A national study of gynecological morbidities in Oman

Effect of women's autonomy

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ABSTRACT

Objectives: To determine the level of gynecological morbidities and other related morbidities; and to examine the effect of women empowerment on the reproductive tract infections among currently married Omani women.

Methods: This study is a part of the National Health Survey in the Sultanate of Oman, conducted between January and March 2000. The total number of households selected was 1968 with a total of 2037 ever-married women aged 15-49 years, of them 1662 were eligible to complete the gynecological morbidity symptoms questionnaire and to be clinically examined for gynecological morbidities.

Results: Despite the free facilities provided, one in every 4 women had reproductive tract infection and nearly half of the women suffer from at least one kind of gynecological disease. The prevalence of any sexually transmitted diseases was 4%, approximately 10% had combined genital prolapsed and 27% had cervical ectopy. Older women, education, work status, urban residence, heads of households, high economic status, and took their own decision about going to hospital, are significantly more empowered.

Conclusion: Gynecological morbidity is highly prevalent among ever-married women. The contribution of the sexually transmitted diseases to the high prevalence of reproductive tract infection appears to be modest. Genital prolapse was one of the risk factors for reproductive tract infection, education as a proxy for women empowerment was a poor predictor for the occurrence of the diseases.

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The Cairo program of action set out a 20-year strategy for promoting sexual and reproductive health, women empowerment, human rights and resource mobilization. It also highlighted the fact that reproductive morbidity is an important part of women's health requiring health services to expand their focus on maternal health and family planning.[1] At the UN General Assembly meeting in 2004, it was stressed that accelerating the implementation of the reproductive health program would contribute directly to the achievement of the Millennium Development Goals to dramatically reduce poverty, hunger, poor health, HIV/AIDS and gender inequality by 2015.[2] The status of reproductive rights and practices is often prefixed by women's autonomy. This autonomy, at least from the reproductive health rights perspective, means that women can make decisions in matters of reproduction and that she has the information and services that make her reproductive rights and desires realized.[3] Although empowerment and autonomy have different connotation, they are often used interchangeably in the literature and similarly in this paper. In addition to the critical importance of supporting women's involvement in the developmental process, most of the health studies showed that there are firm relations between women's situation and health status and survival of their children globally.[4-8] Because of the growing cultural sensitivity over reproductive health issues, particularly reproductive morbidity, this area remains relatively unexplored in most of the Arab countries. Very little is known about the reproductive morbidity and its determinants in the community. In Oman, reproductive morbidity has only been mentioned in reports from verbal autopsy of the Omani health surveys,[9-10] and from hospital based statistics.[11] Getting valid community-based information about reproductive morbidity does not only help assess the burden of the problem

and the trend of its development, but is expected to help prevent and avoid its devastating sequelae through better planning for intervention programs. Therefore, a population-based survey of reproductive morbidity was conducted to address this need. The aim of this study is first to determine the level of gynecological morbidities and other related morbidities and secondly to examine the effect of women empowerment on the reproductive tract infection (RTIs) among currently married Omani women.

