

Reproductive tract infections among married women in Upper Egypt

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عدوى الجهاز التناسلي بين السيدات المتزوجات في صعيد مصر

سنى عبده سلام وأحمد عبد الرحمن محفوظ ونهاد إبراهيم دبوس ومحمد عباس البراوي ومراد محيى الدين السعيد

خلاصة: تم اختيار 1344 سيدة متزوجة من مناطق حضرية وريفية في صعيد مصر (محافظة المنيا وأسيوط وسوهاج) وذلك بطريقة الاعتيان (أخذ العينات) العنقودي. وأجري عليهن مسح منزلي، حيث تمت مقابلتهن وفحصهن لدراسة حجم عدوى الجهاز التناسلي ينهن ومحدداتها. وتبين أن معدل الانتشار الإجمالي كان 52.8%، حيث كانت أكثر أنواع الجراثيم انتشاراً، المبيضات البيضاء (28%) والمُشعَّرات المهبلية (8.7%) وأنواع الرشاشيات (7.4%) والعقديات (4.6%) ومتدثرات التراخوما (4.2%). وأسفر التحليل العديد المتغيرات عن تحديد مجموعات معينة من النساء تتميز بارتفاع اختطار الإصابة بعدوى الجهاز التناسلي (اللاتي يستعملن اللولب لمنع الحمل في الوقت الراهن، واللاتي يمارسن القسمل الداخلي للمهبل بانتظام). وأظهر التحليل التفريقي أن الأعراض كانت ذات قيمة تفرقية منخفضة. إن الحاجة ماسة إلى زيادة فهم السيدات والمجتمع المحلي لعدوى الجهاز التناسلي.

ABSTRACT In a house-to-house survey using cluster sampling, 1344 married women from urban and rural areas of Upper Egypt (Minia, Assiut and Sohag) were interviewed and examined to study the magnitude and determinants of reproductive tract infections. Overall prevalence was found to be 52.8%, with the most prevalent forms being *Candida albicans* (28.0%), *Trichomonas vaginalis* (8.7%), *Aspergillus* species (7.4%), streptococci (4.6%) and *Chlamydia trachomatis* (4.2%). Multivariate analysis identified certain groups of women at high risk of developing reproductive tract infections (those currently using an intrauterine device, those who regularly practised internal vaginal washing). Discriminant analysis showed that symptoms were of low discriminating value. There is a great need to increase community and women's understanding of reproductive tract infections.

Les infections génitales chez les femmes mariées en Haute Egypte

RESUME Au cours d'une enquête porte-à-porte utilisant un échantillonnage en grappes, 1344 femmes mariées des zones urbaines et rurales de Haute Egypte (Minia, Assiout et Sohag) ont été interviewées et examinées pour étudier l'ampleur des infections génitales et leurs déterminants. On a trouvé que la prévalence globale s'élevait à 52,8 %, les formes les plus répandues étant *Candida albicans* (28 %), *Trichomonas vaginalis* (8,7 %), les espèces d'*Aspergillus* (7,4 %), les streptocoques (4,6 %) et *Chlamydia trachomatis* (4,2 %). L'analyse multivariée a identifié certains groupes de femmes à haut risque d'infections génitales (celles qui utilisaient alors un dispositif intra-utérin, celles qui pratiquaient régulièrement la toilette vaginale interne). L'analyse des discriminants a montré que les symptômes constituaient une valeur discriminante faible. Il existe un important besoin d'accroître la compréhension des infections génitales par les femmes et la communauté.

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Introduction

Reproductive tract infections (RTIs) in women are common worldwide [1]. Prevalence studies of RTIs in Egypt have usually been based on women seeking medical advice [2,3]. Such studies miss the large cohort of women who internalize their reproductive problems as a part of a "culture of silence" about their health, or who are shy or feel ashamed to report a disease that may be sexually transmitted [4]. Data regarding RTIs at the community level among married women in Egypt, particularly in Upper Egypt, are scarce. A 1989-90 study covering two villages in Giza Governorate showed RTIs to be a public health problem [5]. The present work studied the magnitude and determinants of RTIs among married women in Upper Egypt, and investigated their knowledge, attitudes and behaviour regarding RTIs.

