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Abstract
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Keywords
aging, Egypt, Tunisia, disability, gender, comparative studies

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Differences in Disability among Older Women and Men in Egypt and Tunisia
Author(s): Kathryn M. Yount and Emily M. Agree
Source: *Demography*, Vol. 42, No. 1, (Feb., 2005), pp. 169-187
Published by: Population Association of America
Stable URL: http://www.jstor.org/stable/1515182
Accessed: 23/04/2008 16:47

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DIFFERENCES IN DISABILITY AMONG OLDER WOMEN AND MEN IN EGYPT AND TUNISIA*

KATHRYN M. YOUNT AND EMILY M. AGREE

Research on child survival and health has indicated disparities between boys and girls in selected Middle Eastern countries. Health disparities in later life are understudied in this region. In this article, we examine differences between women and men in later-life activity limitation in Egypt and Tunisia. Difficulty executing physical tasks is more common for women than for men in both study sites, although differences are smaller after adjustment for underlying illness. Differences in the difficulty of executing physical tasks also are sensitive to environmental controls in variable ways across the study sites. The findings caution against the sole use of reported disability in comparative studies of gender and aging.

More than 10 years ago, Watkins (1993) observed that the study of gender in demography was limited by conventional views of what is important about women (e.g., reproduction and maternal behavior) and of the ages at which women matter (e.g., 15–50 years), noting that women "disappear from view" after menopause (p. 559). Much has changed in the discipline of demography since the publication of that article: recognition of the implications of the demographic and epidemiological transitions for change in morbidity has sparked an interest in the causes of disparities in health, including gender-related factors (e.g., Langford and Storey 1993; Myers, Lamb, and Agree 2003). Much of this work outside the West has concentrated on disparities in child health and survival (e.g., Hill and Upchurch 1995; Pande 2003),[1] and some of the largest disadvantages among girls persist in the Middle East (e.g., Hill and Upchurch 1995; Yount 2001). In such settings, gender inequalities in health also may be present among adults because disadvantage may accumulate over the life course (e.g., O'Rand 1996; Rudkin 1993), and priorities in the allocation of food, money, and health care in families may rank older women as being a lesser priority than other family members (e.g., Gittelsohn 1991). Little research has compared later-life illness among women and men in this region, however. We adapted the most recent classification of functional health—the International Classification of Functioning, Disability, and Health (ICF)—developed by the World Health Organization (WHO; 2001), to assess, in the varied contexts of Egypt and Tunisia, differences between women and men in having any difficulty executing physical tasks and performing activities, as well as the underlying illnesses and environmental factors that may account for these differences.

SEX, GENDER, AND DISABILITY

The ICF (WHO 2001) is the product of decades of thinking about functional health and integrates medical models of inherent physiological impairments with models of the

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1. Gage (1994) and Gragnolati, Elo, and Goldman (1999) are two exceptions.

handicapping nature of the physical and social environment, brought to the fore by advocacy groups and recent legislation. According to the ICF, the functioning of an individual can be classified according to a set of health domains (bodily functions and structures) and a set of health-related domains (*execution* of tasks, *performance* of activities, and participation in life situations), which are modified by an individual's physical and social environment and/or personal attributes. Therefore, functional ability or disability can be represented as a continuum and reflects the intersection of an individual's physiological capacities (e.g., bodily functions and structures) and the opportunities, constraints, and demands of the environment.