Methods. This study is a part of the National Health Survey 2000 (NHS 2000), which consists of 2 major parts; the first is the study of lifestyle risk factors and the second is reproductive health. The sample for the national health survey was selected to be representative of the Nation as a whole. The survey adopted a multi-stage, stratified probability-sampling design. The total number of households selected was 1968 with total of 2037 ever-married women age 14-49 years, of them 1662 were non pregnant at the time of survey and were eligible to report the gynecological morbidity symptoms questionnaire and to be gynecologically examined. The response rate of completing the interview and filling the questionnaires was 88.9% and the response rate of visiting the health facility (in women's catchments area) for gynecological examination was 82.1% leading to 1364 women subjected to data analysis. The questionnaires used in this study are: the Household Health Status Questionnaire, which covers the demographic data; the Reproductive Health Questionnaire, which comprised of several modules including fertility, family planing and women empowerment (household decision making and freedom of movement); and the Gynecological Morbidity Symptoms Questionnaire, which consists of 8 modules: women's general health, menstrual cycle, abdominal pain, vaginal discharge, urinary complaints, genital prolapse, complaints during intercourse, and infertility module. In addition, Physical Examination Form for gynecological morbidity, which included sections for general, abdominal, and gynecological examinations and the laboratory forms for the results of hemoglobin, urine routine and culture, vaginal and cervical swab, and Pap smear form. A women was eligible for the study if she was ever-married, non pregnant and between the age 14-49 years. Twenty-five teams covering all the Sultanate regions were chosen for the survey. Each team was multidisciplinary consisting of a female health educator who was trained to interview the selected women, a nurse to take the physical measurements, a lab technician to draw the lab samples, a health inspector to transport the lab samples, an experienced female physician who worked in gynecology section to examine women, and a field supervisor (statistician) to supervise and review the questionnaires during field operation. Pathologists supervised and interpreted the laboratory results. Teams in each region were headed by one regional research coordinator who was responsible for the research teams in the region and for communicating with the central research team. The training was designed for different categories of the study team. During the training, physicians were given special attentions by the gynecologist-trainer to unify the procedures of gynecological examination, techniques of taking vaginal swabs and Pap smear. The physicians were extensively supervised during the pre-test and first week of the survey, and continued throughout the field work period. For traditional reasons, we only allow females workers to enter the households. Furthermore, all gynecologists and physicians working for maternal care are mostly females. The total numbers of personnel involved were 16 physicians, one in each health center for the gynecological examination, 10 pathologists, one in each referral hospital and 25 nurses, one in each team. The study was approved by the Research Review Ethical Committee at the Ministry of Health with no conflict of interest. A pre-test was designed to test the households, individuals, questionnaires and forms, order to obtain informations about operational and organizational procedures and to get an indication of general response to physical examination and specimens' collection.

A total of 120 households were selected from different areas in Muscat governorate. All the survey questionnaires and forms were interpolated, and were revised by experts. Measurements and specimens were also taken. The questionnaires, forms and some organizational procedures were adjusted after interviewers' and supervisors' debriefing session, who were from the selected villages and helped in rewording the questions according to women's perception regarding meaning and interpretation of questions. The emerging problems, performance rates, and general receptivity to the survey were analyzed and discussed. Before the field work, the whole community was prepared, the purpose was to encourage as much women as possible to participate and to clear doubt or any misconception on the tools and techniques used. Different strategies were used, mainly involving the tribal leader (sheikh) or (wali) who is the head of willayate (district). The research team explained the aims, methodology and type of benefits that would be gained to both participants and to the government (ministry). They asked them to talk to their husbands to encourage their wives to participate, and to go for gynecological examination. We used media such as television and radio by interviewing the principal investigator, ministry official or one member of the team to talk about the survey. Daily news papers were also used. At the households, the eligible women were

asked to participate in the survey and the interviewer filled-up the household questionnaire, the reproductive health questionnaire and the gynecological morbidity symptoms questionnaire. The nurse recorded the height, weight, waist circumference and blood pressure of the participant. The laboratory technician collected some laboratory samples for hemoglobin and blood sugar. The samples were labeled and transferred immediately to the laboratories at the regional hospitals in cold boxes filled with ice. The eligible woman was then invited to visit the health center within their living area for medical examination (selected health centers were chosen for the survey). At the health center, a trained physician examined the participant. The examination involved; general examination, abdominal, vulval, characteristics of discharge and pelvic examination. Three types of vaginal specimens were collected; high vaginal swab, cervical swab and cervical smear (Pap) smear. Urine specimen was taken after educating the women in the procedure of aseptic collection of urine. The collected samples from the health care centers were also transfer immediately to the regional hospital laboratories. The trained physician writes the provisional diagnosis and the final diagnosis follows after the laboratory results. Participants were informed about their illness, and if they have infections, they were treated and given the medications while others were transferred to the regional hospital to be seen by the gynecologist for further follow up or for operation. If necessary, when the woman had no means of transport or needed someone to accompany her to the health center, the interviewers would go to accompany her using special cars allocated for the study. Waiting time at the health care center was minimized by giving priority to the participated women and the presence of the interviewer to arrange for the correct flow of the examination and specimens, to solve any emerging problem and talk to the woman if necessary. The main survey field work started in January 2000 and ended in March the same year, all the 25 teams began the field work at the same time.