Methods

The survey targeted three governorates in Upper Egypt: El-Minia, Assiut and Sohag. The combined population of the three governorates is almost 10 million. The present study used both qualitative and quantitative instruments. For qualitative research, a series of focus-group discussions were conducted. Female participants were recruited from rural and urban areas in each of the three governorates. For the community-based quantitative study, cluster sampling was used. Based on the population of each official district, 30 clusters were selected from urban and rural areas in each of the three governorates, and 15 women selected from each cluster. Through house-to-house survey, health teams visited each house to reach the target population, i.e. married women 15-45 years of age and not currently pregnant.

The health teams included researchers, Ministry of Health and Population (MOHP) physicians, and local health educators to facilitate contact with the community. Through questionnaire interview, relevant data were collected from the female respondents. Respondents were invited to attend the MOHP mobile clinics (used mainly for family planning purposes) for medical examination (general, abdominal and vaginal). During the examination venous blood samples and endocervical swabs were collected.

Samples taken in the field were transported immediately to the laboratory for processing [6]. Smears of endocervical swabs in saline tubes were examined microscopically to detect motile *Trichomonas vaginalis*. Swabs in Ames transport medium were inoculated on different media and incubated aerobically and anaerobically using different API systems. Swabs (scraping) in dry tube were subjected to antigen extraction. Subsequent examination was performed by an enzyme-linked immunosorbent assay (ELISA) technique for the detection of *Chlamydia trachomatis* (Chlamydiazyme) [7]. Dry swabs were also subjected to cytological examination using the Papanicolaou method. Endocervical swabs in special A3 transport media were inoculated and incubated anaerobically for detection of *Mycoplasma hominis* or *Ureaplasma* (Mycfast International, France). Serum samples from venous blood were examined by RPR or VDRL test for possible reactivity for *Treponema pallidum* and for human immunodeficiency virus (HIV) using an ELISA technique. Systematic random subsamples of serum (every fifth sample) were examined using ELISA for the detection of IgM for cytomegalovirus and IgM for herpes simplex virus type 2.

Multivariate logistic regression analysis was carried out to study the association between certain potential risk factors for RTIs. All 39 potential variables (sociodemographic, biological and obstetric history, behavioural, knowledge, and environmental) were included in the multivariate logistic regression equation. To study reliability and validity of symptoms (as mentioned by respondents) and signs (as detected by gynaecological examination) in detecting RTIs, stepwise discriminant analysis was used [8].

Results

The survey included 1344 women (387 from urban areas and 957 from rural areas), with a mean age \pm standard deviation of 29.3 ± 7.3 years.

Prevalence of RTIs

The overall prevalence of RTIs was 52.8%. The most prevalent forms were *Candida albicans* (28.0%), *T. vaginalis* (8.7%), *Aspergillus* species (7.4%), streptococci (4.6%), *Chlamydia trachomatis* (4.2%) and *Gardnerella* species (2.8%). As for seroprevalence, cytomegalovirus was found in 24.1% of the women and herpes simplex virus type 2 in 11.9%. *M. hominis* was detected in 24.8% of the examined samples. *Neisseria gonorrhoeae* was not isolated from any of the women examined. All serum samples tested for HIV and *Treponema pallidum* were seronegative.

The most prevalent cytopathological change was severe inflammation with *T. vaginalis* (2.6%), followed by mild inflammatory changes (0.9%). There was no significant difference between prevalence in urban and rural areas.

Knowledge, attitudes and behaviour

In focus group discussions the most striking finding was the lack of any clear consensus among the women as to what precisely constituted "normal" and "abnormal" reproductive morbidity or experience, in general, and vaginal secretions in particular. The respondents regarded having excessive vaginal secretions as normal, as being either unworthy of medical attention, too costly to address, or as a part of their burden in life about which they could not or should not complain. The lack of consensus regarding what precisely constituted reproductive morbidity was mirrored in the variety of steps women took to prevent or treat uncomfortable symptoms or experiences related to the reproductive tract. When asked who to consult and what to do before seeking medical advice for such conditions, the answers were very varied and sometimes questionable.