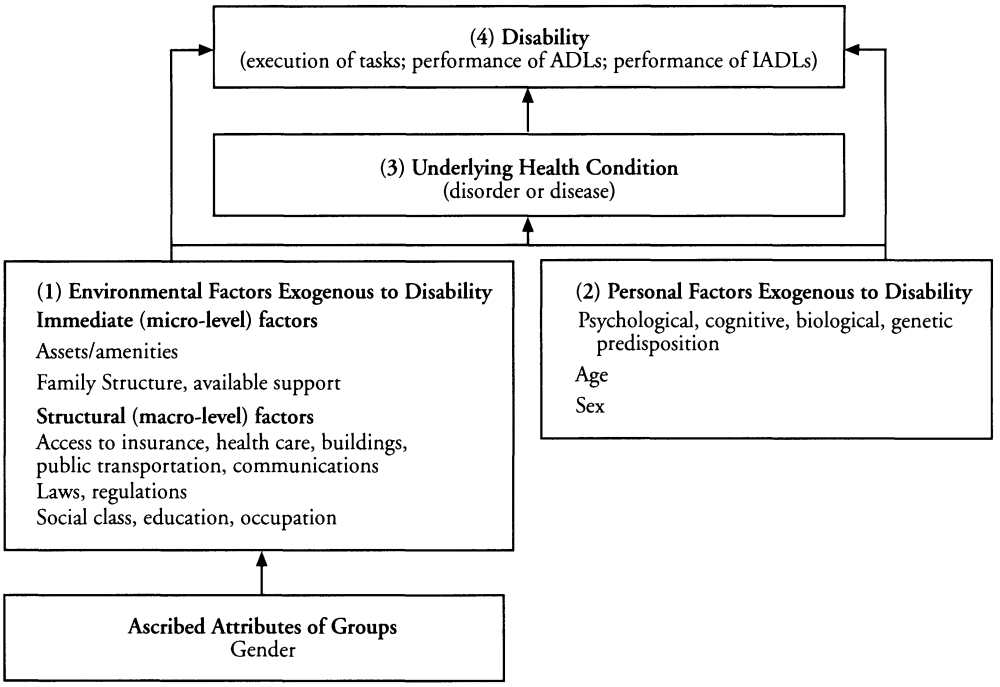
"Disability" in older populations most often is measured with respect to the ability to *perform*—in one's own environment—basic activities of daily living (ADLs) that are needed for survival and instrumental activities of daily living (IADLs) that are seen as necessary for independent living. ADLs include feeding oneself, dressing, transferring in and out of bed or chairs, bathing or showering, and using the toilet. IADLs include using a telephone, going to distant places, shopping for food, preparing meals, and handling money. Contextual variation in social roles and living conditions, however, make certain measures of the *performance* of activities problematic in comparative research (Kovar 1991; Liang, Gu, and Krause 1992). Responses to questions about IADLs may be especially sensitive to the segregation of women's and men's roles and living environments, and indeed women in Bangladesh have reported greater activity limitation than men at similar levels of observed physical function (Rahman and Liu 2000). Thus, indicators of the ability to *execute*—in a real or hypothetical *standard* environment—discrete physical tasks like kneeling, lifting weights, reaching, and climbing stairs were designed to measure actions that are independent of the social and physical opportunities, constraints, and demands of one's environment (Nagi 1976). Here, we assess explicitly whether environmental factors account for differences between women and men in all three dimensions of disability, namely, reported difficulty *performing* basic and instrumental activities in one's own setting and *executing* physical tasks in a hypothetical standard environment.

Of considerable importance to this research is the ICF's attention to the *environmental* and *personal* contexts that account for an individual's ability to perform activities and to participate in society. Environmental factors include (1) the physical and material features of a person's *immediate setting*, such as the home, workplace, or school, and direct contact with family and others and (2) formal and informal *social structures*, like work-related organizations and services, governmental agencies, communication and transportation services, informal social networks, laws, regulations, and ideologies. In this model, environmental factors may facilitate or impede the performance of activities.[2] Personal factors include the attributes of an individual that are not part of a health condition or state, such as sex, race, age, health behaviors, and psychological assets. The ICF interprets these factors as idiosyncratic but allows them also to have positive and negative effects.

