Journal of Infection and Public Health (2016) xxx, xxx–xxx

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Screening of vulvovaginal infections during pregnancy in resource constrained settings: Implications on preterm delivery

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Received 22 March 2016; received in revised form 11 June 2016; accepted 24 June 2016

KEYWORDS
Bacterial vaginosis;
Preterm delivery;
Vaginitis;
Abnormal vaginal microbiota;
Vulvovaginal infections

Abstract The present study was undertaken to evaluate the efficacy of clinical and microbiological investigations available in limited resource settings for an effective diagnosis of vaginal infections/abnormal vaginal microbiota among pregnant women. As an outcome of the study we intended to find the association of various vaginal infections during pregnancy with preterm delivery. Pregnant women presenting for routine antenatal care at an antenatal clinic in south India were enrolled in the study. Each participant underwent clinical and microbiological examinations for the diagnosis of vaginal infections such as bacterial vaginosis (BV), vulvovaginal candidiasis (VVC) and trichomoniasis. In addition, Gram's stained high-vaginal smears were evaluated for the presence of partial BV and vaginitis. Diagnostic accuracies of clinical diagnosis for the aforementioned infections was determined in comparison

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http://dx.doi.org/10.1016/j.jiph.2016.06.003

Please cite this article in press as: Tellapragada C, et al. Screening of vulvovaginal infections during pregnancy in resource constrained settings: Implications on preterm delivery. J Infect Public Health (2016), http://dx.doi.org/10.1016/j.jiph.2016.06.003

with gold standard microbiological diagnosis. Proportion of women with vulvovaginal infections were estimated using descriptive statistics and incidence risk ratio for preterm delivery with each form of the infection was estimated using univariate analysis. A total of 790 pregnant women were recruited in the study. Positive predictive values of clinical diagnosis for BV, VVC and Trichomoniasis in comparison with reference method were 72.7, 33.5 and 37.6% respectively. Partial BV (3.2%) and vaginitis due to mixed bacterial etiology (9.4%) were per exclusionem diagnosed using the microbiological smear examination. Microbiological diagnosis of BV and vaginitis were found to have a statistically significant association with preterm delivery. Effective diagnosis of vaginal infections/abnormal vaginal microbiota associated with preterm delivery can be achieved by the adjunct of microbiological smear examination of the vaginal smears to the clinical examination in limited resource settings.

Introduction

Vaginitis among women of child bearing age is well acknowledged as a public health concern due to its high occurrence. Based on the microbial etiology, infectious vaginitis is classified broadly as Bacterial vaginosis (BV), Vulvovaginal Candidiasis (VVC) and Trichomoniasis. Role of these infections in the causation of preterm delivery and other adverse pregnancy outcomes has been well explored in the past few decades. More recently, vaginal dysbiosis (abnormal vaginal microbiota) during early stages of pregnancy is gaining recognition due to its positive association with adverse pregnancy outcomes [1,2]. Further, application of culture independent techniques such as phase contrast microscopy, broad range PCR and microbiome analysis of vaginal secretions has widened our knowledge regarding the microbial etiology of polymicrobial infections like BV and variations in the vaginal ecosystem among women from various ethnicities [3,4]. While, laboratory based diagnosis and confirmation of vaginal infections and/or abnormal vaginal microbiota is a part of routine antenatal care practices in developed nations, diagnosis and treatment of vaginal infections among pregnant women is solely based on clinical signs and symptomology of the patients in developing nations like India. With this background, we undertook the present study to estimate the proportion of vaginal infections/abnormal vaginal microbiota among south Indian pregnant women using clinical and microbiological investigations and find their association with preterm delivery.

Methodology

A case-cohort study was undertaken between May 2011 and April 2014 at an antenatal clinic of a secondary care hospital in South India. The study protocol was approved by the institutional ethical committee. Pregnant women in the age group of 18—35 years and 8—24 weeks of gestation were recruited in the study after obtaining a written informed consent. Women with history of medical diseases such as diabetes mellitus, hypertension, thyroid abnormalities, HIV and obstetric complications such as placental previa, cervical insufficiency and twin pregnancy were excluded from study.

Each study participant underwent a vaginal speculum examination and presence of inflammatory signs and/or vaginal discharge suggestive of infections were recorded. High-vaginal swabs were collected from the posterior fornix region for microbiological examination of vaginal infections. Vaginal pH testing, Whiff test and wet mount examination of the vaginal secretions for the presence of clue cells and motile trophozoites of *Trichomonas vaginalis* were performed at the patient bed side. Presence of three or more of the four Amsel criteria was diagnostic for Bacterial vaginosis [5]. One swab was transported to the microbiological laboratory using Stuart's transport media for aerobic and anaerobic microbiological culture techniques. A smear prepared from the high-vaginal swab of each woman was used for Gram's stain examination using Nugent's scoring system as originally described by Nugent RP et al. [6].

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