Determinants of RTIs

Table 1 shows the significant determinants of RTIs as indicated by multivariate analysis [odds ratio (OR), 95% confidence intervals (CI)]. No sociodemographic variable appeared to be a significant determinant. Among biological and obstetric variables, only women currently using intrauterine contraceptive devices (IUDs) had significantly greater risk, almost twice as high, of contracting an RTI compared to non-users (OR = 1.89, 95% CI: 1.08–2.65).

Behaviour significantly associated with RTIs included cleaning the inside of the vagina during daily personal hygiene (OR = 1.83, 95% CI: 1.04–2.94) or cleaning after sexual intercourse (OR = 1.62, 95% CI:

Table 1 Multivariate logistic regression model: adjusted odds ratios (OR) and 95% confidence intervals (95% CI) of potential risk factors in developing reproductive tract infections

Variable	OR	95% CI
Currently using intrauterine devices versus non-users	1.89	1.08–2.65
Regular internal vaginal washing as part of daily ablutions	1.83	1.04–2.94
Internal vaginal washing after intercourse	1.62	1.11–2.85
Taking no action for vaginal discharge	1.64	1.06–2.49
Shared toilet compared to having own toilet	2.07	1.31–5.65
Lack of audiovisual equipment (e.g. radio, television)	1.75	1.08–2.74

1.11–2.85). Women not seeking medical advice for vaginal discharge were also at significantly greater risk of RTIs (OR = 1.64, 95% CI: 1.06–2.49) compared to those who sought medical advice.

In terms of environmental conditions, Table 1 shows that women who used shared toilet facilities had a significantly

greater risk of RTIs than women using separate facilities (OR = 2.07, 95% CI: 1.31–5.65). Similarly, women lacking any mass media facility in the dwelling (radio, television, or video player) were more likely to contract an RTI than those with such equipment (OR = 1.75, 95% CI: 1.08–2.74).

Table 2 Discriminant analysis model: potential association of clinical signs (as discovered by gynaecological examination) with reproductive tract infections

Sign	Wilks lambda	Canonical correlation	F	% correctly classified		
				Sensitivity (%)	Specificity (%)	Overall (%)
Vaginal discharge	0.299	0.163	5.270*	71.3	74.8	72.40
Colour of discharge	0.295	0.175	5.730*	71.3	79.8	72.39
Type of discharge	0.293	0.181	8.890*	71.3	74.8	72.48
Odour of discharge	0.993	0.052	2.663	41.3	60.5	52.40
Cervical discharge	0.279	0.151	4.380*	76.9	79.1	72.60
Cervical dysplasia	0.997	0.029	1.117	43.0	49.2	47.70
Cervical ectropion	0.997	0.045	2.742	27.0	55.1	48.60
Cervicitis	0.995	0.037	1.012	25.2	57.9	50.07
Contact bleeding	0.992	0.009	0.109	20.2	50.5	47.99
Abdominal tenderness	0.999	0.009	0.108	15.8	44.6	47.69
Pelvic tenderness	0.997	0.030	1.245	50.8	21.6	52.90

*Significant ($P < 0.05$).

Validity of symptoms and signs in detecting RTIs

Results of discriminant analysis of symptoms mentioned by respondents showed them to be of low discriminating value in detecting RTIs. The results of discriminant analysis of signs discovered by gynaecological examination are shown in Table 2. Vaginal discharge, abnormal colour (yellow or green) of vaginal discharges, abnormal type of vaginal discharge (frothy, cheesy), and presence of cervical discharge detected by gynaecological examination were significantly associated with RTIs (small value of Wilks lambda, canonical correlation and $P < 0.05$). These clinical signs had a high sensitivity and specificity (of more than 70%) in detecting RTIs.