With regard to the effects of sex or gender on various dimensions of disability, evidence from industrialized countries suggests that compared with older men, older women more often experience functional impairments and activity limitations, have longer durations of disability, and spend proportionately more remaining years of life disabled (e.g., Arber and Cooper 1999; Leveille et al. 2000; Leveille, Resnick, and Balfour 2000; Oman, Reed, and Ferrara 1999; Verbrugge 1985). Although women's greater disability often is attributed to a higher prevalence of and greater susceptibility to certain underlying pathologies and impairments (e.g., Andersen et al. 1999; Dunlop et al. 2002; Goldman et al. 2004; Shriver et al. 2000; Wingard et al. 1989), Figure 1 illustrates, with concepts from

2. The demands of people's activities and social roles may induce them to make changes to their homes or workplaces, but we focus on exogenous measures of the immediate environment.

Figure 1. Disability in Women and Men: Adaptation of the ICF Framework



the ICF model, that a range of factors may account for differences between women and men in levels of *performance* disability.

Part 1 of Figure 1 refers to structural features of society (macro-level factors) and a person's immediate physical and social environment (micro-level factors) that may differ by gender in ways that explain differences in disability between women and men. For example, gendered segregation of the occupational structure may lead to differences in women's and men's exposure to the risks of disabling occupational injuries. Differences in educational attainment may explain differences in women's and men's ability to perform certain instrumental activities. Finally, gendered segregation of familial roles may lead to differences in the quality of women's and men's relationships (e.g., with spouses and children) and their access to and use of household amenities and resources.

Part 2 of Figure 1 refers to exogenous personal factors—biological, cognitive, psychological, and genetic predispositions—that may vary by demographic characteristics (age and sex) and may influence the progression of underlying pathologies, as well as interactions among bodily functions and structures, activities, and participation. Part 3 refers to underlying health conditions that may differ between women and men and may account for differences in their ability to execute tasks, perform even the most basic activities, and participate fully in society.

In sum, this model, based on an adaptation of the ICF framework, emphasizes that differences in disability among older women and men arise from *differences by sex* in predispositions to pathologies and impairments and from *differences by gender* in the

opportunities, demands, and constraints of the macro- and microenvironments in which women and men conduct their daily lives. Because underlying illnesses may affect one's ability to execute physical tasks *and* to perform activities, differences between women and men in underlying illness should account for some portion of any crude difference between women and men in all three measures of disability. Because basic activities are gender neutral and physical tasks presumably are gender neutral and occur in a standard environment, differences between women and men on these dimensions of disability should be less sensitive to gendered micro- and macroenvironments. Because one's social and physical environment is implicit in the performance of IADLs, environmental variables should account for some of the difference between women and men in their ability to perform these activities.

With these expectations, we compared unadjusted and adjusted odds of reporting any difficulty executing physical tasks and performing ADLs and IADLs among older women and men using survey data from settings in Egypt and Tunisia. These settings represent contexts in which mortality from infectious diseases was similarly high, but where educational, occupational, and legal structures and estimates of early child mortality reflected a greater female disadvantage in Egypt. A comparison of three dimensions of disability in older women and men fills gaps in research that persist despite increasing population aging throughout the Middle East and known female disadvantages in health and health care in parts of the region (Yount 2001, 2003a, 2003b, 2004; Yount, Agree, and Rebellon 2004).

STUDY SITES

From 1978 to 1988, diarrhea was the main cause of death among children younger than age 5 in Egypt and Tunisia (Aloui, Ayad, and Fourati 1989; Langsten and Hill 1994), but the risk of postneonatal and early child (ages 1–4) mortality has remained higher for girls than boys in Egypt (Aloui et al. 1989; Sayed et al. 1989; Yount 2001).[3] Maternal mortality also has accounted for as much as 20% of the deaths of women of reproductive age in Giza, Egypt (Kane et al. 1992). Older women in both settings have reported having difficulty walking more often than have older men (Andrews 1998), and adjusted estimates of reported difficulty with daily activities have been higher among women than among men in Egypt (Lamb 1997). As a result, even though life expectancy at birth has been 2–3 years higher for women than for men (65 versus 62 in Egypt; 69 versus 67 in Tunisia) (United Nations, UN, 2002; United Nations Development Program, UNDP, 2002), disability-adjusted life expectancies at birth and at age 60 have been the same or lower for women (58 versus 59 years at birth and 12 versus 12 years at age 60 in Egypt; 61 versus 62 years at birth and 10 versus 11 years at age 60 in Tunisia) (WHO 2000).