Criteria of diagnosis. Lower reproductive tract infections (LRTIs) occur in the vagina and cervix, and are suspected whenever abnormal vaginal and/or cervical discharges are present. Lower reproductive tract infections are diagnosed by laboratory testing as follows: a) Bacterial vaginosis: diagnosed by the presence of clue cells in vaginal swab. b) Trichomonal vaginitis: diagnosed by wet mounting, organism moving by undulating membrane and flagella. c) Candida albicans: diagnosed by a wet mount showing yeast buds or positive culture. d) Clinical cervicitis: diagnosed by the presence of a mucopurulent discharge in the cervix. e) Gonorrhea: diagnosed by a positive cervical swab culture on Chocolate agar.

Upper reproductive tract infection (URTI). It occurs in the uterus, fallopian tubes, and ovaries. It is also called pelvic inflammatory disease (PID). It was diagnosed if there was uterine tenderness alone or with adnexal tenderness, together with clinical cervicitis. Cervical ectopy was diagnosed if an abnormal layer that looked red on speculum examination replaced the surface layer of the cervix. Cervical cell changes were considered abnormal in the presence of mild, moderate or severe Dyskaryosis (Cervical Intraepithelial Neoplasia; CIN I, II or III). Genital prolapse was diagnosed for anterior vaginal wall, posterior vaginal wall, and/or uterine prolapse when they descended below their normal position. Syphilis was diagnosed by a positive Treponema Pallidum Haem-agglutination test (TPHA). Urinary tract infection: diagnosed when the bacterial count was higher than 105/ml of urine after culture. The WHO criteria (1999) for diagnosis of hypertension, body mass index and glucose intolerance were adopted.[12] Anemia: diagnosed when the hemoglobin level was lower than 12gm/dl for non-pregnant women. Hypertension prevalence was estimated based on adding up the subjects with self reporting of hypertension and subjects if the mean of their 2 readings were > 140 mm Hg systolic or 90 mm Hg diastolic (Kortakoff phase 5). Body mass index (BMI)= weight in Kg/(height in meters).[2] The women was considered over weight or obese if the weight to height ratio is ≥25.0 kg/m.[2] Diabetes prevalence was estimated based on adding up the subjects with self reporting of diabetes and subjects with fasting blood glucose is >7.0 mmol.

Data entry was carried out using EPI INFO version 6.[13] The process of preparation of data file was completed by July 2000. Analysis of the data was carried out using SPSS for windows version 9[14] Group means were compared using ANOVA while the likelihood Chi squared test examined the distribution of data. Multivariate analysis (several multiple logistic regression models) was conducted to test the effect of the independent variables on the outcome variables.

Two indicators of empowerment were developed from the women's status module to measure women's involvement in decision-making and freedom of movement.[15] To understand the decision making process, married women were asked "who has the final say on..." 8 decisions were indicate such as: what foods to cook, household expenditure, children's clothes, children's medicine and health care, problem solving, family planning, having another baby and visiting relatives. To measure decision-making power, an index was created (0 to 8) where 0 = no responsibility for any of the 8 decisions and 1–8 = responsibility for 1–8 decisions. Similarly, married women were asked "Does your husband allow you to go alone or accompanied

by your children to...” 6 places were indicate such as: shopping, hospital/health centers, children's schools, visit relatives, visit friends and go for a walk. Again, an index was used with a range from 0 to 6 (0 = no freedom and 1-6 = 1-6 places women can go). Cronbach-a coefficient was used to measure the reliability of both indices, and showed satisfactory results. The 2 indices were computed together to get the women's empowerment scale as an independent variable, ranging from 0 (very low empowerment) to 14 (very empowered).