Discussion

Our study shows that RTIs among married women in Upper Egypt are widespread and constitute a significant public health problem. The study revealed that one in two women suffered from an RTI. Other studies in developing countries have shown a similarly high prevalence: in rural South Africa (29%) [9], Tanzania (68%) [10], Morocco (54%) [11], India (42%) [12] and Namibia (43%) [13].

The most prevalent infections in the present study were *C. albicans*, followed by *T. vaginalis*, *Aspergillus* species, streptococci, *Chlamydia trachomatis* and *Gardnerella* species. Fungal infections were the most prevalent forms. Recent studies in developing countries have shown similar results [9–12]. The pattern of infection uncovered by our study should be used to direct the availability of medications at the primary health care level towards the most prevalent types of infections.

An almost universal lack of knowledge among women regarding RTIs was revealed from focus group discussions and the community-based survey. High-risk behaviour associated with RTIs included vaginal cleaning practices and not seeking medical advice for related symptoms. Similar findings of low awareness and perception of RTIs have been reported in other developing countries [13–16].

Prompt intervention and preventive measures are essential. There is a great need to improve community and, especially, women's knowledge of RTIs. The focus should be on appropriate hygiene practices to reduce RTI exposure. Current misconceptions and beliefs need to be countered by appropriate health messages effectively disseminated throughout the community.

Our study showed that, of all the variables analysed, current IUD use presented the highest risk of developing an RTI, a finding similar to that recently reported in Portugal, where the prevalence of any infection, and particularly of bacterial vaginosis, was highest among IUD users [17].

Our study also showed that symptoms mentioned by the women were of low discriminating value in detecting RTIs. This agrees with findings in Turkey [18] and elsewhere in Egypt [19], which showed the low reliability of self-reporting for determining the extent of RTIs. Clinical signs, however, have a high sensitivity and specificity in detecting RTIs. Continuing medical education programmes for primary health care physicians should focus on signs rather than symptoms. The establishment of a standardized checklist of signs should be given high priority.

In our study, to ensure community support and motivate women to participate,

only female physicians carried out examinations. This should be a principal requirement for the delivery of all women's health services. Mobilization of community leaders helped us reach the target group for examination. Community involvement was an effective way to increase awareness regarding RTIs. Men's cooperation was sought by explaining the purpose of the survey, thereby increasing acceptance among their wives. As the decision-makers in Egyptian culture, men's support of their wives in seeking professional health advice is essential.

The use of the family planning mobile clinics to implement the survey provided an integrated approach and maximized available resources, an important consideration in the context of being able to deliver a comprehensive women's health package. Previous studies in developing countries have shown the benefits of integrating RTI prevention and control services with maternal and child health and family planning services [20]. By using the mobile clinics, women in remote areas could be included in the study. Future women's health strategies must take into account the need to provide access to women in remote areas.

Our study showed a higher risk of RTI for women who did not seek medical advice for excessive vaginal discharge compared to those who did. Reasons why women delay seeking medical care for RTIs are personal, social and professional. They include:

- lack of time because of work and family demands;
- lack of money;
- lack of transport;
- need for permission from, or to be accompanied by, a male family member when going to the health care facility;

- poor education/poor health awareness;
- the stigma attached to RTIs;
- poor perception of quality of care at the government level;
- lack of female physicians;
- attitude of health workers;
- the culture among women of "silent endurance", prevalent in many communities.

Possible ways to combat the delay in seeking treatment include:

- use of the mass media, especially radio and television, to broadcast relevant messages;
- training and motivation of female health physicians to work in health units;
- improvement of the attitudes and communication skills of health providers;
- outreach health education programmes;
- extended afternoon or evening opening hours at health care units to provide services at times more convenient for women.

The survey revealed that the pattern of RTIs was not influenced by sociodemographic conditions — neither geographic differences (urban/rural), age, educational level/occupation of women, nor education level/occupation of husbands. Thus, all married women of reproductive age should be have regular examinations for RTIs.

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Laboratory tests for the detection of reproductive tract infections

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