Differences between women and men in educational and employment opportunities have been marked in both settings, but more so in Egypt. In 1990, 60% of men and 34% of women were literate in Egypt, compared with 72% of men and 46% of women in Tunisia (World Bank Group 2002). Women made up less than one third of the documented labor force in both settings (27% in Egypt and 29% in Tunisia), yet Tunisian law encourages wives with sufficient means to contribute financially to their families, whereas Egyptian law allows men to forbid their wives to work if working interferes with familial duties. Relative to working men, working women in Egypt disproportionately occupy the agricultural and service sectors (UNDP 2004).

Family in Egypt and Tunisia is the main source of support for older adults, although patterns of coresidence and marital laws differ across settings. In 1995 in Egypt, 55% of

3. The figures are 51 versus 42 postneonatal deaths per 1,000 in Egypt and 29 versus 25 postneonatal deaths per 1,000 in Tunisia, in addition to 47 versus 38 early child deaths per 1,000 in Egypt and 19 versus 18 early child deaths per 1,000 in Tunisia.

ever-married women aged 15–49 lived with their husbands' families at the start of marriage (El-Zanaty et al. 1996). In Tunisia, nuclear living has been well documented, but women in Tunis often live near and visit their natal and marital kin (Holmes-Eber 1997). A high prevalence of patrilocal, endogamous marriage (e.g., marriage to a blood relative) in both settings enables daughters in such marriages to provide daily assistance (e.g., Yount and Agree 2004).[4] Offspring in both settings may provide more care to older women because women tend to outlive their husbands and contribute more to kin-keeping activities (Knodel and Ofstedal 2003; Silverstein and Bengtson 1991; Yount forthcoming). Tunisian marriage laws are more equitable than Egyptian laws in that the former require explicit, mutual consent and prohibit polygamy and extrajudicial repudiation of a spouse. As of 2000, over 75% of reproductive-aged women in Egypt did not select their first husbands (El-Zanaty et al. 1996), polygamy was admissible (albeit rare) if husbands notified existing and intended wives, and husbands could verbally repudiate their wives. Tunisian laws pertaining to inheritance require written, signed wills and favor spouses and descendants over extended relatives, whereas Egyptian laws give preference in inheritance to husbands, sons, and male relatives over wives, daughters, and female relatives. Thus, Egyptian marriage laws reinforce women's socioeconomic dependence on marriage and biological kin.

The Egyptian and Tunisian governments have differed in their contributions to social security and health. In Egypt, older adults have access to public health insurance facilities, teaching hospitals, primary care facilities, and private hospitals and clinics, especially in urban areas (Kamel et al. 1999). Formal geriatric services and expanded eligibility to use health insurance facilities began only in the 1990s, however, and senior pensions provide minimal support to a small pool of beneficiaries (Social Security Administration, SSA, 1999). Access to care in Tunisia also remains greater in urban than rural areas (Aloui et al. 1989; Touati et al. 2001), but the Tunisian government has invested more heavily in the health sector than has the Egyptian government,[5] and old-age pensions and survivors' benefits are more generous in Tunisia than in Egypt (SSA 1999). Differences by gender in use of health care also are more marked in Egypt. Girls receive preventive care, as well as money, standard care, and private care for the management of illness, less often than do boys (Yount 2001, 2003a, 2003b, 2004), and older women have lower adjusted odds of visiting physicians than do older men (Yount et al. 2004). In Tunisia, girls have lower adjusted odds of being fully immunized and of receiving any medical treatment, but boys and girls have similar adjusted odds of receiving private curative care (Obermeyer and Cardenas 1997). Older Tunisian women and men have similar adjusted odds of visiting physicians (Yount et al. 2004).

