or Pap smear	+

	exam) were excluded…. women included in the study said that they had not had sexual intercourse or engaged in any vaginal practice (such as douching or using vaginal suppositories) in the past 3 days and had not used antibiotics in the past 2 weeks…..Further exclusion criteria were partial or total hysterectomy, menopause induced by drug treatments, HRT terminated less than 6 months earlier, HRT taken for less than 3 months, vaginal estrogenic treatment, progestinic treatment in perimenopause, and tamoxifen or analogous antiestrogen drug therapy… excluded for reasons such as an incomplete questionnaire, positive cervical intraepithelial neoplasia discovered as a result of the Pap test performed at the time of the visit, or an inadequate vaginal secretion smear." c) Consecutive d) NR e) NR	
Measurement	a) Nugent Scoring b) "All the Gram smear evaluations were performed by two independent investigators, with more than 90% agreement; discrepant readings were re-examined, and a third investigator was consulted in case of persistent disagreement.	+
Statistical	a) 921 b) NR	+
Djomand, 2016 **Genital infections and syndromic diagnosis among HIV-infected women in HIV care programs in Kenya**		
Area of bias	**Criteria**	**Assessment of risk of bias**
Selection	a) HIV+ women recruited from HIV care programs b) NR c) Random sampling d) NR e) NR	+++ (compared to the general population) ++ (for the study population)
Measurement	a) Nugent Scoring b) NR	+
Statistical	a) 89 b) NR	+
Hay, 2002 **Diagnosis of bacterial vaginosis in a gynaecology clinic**		
Area of bias	**Criteria**	**Assessment of risk of bias**

Selection	a) Female 1st time attendees to a Gynaecology Clinic b) NR c) Consecutive d) 118/119 (99.2% response fraction) e) Not reported	+
Measurement	a) Amsel criteria b) NR	+
Statistical	a) 14 b) NR	+++
Hoffman, 2014 **Prevalence of Bacterial Vaginosis and *Candida* among Postmenopausal Women in the United States; Wave 2 data**		
Area of bias	**Criteria**	**Assessment of risk of bias**
Selection	a) Women participating in the National Social Life, Health and Ageing Project (NSHAP Survey) b) Inclusion: Women born between 1920 and 1947. Exclusion criteria NR *c)* NR d) 74.3% a) 1.5% (98.5% "were determined to be adequate for analysis")	++
Measurement	a) Nugent Scoring b) a trained microbiologist	+
Statistical	a) 790 b) NR	+
Joshi, 2020 **Prevalence and predictors of bacterial vaginosis in HIV-infected women in Maharashtra, India**		
Area of bias	**Criteria**	**Assessment of risk of bias**
Selection	a) HIV+ women recruited from several different regions, rural and urban, in the state of Maharashtra in India b) Inclusion: HIV+ non-pregnant women aged 21–60 having an intact uterus and no prior treatment for (CIN) or cervical cancer. Exclusion criteria NR c) Not clear d) NR e) NR	+++ (compared to the general population) ++ (for the study population)
Measurement	a) Nugent Scoring	+

	b) 'expert microbiologists'	
Statistical	a) 61 b) NR	+
Li, 2019 **Prevalence and risk factors for bacterial vaginosis and cervicitis among 511 female workers attending gynecological examination in Changchun, China**		
Area of bias	**Criteria**	**Assessment of risk of bias**
Selection	a) Obstetrics-Gynaecology Hospital; Yearly employment check up b) Inclusion criteria: "…included: 1) aged 18 years or older; 2) had lived in communities in Jilin province for more than 6 months as of June 30, 2015; 3) engaged in any of the eight occupations in the Occupational Classification of People's Republic of China……" Exclusion criteria: "…. included: 1) virgin; 2) women who were unemployed or retired; 3) women in pregnancy or lactation; 4) women who were menstruating; 5) intravaginal medication in the past 72 h; 5) HIV infection; 6) after hysterectomy; 7)subjects with missing data on age, age of first sex or gynaecological examination results." c) NR d) NR e) NR	+++ (compared to the general population) + (for the study population)
Measurement	a) Amsel criteria b) Gynaecologists	+
Statistical	a) 44 b) NR	+++
Massad, 2017 **Correlates of Bacterial Vaginosis Over Long-Term Follow-Up: Impact of HIV Infection**		
Area of bias	**Criteria**	**Assessment of risk of bias**
Selection	a) Women participating in the Women's Interagency HIV Study (WIHS) b) Inclusion criteria: "Adult women able and willing to consent to participation in the study, complete the interview in English or Spanish, travel to the research site for an interview and physical examination every six months, and have blood drawn for laboratory testing by venous or arterial access were enrolled" Exclusion criteria NR c) NR d) NR e) NR	++
Measurement	a) Amsel Criteria	+