The other independent variables used were age in years, educational level, residence (urban-rural), marital status (currently married, divorced or separated, or -widowed), number of marriages, age at marriage, polygamy (co-wife), working status, family welfare (constructed using the ownership of essential commodities), family structure; type of family (nuclear or extended), sex of the head of family (male or female) and presence of at lest one grandparents in the family, gravidity, IUD use, household workload (from women point of view), personal hygiene behavior, in terms of protection in menstruation was taken as a proxy for such behavior, for menstruating women excluding women who were amenorrheic because of breast feeding or menopause (a score combining whether she is using tampons, cotton or piece of cloth to protect herself during menses and whether is washing herself with water and antiseptics, soap or only with water). In view of the difficulty of asking about sexual activity, currently married women were asked about their husband availability at home. A woman was considered sexually active if her husband was living with her or coming to her at weekends. Women whose husbands were not coming for months because they are working abroad and women who are separated, divorced or widowed were considered sexually inactive. Women's decision to obtain medical care and if she is consulting others before going to the hospital was explored. The dependent or the outcome variables tested in different logistic regression models was reproductive tract infections. For categorical variables in logistic regression, one category was selected as reference category. Odds ratio was derived for each category expressing the magnitude of the increased risk in relation to the reference category. The odds ratio for an independent variable in logistic regression is adjusted for other independent variables in the model. A p value of <0.05 was considered statistically significant.

Results. **Table 1** shows the characteristics of the study sample. The mean age of women was 31.89 years and 41% were in the 25-34 years group. Only 16% finished the secondary level of education or above. The majority was from urban areas (73.4%), and currently married (91%). Almost half of the sample had 6 pregnancies or more (48.3%) and had a pregnancy end within the last 2 years (47.2%). The majority of women reported that their household work was low to medium (81%). In terms of personal hygiene, almost half of menstruating women are hygienic and the rest adopted a less hygienic behavior. The distribution of women according to their use of family planning methods showed that approximately 31% of the currently married women were currently using a modern method of contraception.

Table 1 - Percent distribution of the study sample according to their characteristics, (n=1365).

Characteristics	Percentage
Age groups	
15 - 24	19.9
25 - 34	40.7
35 - 44	32.4
45 - 49	7
Educational level	
Illiterate	35
Read & Write	22.2
Primary	16.6
Preparatory	10.2
Secondary	11.2
University	4.8
Residence	
Urban	73.4
Rural	26.6
Marital Status	
Married	90.5
Divorced/separate	6.2
Widowed	3.3
Polygamy	
Yes	11.8
Husband availability	
Yes	84.8
Gravida	
0 - 1	14.3
2 - 3	21.5
4 - 5	15.9
6+	48.3
Recent delivery (during the last 2 years)	
Yes	47.2
Workload	
Low	9.4
Low-medium	81
Medium-high	9.6
Personal hygiene (for menstruating women)	
Hygienic	51.7
Moderate	38.5
Less hygienic	9.8
Contraceptive use (currently married)	
Any modern method	31
Pills	5.3
Intrauterine device	4.2
Injectables	10.5
Male condom	4.1
Female sterilization	6.9

The most common method used for both ever and currently married women was injectables (10.5%). Female sterilization was relatively high (6.9%).

In **Table 2**, bacterial vaginosis was the most common morbidity revealed by lab investigation (11%) while other types of vaginitis were less common. Approximately 3% had definite pelvic inflammatory disease. The prevalence of any sexually transmitted diseases was approximately 4% and around a quarter of the women had endogenous RTI (23.4%). Approximately 10% had genital prolapse and 27% had cervical ectopy. About 47% of ever-married women were suffering from gynecological morbidity or physiological condition. The presence of related morbidities was common; 11% had urinary tract infection, 26% of non-pregnant women had anemia and more than half of the sample was either overweight or obese (54%). Hypertension and diabetics were found among 22% and 8% of the examined women respectively.

Considering the joint occurrence of morbidity conditions, the co-morbidity of different morbidities examined namely reproductive tract infection, cervical ectopy, genital prolapse, cervical cell change, human papilloma virus, urinary tract infection, anemia, hypertension, diabetics and obesity. Most of the women were suffering from at least one category of gynecologic or related morbidity (85%). **Table 3** shows that about one fifth of the women have at least one disease of the reproductive tract infection. More than one third are suffering from at least one of gynecological diseases or physiological condition; of them almost 15% have 2 categories or more. Only 15% were free from a morbidity condition. The mean women empowerment scale for the ever-married women who had gone for

Table 2 - Prevalence of gynecological morbidities and related morbidities (laboratory investigation) among every-married women in Oman.