This comparison suggests that by the 1990s, female disadvantages in health and survival, educational and work opportunities, marital rights, and the use of health care were marked in Egypt. Differences between women and men in rates of any difficulty performing IADLs should therefore be especially sensitive to adjustment for environmental variables in Egypt. Differences in rates of any difficulty executing physical tasks and performing ADLs, however, should be less sensitive to such adjustments in both settings. With these expectations, we assessed differences between women and men in Egypt and Tunisia in these dimensions of disability before and after we accounted for differences in reported underlying illness and aspects of the micro- and macroenvironment.

4. In the 1990s in Egypt, 39% of marriages were to a cousin or other blood relative. In Tunisia, 47% of ever-married women who were first married between 1984 and 1988 were married to blood relatives (Casterline and El-Zeini 2003; El-Zanaty et al. 1996).

5. In 2001, public expenditures on health in Tunisia and Egypt, respectively, were 4.9% and 1.9% of the countries' gross domestic products (UNDP 2004).

DATA

Data for this analysis came from the World Health Organization Collaborative Study on Social and Health Aspects of Aging, conducted during 1989–1990 in Bahrain, Egypt, Jordan, and Tunisia (Andrews 1998). A relatively low response rate in Bahrain (80%) and high item nonresponse in Jordan justified our restricted geographic focus on the Egyptian and Tunisian study sites. Samples in Egypt and Tunisia consisted of community-dwelling women and men aged 60 and older. Multistage, stratified cluster-sampling procedures were used to identify eligible participants. The Egyptian sample was drawn from the contiguous governorates of Cairo, Giza, and Qaliubia in northern Egypt and the governorates of Minia and Fayoum in southern Egypt. The sample in Tunisia was drawn from three governorates in the District of Tunis. The extent to which the Tunisian sample was rural at the time of data collection is unknown. Roughly an equal number of persons aged 60–64, 65–69, 70–74, and 75 years and older were sampled. Response rates were approximately 99% in both study sites, which are comparable in level to national surveys (Aloui et al. 1989; El-Zanaty et al. 1993). Interviews were conducted with older subjects or coresident proxies in the 5% of cases in which scores for a modified Mini-Mental-Status Exam (MMSE) indicated cognitive impairment (Andrews 1998). Thus, the term *respondents* hereafter includes eligible older adults or proxies who reported on their behalf. Interviewers asked standard questions about demographic characteristics, housing, employment, assets, social integration and support, living arrangements and family networks, risk behaviors, illness, psychological status, morale, visits to health professionals, and use of medications and assistive devices. Questions about executing physical tasks and performing ADLs and IADLs were adapted from existing instruments (Katz 1983; Lawton 1975; Nagi 1976). The analysis is based on ever-married older adults with complete data on the variables of interest (weighted sample sizes of 474 women and 548 men in Egypt, and 555 women and 634 men in Tunisia).[6]

Dependent Variables

Following the ICF guidelines, three dependent variables that indicate "any disability" were derived from summative scales of items measuring reported (1) difficulty executing physical tasks (0 = none, 1 = some, 2 = a lot, and 3 = unable), (2) difficulty performing ADLs (0 = can do without help, 1 = with help, and 2 = unable), and (3) difficulty performing IADLs (0 = can do without help, 1 = with help, and 2 = unable). Physical tasks include pulling or pushing objects, stooping or kneeling, lifting weights, and reaching or extending arms. ADLs include eating, dressing or undressing, caring for appearance, getting in and out of bed, walking, bathing or showering, and going to the toilet. IADLs include using the telephone, going places too far to walk, shopping, preparing meals, and handling money.