	b) NR	
Statistical	a) 149 b) NR	+
Myer, 2005 **Bacterial Vaginosis and Susceptibility to HIV Infection in South African Women: A Nested Case-Control Study**		
Area of bias	**Criteria**	**Assessment of risk of bias**
Selection	a) HIV+ female seroconverters, selected from a community-based randomised controlled trial b) To be eligible, cases were selected from women who had seroconverted to HIV; controls were selected at random from women who had not seroconverted. Exclusion criteria NR c) "…all women who had seroconverted were selected…." d) 100% e) "Of the 410 participants, 383 (93%) had Gram-stained samples that were suitable for Nugent scoring"	+++ (compared to the general population) + (for the study population)
Measurement	a) Nugent Scoring b) NR	+
Statistical	a) 38 b) NR	+++
Sianou, 2017 **Prevalence of vaginitis in different age groups among females in Greece**		
Area of bias	**Criteria**	**Assessment of risk of bias**
Selection	a) Hospital Outpatient Clinic, Participants were eligible if diagnosed with vaginitis b) NR c) NR d) NR e) NR	+++
Measurement	a) Nugent Scoring and Amsel criteria were both required to be POS for a diagnosis of BV b) NR	++
Statistical	a) 35 b) NR	+++
Spinillo, 1997 **The relationship of bacterial vaginosis, candida and trichomonas infection to symptomatic vaginitis in postmenopausal women attending a vaginitis clinic**		

Area of bias	Criteria	Assessment of risk of bias
Selection	a) Women attending a Vaginitis Clinic, both self-referred and clinician-referred b) Inclusion criteria: "women aged over 50 years, judged to be postmenopausal by spontaneous amenorrhea of at least 12 months duration, Also included among cases were oophorectomized women regardless of their age…… we only included in the study patients with physical signs of vulvovaginal infection (abnormal vaginal discharge or odour, vulvar or vaginal erythema) on physical examination." Exclusion criteria: "presence of vulvar dystrophy *(sic),* use of any local vaginal medication within the 2 weeks before the visit, and microbiologic evidence of herpes simplex, NG or CT infection. c) NR d) NR e) NR	+++
Measurement	a) Modified Amsel Criteria b) NR	+
Statistical	a) 148 b) NR	+
Tibaldi, 2009 **Vaginal and endocervical microorganisms in symptomatic and asymptomatic non-pregnant females: risk factors and rates of occurrence**		
Area of bias	**Criteria**	**Assessment of risk of bias**
Selection	a) Non-pregnant, female 1st time attendees to the Genital Tract Diseases Outpatient Clinic b) NR c) NR d) NR e) NR	+++
Measurement	a) Amsel criteria b) Not reported	+
Statistical	a) 1732 b) NR	+

Supplementary Table S3

Authors unable to provide prevalence data on the postmenopausal women in their studies

1st Author	Year of Publication	Journal Title
Adane Bitew	2017	Prevalence of Bacterial Vaginosis and Associated Risk Factors among Women Complaining of Genital Tract Infection
Qingkai Dai	2010	An epidemiological survey of bacterial vaginosis, vulvovaginal candidiasis and trichomoniasis in the Tibetan area of Sichuan Province, China
Huan Lu	2015	Characteristics of bacterial vaginosis infection in cervical lesions with high-risk human papillomavirus infection
Najmeh Maharlouei	2013	Prevalence and risk factors of reproductive tract infections among a defined population of Iranian women
Kate V. Meriwether	2015	The effect of hydroxyquinoline-based gel on pessary-associated bacterial vaginosis: a multicenter randomized controlled trial
Muvunyi, Claude Mambo	2009	Prevalence of bacterial vaginosis in women with vaginal symptoms in South Province, Rwanda
Wu Li	2020	Associations of sexually transmitted infections and bacterial vaginosis with abnormal cervical cytology: A cross-sectional survey with 9090 community women in China
Xu Caiyan	2012	Prevalence and risk factors of lower genital tract infections among women in Beijing, China