Morbidity	No. of positive/ total	Percentage
Any sexually transmitted diseases	52/1303	(4)
Trichomonad vaginitis	43/1256	(3.4)
Gonorrhea	7/1282	(0.5)
Syphilis	4/1303	(0.3)
Any endogenous RTI	297/1271	(23.4)
Bacterial vaginosis	139/1271	(10.9)
Candida albicans	120/1232	(9.7)
Clinical cervicitis	67/918	(7.3)
Upper RTI (PID definite)	35/1293	(2.7)
Any low RTI	318/1242	(25.6)
Any RTI (upper or lower)	337/1293	(26.1)
Cervical ectopy	338/1272	(26.6)
Genital prolapse	134/1365	(9.8)
Cervical cell change (CIN I, II, III) ≥20 years	14/1278	(1.1)
Cervical cell change (CIN I, II, III) ≥30 years	14/720	(1.94)
Human papilloma virus	7/727	(0.96)
Any gynecological morbidity (RTI, cervical ectopy, prolapse, cervical cell change and HPV	639/1365	(46.8)
Any related morbidity	800/1365	(58.6)
Urinary tract infection	140/1326	(10.6)
Overweight and obesity (BMI) ≥20 years	703/1302	(54)
25 - 29.9 kg/m^2	372/1302	(28.6)
≥30 kg/m^2	331/1302	(25.4)
Anemia (<12 mg/dl)	329/1270	(25.9)
Hypertension (systolic or diastolic) ≥20 years	301/1365	(22.1)
Diabetes (≥20 years)	85/1091	(7.8)
Any gynecological or related morbidity	1163/1365	(85.2)

HPV - Human papilloma virus, RTI - reproductive tract infection, PID - pelvic inflammatory disease

Table 3 - Percentage of number of gynecological and related diseases (laboratory investigation) among ever-married women.

Morbidity	n	Percentage
Any reproductive trace infection		
No infection	956	(73.9)
Have one infection	278	(21.5)
Have two infections	47	(3.6)
3 – 5 infections	12	(0.9)
Any gynecological morbidity		
No disease	726	(53.2)
Have one disease	439	(32.2)
Have two diseases	152	(11.1)
3 – 5 diseases	48	(3.5)
Any related morbidity		
No disease	565	(41.4)
Have one disease	494	(36.2)
Have two diseases	242	(17.7)
3 – 5 diseases	64	(4.6)
Any gynecological or related morbidity		
No disease	202	(14.8)
Have 1 - 2 diseases	750	(54.9)
Have 3 or more diseases	413	(30.3)

gynecological examination (N=1364) was 8.2. Women who were older, more educated, working, lived in urban areas, married later than 21 years, divorced or widowed, whose husbands were not available all the time, heads of households, took their own decision about going to hospital, and women from high economic status were significantly more empowered than other categories of women (**Table 4**). Presence of either grandfather or grandmother in the family, number of marriages, hygiene and number of children did not show any significant relationship with women's empowerment. The differences in means of empowerment scale of women with reproductive tract infection and with urinary tract infection showed that women with those diseases were more empowered than women without these infections. There were no significant differences in means of the empowerment scale of women with prolapse.

Logistic analyses according to models of risk factors hypothesized for lower or upper reproductive tract infection (RTI) are presented in (**Table 5**). Several logistic regressions were run to investigate the effect of different variables measuring empowerment. All models presented include the following variables as controls: age, residence, prolapse, IUD use, husband availability, anemia, hygiene, gravida, workload, and number of marriages. In Model 2 the empowerment scale was added to the base model. In Model 3, the empowerment proxies, working status and educational level, were added. The family structure and economic status were added in Model 4 while in model 5 all variables of interest were entered together. The empowerment scale could predict those who were with RTIs compare to those without the RTIs. It is clear that empowerment proxies; working status, educational level, family structure variables (sex of head of household, presence of grandfather or grandmother, co-wife) and economic status of the women had no effect on the occurrence of RTI. Among controlled risk factors; Prolapse, husband availability and gravida contributes significantly to the prevalence of RTI in all models. Women with prolapse were found to be at more than one and half times the risk of RTI compared with women who were not suffering from prolapse. Husband availability (sexual activity) and more deliveries (gravida) reduce the risk of RTI (**Table 5**).

Discussion. This national survey with a sample randomly drawn from all over the country represents a distinct advantage over other similar surveys in the Arab world and in other developing countries, which were restricted to villages or specific urban areas.[16-22] In addition, the inclusion of the women empowerment module as a new component to this survey made

Table 4 - Women empowerment by demographic, socio-economics and reproductive morbidity.