Independent Variables

The main independent variable is the respondent's sex or gender.[7] Measures for underlying illness include a summative scale for the number of reported medical conditions and two

6. Of the 1,180 older adults in the original sample in Egypt, 61 never-married respondents, 30 respondents with incomplete information on covariates, and 65 respondents with incomplete information on items measuring difficulty executing physical tasks and performing ADLs and IADLs were excluded from the analysis, resulting in an unweighted sample of 1,024 (401 women and 623 men). Of the 1,236 older adults in the original sample in Tunisia, 11 never-married respondents, 18 respondents with incomplete information on covariates, and 21 respondents with incomplete information on items measuring difficulty executing physical tasks and performing ADLs and IADLs were excluded from the analysis, resulting in an unweighted sample size of 1,186 (555 women and 631 men).

7. The terms *sex* and *gender* acknowledge that the indicator for female gender may capture differences by sex in underlying illness and differences by gender in roles and living conditions.

measures for cognitive limitation (see Figure 1). Although the respondents could report on 16 medical conditions,[8] the maximum number reported was 8 in Egypt and 9 in Tunisia. Use of a proxy respondent measures gross cognitive limitation, and respondents' scores on a 20-point modified MMSE reflect their level of cognitive limitation.[9] Use of a proxy respondent and respondents' scores on the modified MMSE are correlated, but the former variable also controls for other reasons that respondents who scored 15 or higher on the MMSE were interviewed by proxy. Added to models for difficulty performing ADLs and IADLs is the score for difficulty executing physical tasks. Age captures unmeasured underlying medical conditions and changes in social roles associated with advancing years. Measures of the immediate environment include the availability of kin (whether or not widowed and the number of living sons and daughters) and characteristics of the respondent's home (urban-rural residence; whether the respondent or spouse owned the respondent's home; a summative scale of amenities, including clean water, a toilet, facilities to cook, facilities to bathe or shower, and possession of a washing machine, refrigerator, telephone, television, and radio). Measures of the macroenvironment include childhood residence, education, and prior main occupation (skilled or unskilled/never worked).

ANALYTIC METHODS

We describe sociodemographic characteristics, reported levels of difficulty executing physical tasks and performing ADLs and IADLs, and the prevalence of reporting any difficulty with these tasks and activities for women and men separately and by study site. Estimates and p values were computed using normalized probability weights and accounting for the age-stratified, cluster-sample study designs (Rao and Scott 1981, 1984). Also taking design effects into account, we fitted a series of logistic regression models for each setting separately to estimate unadjusted, partially adjusted, and fully adjusted odds, for women versus men, of reporting any difficulty with each of the three indicators of disability, all measured in the aforementioned locations in Egypt and Tunisia:[10]

$$\text{logit}(P_i) = \beta_0 + \beta_1 F_i + \sum_{j=2}^{5} \beta_j U_{ij} + \sum_{j=6}^{8} \beta_j S_{ij} + \sum_{j=9}^{11} \beta_j E_{ij} + \sum_{j=12}^{14} \beta_j M_{ij} \tag{1}$$

$$\text{logit}(A_i) = \beta_0 + \beta_1 F_i + \beta_2 P_i + \sum_{j=3}^{6} \beta_j U_{ij} + \sum_{j=7}^{9} \beta_j S_{ij} + \sum_{j=10}^{12} \beta_j E_{ij} + \sum_{j=13}^{15} \beta_j M_{ij}, \tag{2}$$

where P_i indicates any difficulty with physical tasks (note that P_i also is a covariate in Eq. (2)), A_i is one of the two disability measures indicating any difficulty with basic ADLs or IADLs; i indexes the respondent; F_i denotes female gender; and U_{ij} denotes reported underlying illnesses, cognitive impairment, and age. S_{ij} denotes measures of the availability of kin, E_{ij} denotes measures of the immediate environment, and M_{ij} denotes measures of the macroenvironment. Unadjusted effects of F_i are sequentially adjusted for U_{ij}; U_{ij} and S_{ij}; U_{ij}, S_{ij}, and E_{ij}; and U_{ij}, S_{ij}, E_{ij}, and M_{ij}. Changes in female-to-male rates of any reported disability with these sequential adjustments show the extent to which U_{ij}, S_{ij}, E_{ij}, and M_{ij} account for differences between women and men in the odds of reporting any difficulty with each dimension of disability.

8. These conditions were hypertension, heart attack, other heart problems, diabetes, arthritis, falls, foot problems, bone problems, ulcers, infectious or parasitic diseases, burns, stroke, tuberculosis, other lung conditions, cancer, other injuries.

9. In a comparative study of older adults in Taiwan and the United States, cognitive functioning was a more powerful predictor of difficulty with IADLs than with ADLs (Ofstedal, Zimmer, and Lin 1999).

10. We also analyzed scores for physical functional limitation, ADLs, and IADLs. Because the inferences are similar and responses to items for executing physical tasks and performing daily activities were not identical, we present findings that are based on reports of any difficulty on each dimension.

Certain limitations of the analysis merit remark. First, because the samples were drawn in dissimilar localities, some variables may have different meanings across sites (e.g., rural/urban residence). As a result, data from each site cannot readily be pooled to test for differences in parameter estimates across settings, and estimated coefficients from stratified analyses are compared. Second, indicators for governorate or a locality within the governorate are not available in either data set. These variables are therefore not part of the analysis, and the indicator for urban versus rural residence may capture contextual differences across governorates or districts. Third, cross-sectional data limit the assessment of whether observed associations between covariates and measures of disability arise as a result of selection (e.g., the more disabled less often marry) or represent causal effects of covariates (Lillard and Panis 1996; Murray 2000). In the Egyptian site, however, only 5% of the sample was never married, and only 1% reported being divorced or separated. These percentages are less than 1 in the Tunisian site. Thus, we restricted our analytic samples to ever-married respondents and estimated the effect of widowhood and other covariates on measures of disability. This procedure did not eliminate the problem of selection and restricts generalization to ever-married older adults in these settings; yet, if residual effects of selection operate similarly for women and men, gender differences in rates of disability should be unbiased. Finally, we excluded personal factors indicated in the ICF model that may be endogenous to disability, such as lifestyle, fitness, and use of medications.

RESULTS

Characteristics of the Study Samples

Table 1 compares the characteristics of women and men in each study site. *P* values for chi-squared tests of association and for differences in the percentage of women and men in higher categories of ordinal covariates are provided. The number of reported medical conditions differed significantly between women and men in both sites, and women reported more often than men that they had at least three acute or chronic conditions. Differences between women and men in MMSE scores also were significant in both sites, but only in Tunisia did women have any cognitive impairment more often than men. Also, a higher percentage of women than men in Tunisia were interviewed by proxy. In both sites, women were widowed markedly more often than men, and less often had two or more living sons and two or more living daughters. Over 40% of the older women and men in Egypt and over 60% in Tunisia had at least two surviving siblings. In both sites, women reported less often than men that they or their spouses owned their places of residence, but women and men reported access to a similar number of major amenities, on average. In Egypt, women reported at least marginally more often than men to have access to facilities for bathing and cooking (not shown) and to all amenities about which questions were asked. No such differences were observable in Tunisia. The distributions of residence in childhood and current residence were similar for women and men in both sites, but women reported substantially less often than men that they had any education and skilled prior employment. These findings suggest that compared with men, women in both sites reported higher levels of underlying illness, higher levels of widowhood, and less frequent access to educational and employment opportunities. Women's greater access than men to cooking and bathing facilities in Egypt but not in Tunisia is consistent with the more rigid gender roles and spheres in Egypt. Women's poorer educational attainment and less frequent skilled employment in both sites reflect highly gendered institutional environments.