Variable	Empowerment (0-14)	
Age		
14-24	7.2	
25-34	8.4	F=13.37
35-44	8.7	P=000
45-49	8.0	
Marital status		
Divorce/widow	9.5	F=7.01
Married	8.2	p=0.008
Place of residence		
Urban	8.7	F=76.68
Rural	7.1	P=0.00
Education		
Illiterate	7.7	F=11.52
Less than secondary	8.4	p=000
Secondary & above	9.0	
Workload		
Low	7.6	F=5.36
Medium-high	8.3	P=0.020
Husbands' availability		
Absent	8.8	F=4.32
Present	8.2	P=0.038
Family type		
Nuclear family	8.4	F=4.44
Extended family	8.1	P=0.03
Present of grand parents		
No	8.3	F=0.87
Yes	8.1	P=0.35
Co-wife		
No	8.3	F=0.97
Yes	8.0	P=0.32
Age at marriage		
≥21	8.7	F=4.85
<21	8.2	P=0.02
Number of marriages		
Once	8.2	F=1.04
More than once	8.5	P= 0.30
Consultation/decision to go to hospital		
Take her own decision	9.3	F=111.91
Others take decision	7.6	P=000
Hygiene		
Good	8.2	F=0.75
Poor	8.3	P=0.785
Head of house hold		
Male	8.2	F=12.1
Female	12.0	P=0.001
Work status		
Not working	8.1	F=23.85
Working	9.1	P=000
Economic status		
Low	7.5	F=8.95
Medium	8.1	P= 000
High	8.6	
Gravid(no of children)		
0-5	8.1	F=3.40
≥6	8.4	P=.065
Reproductive tract infection		
No	8.1	F=9.30
Yes	8.7	P= 0.002
Prolapse		
No	8.2	F=1.08
Yes	8.5	P= 0.29
Urinary tract infection		
No	8.1	F=8.49
Yes	8.9	P= 0.004

it possible to explore association of women status as measured by empowerment and its proxies with gynecological morbidities. The problem of women's hesitation to undergo gynecological examination is quite common in many community-based surveys of reproductive morbidity, particularly in the absence of the symptoms. Younis et al[18] explained careful planning and approaches to enter the community. As a National Survey, the response rate of over 82% is considerably high; the refusal rates reported in other studies involving gynecological examination reached 81%.[23]

The most important finding of this survey is the high prevalence of gynecological morbidity among ever-married women, almost 47%. About a quarter of the women studied had at least one lower or upper RTI. It is well known that RTI cause embarrassment and discomfort and influences pregnancy outcome and low birth weight babies.[24] The endogenous reproductive tract infection was almost 23.4%, which was higher than what was found in a Lebanese community (9.3%)[21] and lower than one district in South India (54%)[22] and in Matlab, Bangladesh (30%).[25] The study of women attending MCH/FP clinics in Moshi, Tanzania estimated the prevalence of Bacteria vaginosis and Candida to be 34% and 27%, respectively,[26] compared to 11% and 10% in Oman. The contribution of the STDs to the high prevalence of reproductive tract infection in the studied population appears to be modest. Sexual transmitted infections were found in almost 4% of the women studied, a proportion that is much lower than a

Tables 5 - Odds ratios (derived from multivariate logistic regression analysis) of any reproductive tract infection (laboratory investigation) among ever-married women for women's empowerment indicator, empowerment proxies controlling for other characteristics.

Explanatory variables	Dependent variable Any reproductive tract infection (0=normal; 1=diseases)				
	Model 1	Model 2	Model 3	Model 4	Model 5
Women empowerment scale (0-14)		1.07†			1.06†
Proxies of women empowerment					
Working status			0.96		0.94
Not working = 0					
Working = 1					
Educational level			1.32		1.24
Illiterates = 0					
Literate = 1					
Family structure					
Family type				0.98	1.02
Nuclear=0					
Extended=1					
Head of household				0.89	1.50
Male=0					
Female=1					
Presence of grandparents				1.00	1.03
Absent=0					
Present=1					
Co-wife				1.27	1.20
No=0					
Yes=1					
Welfare				1.53	1.38
Low=0					
Mid-high=1					
Control variables					
Age (continuous 14-49 years)	1.00	0.99	1.00	1.00	1.00
Residence (0=urban, 1=rural)	0.95	0.94	0.99	1.00	1.00
Prolapse (0=normal, 1=diseases)	1.68*	1.65*	1.67*	1.73†	1.69†
IUD use (0=not use, 1=use)	1.17	1.02	1.13	1.16	1.01
Husband availability (0=not available, 1=available)	0.68*	0.63*	0.67*	0.66*	0.64*
Anemia (0=not anemic, 1=anemic)	0.76	0.74	0.75	0.74	0.72
Hygiene (0=hygienic, 1=less hygienic)	1.10	1.04	1.11	1.11	1.05
Gravida (0=0-5, 1= ≥6)	0.68*	0.6†	0.7*	0.67*	0.62†
Workload (0=law/normal, 1=heavy)	1.36	1.40	1.37	1.35	1.39
Number of marriage (0=once ,1=more than once)	0.97	1.06	0.98	0.97	1.05
N[1]	1308	1153	1308	1308	1153
Df	10	11	12	15	18
(-2LL)-2 Log Likelihood ratio	1437.06	1260.53	1434.27	1432.56	1256.48
Difference in -2LL from model 1	0	176.53	2.79	4.5	180.58

N[1] some of cases were omitted during analysis due to missing cells. *p<0.05, †p<0.01.

study of women at risk of conducting STD in Bangkok massage parlors[27] and in primary health care centres in Tanzania where 26% of the studied women had at least one STI.[26] The sexually transmitted diseases in this study might be under estimated; due to loss of samples during long transportation from villages to the regional hospital laboratory, heat affects the samples in the cold boxes or the inability to do Chlamydia test.

Oman, like any other developing country, is undergoing rapid urbanization. Internal migration among men is common for those seeking jobs; more than a third of the women (36%) reported that their husbands are not living with them all the time. The frequency of husbands coming home varied from weekends only to yearly. Short time migration may be one of the mechanism by which STIs spread to rural areas. With the encouragement of tourism industry, sex workers have been noticed coming from other countries. The current condom usage rate among currently married women was 4% but the prevalence of STI and condom use among sex workers is not known. Consequently, there is a potentially high burden of STI risk through unprotected sex. The low level of STI among women reported in this survey may change if the level of STI among sex workers is high and condom use remains low. However, the relatively low STI would give the program manager a unique chance to prevent an emerging epidemic in the community.

The prevalence of PID (2.7%) was not high. It is unfortunate that chlamydia cervicitis was not included. It would be interesting to assess the prevalence of chlamydia infection in a future study. The prevalence of epithelial cervical abnormalities is quite low which are not indicative of the prevalence of HPV. However, human papilloma virus (HPV) was extremely low in this community, which is the strongest risk factor for cancer cervix.[28] This has implications if a cervical cancer program is to be contemplated. The predictive value of the test used is likely to be lower, as it depends on the prevalence. The presence of genital prolapse is less common than in other studies in the region such as Younis et al,[18] Deeb et al[21] and Mawajdeh et al[16] (10% versus 56%, 49.6% and 22% respectively). This may be because of majority of deliveries in Oman (95%) are hospital deliveries and different prevalence of risk factors for genital prolapse in these communities, such as workload and the conduct of deliveries. Another finding is that over 85% of the married women are suffering from gynecological or related morbidity. The conditions represent a long-term threat to health and raises major concern about the physical and social well being of married women.

Oman has well-equipped health facilities; health centers are available within accessible distance in each area. The medical services are comprehensive and completely free of charge, including medication and family planning methods. Despite the free facilities provided, one in every four women had reproductive tract infection and nearly half of the women suffer from at least one kind of gynecological disease. The magnitude of the problem is a real threat and challenge to the health providers. There is little evidence that the pre-existing maternal services and its high coverage had a significant impact on the incidence and prevalence of the gynecological morbidity and on RTI specifically. Even the family planning services were unlikely to have significant influence, especially with low rate of reported condom use.

The results seemed to indicate that women neglected their gynecological morbidity. Many assumptions could explain the high prevalence; one is that women gave lower priority to their health status. Seeking treatment for gynecological concerns and utilization of health services is low; even though most women were aware of gynecological symptoms, only 32.8% had visited the physician (data not shown). One would think that women probably had not realized the severity of the infection and the importance of treatment and they probably perceived these types of illness as normal conditions for a married woman. Also embarrassment and unwillingness to be examined or talk about gynecological and sexual diseases is one of the reasons even though a majority of them would go during pregnancy for antenatal care. Another component that needs to be looked upon is the quality of the maternal care; most of the women who had visited the gynecologist reported that they had used the medication prescribed (91%) but only 52% reported that they felt better or any improvement (data not shown).

The restriction of the survey to ever-married women was one of the potential biases in this study; widowed and divorced women were included in the study. Since it is unacceptable to ask the unmarried girls to undergo gynecological examination or even to ask them about contraceptive use they were excluded from the survey. As an Islamic country, pre-marital sex is considered unacceptable and unsupervised meetings between the sexes is very restricted. Marriage is universal in this community; over 99%[9] of women were married at some point in their life.

Since the sero-prevalence of Positive Treponema Pallidum Haem-agglutination Test (TPHA) was very low among ever-married women therefore, the researchers expect STI to be rare among unmarried girls. Our analysis of controlled risk factors for RTIs found a significant link between occurrence of prolapse and the increase prevalence of RTIs, the cause could be due to exposure of genital organs to outer unclean

environment or ulceration caused by interference of the blood supply.[29] This finding is consistent with findings of Younis et al[18] in rural Egypt, they explained their findings that the vaginal acidity which is a natural protection against infection is interrupted by extended of the vaginal wall outside.

The low risk of RTIs among women with high gravida could be explained by the high visits of antenatal care (99.6%) were women would have the chance to be treated from infections during pregnancy and after delivery. It is most likely that postpartum and post abortive infections are uncommon in this community.

Our analysis found an association between husband availability (sexual activity) and RTIs, women who their husband were available were protected from RTIs It may be attributed to the fact that semen might be protective because of change in the vaginal pH. Many studies demonstrate the relation of women autonomy and contraceptive use.[30-33]

Our previous study, pointed out the week relation between women autonomy and contraceptive use as measured by decision making and freedom of movement, and that education has much stronger influence.[15] In this study we confirm the week link of women autonomy indicator, but in this time with the RTIs. What is surprising and different from our previous study is that, women education had no relation with the occurrence of the RTIs diseases, even when other empowerment proxies were tested they bear no relationship with the probability of women having RTI. In India, the week association between women autonomy and fertility was found.[34] Literature supports the view that women's status is multidimensional in nature, which comprises multiple characteristics of the woman and her relation with the others; therefore it is impossible to capture and understand women's status through a single measure.[35] Moreover, the concept is a multidimensional one since "empowerment in one sphere of activity, in one physical setting or one set of relationships may not lead to the empowerment to another".[36] For example, a woman may have high freedom of movement but low educational status. More than half of the studied women in this survey were illiterate (35%) or less than primary education (22.2%). Kishore[37] in her study of women autonomy and its link to contraceptive use found an elimination effect of the empowerment indicators to other proxies' variables of women empowerment.

In Oman, education was a better predictor of contraceptive use than autonomy.[15] The results of the regression models provide some basis for arguing that the transformation in the female access to education produces a slowly changes in the women's status and demographic and health outcome. Education is relatively new to Omani women, it is expected to take more than one generation before any attitudinal or cultural changes take place. Though the study takes association between family structure variables and RTIs infection, it is still worth including this variable and exploring its association in a better setting.

Our analysis raises more questions than answers. Very real social changes are under way in Oman, but their implications for reproductive morbidity remain poorly understood. This suggests that to better understand the possibility of occurrence of reproductive tract infections among women and possibly other demographic outcome, the role of the empowerment indicators needs to be evaluated in addition or in combination with other variables. The preliminary findings reported here strongly indicate a need for more analysis of the manner in which empowerment and its proxies influence reproductive morbidity. Clearly, better data are needed to specify more precisely the nature of underlying process. Further research is needed in the area of prevalence of STDs among men, quality of reproductive health services, effect of migration on women's health, the underlying factors that hinder women to utilize the health services and health education to break the "women's culture of silence".

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