Difficulty With Physical Tasks and Daily Activities

Table 2 shows the mean scores for level of difficulty executing physical tasks and performing ADLs and IADLs, as well as the percentage of respondents who reported any

Table 1. Percentage Distributions of Older Women and Men Aged 60 and Older, by Background Characteristics and Study Site

	Egypt				Tunisia			
Measure	Men	Women	p^a	p^b	Men	Women	p^a	p^b
Predisposing Risk Factors								
Number of reported medical conditions								
0	30.2	20.2			26.6	10.9		
1	34.3	32.2			29.3	24.0		
2	18.8	21.5			22.1	26.4		
3+	16.9	26.2	***	***	22.1	38.8	***	***
Cognitive impairment								
None, score 20 of 20	18.7	29.8	***	***	15.8	5.8	***	***
Some, score 19 of 20	42.6	28.6			24.2	3.6		
More, score < 19 of 20	38.7	41.6			60.0	90.7		
Proxy respondent (no)	5.6	5.0			2.6	5.1	*	
Age group								
60–64	38.0	36.8			33.5	35.7		
65–69	27.3	27.6			25.8	26.5		
70–74	17.2	17.4			17.6	15.6		
75–79	10.8	10.8			13.8	11.7		
80+	6.8	7.5			9.3	10.6		
Immediate Environment								
Number of living sons								
0	9.7	20.2			7.8	11.5		
1	25.0	28.3			15.0	18.4		
2+	65.2	51.5	***	***	77.3	70.1	*	**
Number of living daughters								
0	17.5	24.3			9.7	12.0		
1	26.0	27.1			17.3	22.6		
2+	56.5	48.6	*	*	73.1	65.4	*	**
Number of living siblings								
0	41.5	44.8			16.5	19.0		
1	15.3	13.9			23.4	18.1		
2+	43.2	41.3			60.1	62.9	†	
Widowed (no)	16.8	79.9	***		10.7	57.6	***	
Urban residence (rural)	45.4	50.7			78.5	81.0		
Self/spouse owns home (no)	68.2	59.3	**		81.8	72.7	***	
Access to utilities/amenities[c]								
0–3	27.1	22.7			12.1	11.9		
4–6	23.9	23.5			47.6	47.7		
7–9	49.0	53.8			40.3	40.4		

(continued)

(Table 1, continued)

Measure	Egypt Men	Egypt Women	p^a	p^b	Tunisia Men	Tunisia Women	p^a	p^b
Macroenvironment								
Educational level								
None	55.1	64.1	*	**	73.9	92.1	***	***
Primary	24.6	19.4			14.4	5.9		
More than primary	20.4	16.6			11.7	2.1		
Childhood residence urban (rural, both)	33.9	37.1			35.6	40.9		
Prior occupation skilled (unskilled/never worked)	23.4	2.5	***		38.3	2.2	***	
n	474	548			634	555		

Note: For binary variables, the percentage reporting positively is shown. Reference categories are in parentheses.

Source: Authors' calculations of data from Andrews (1998).

[a]*p* values are based on the Rao and Scott (1981, 1984) corrected chi-squared test of association, which adjusts estimates for the age-stratified, cluster-sample design.

[b]*p* values are based on the Rao and Scott (1981, 1984) corrected chi-squared test of association between gender and being in indicated extreme category versus not among ordinal variables.

[c]Includes access to clean water, toilet, cooking facilities, bath/shower, washing machine, refrigerator, phone, television, and radio.

$^{\dagger}p < .10$; $^{*}p < .05$; $^{**}p < .01$; $^{***}p < .001$

Table 2. Mean Scores for Difficulty Executing Physical Tasks and Performing ADLs and IADLs and Prevalence of Having Any Difficulty With These Tasks and Activities, Women and Men Aged 60 and Older, by Study Site

Measure	Egypt Men	Egypt Women	Tunisia Men	Tunisia Women
Level of Difficulty Executing Physical Tasks (range 0–12)	2.6 (2.4-2.9)	4.3 (4.0–4.6)	1.9 (1.7–2.1)	3.3 (3.0–3.5)
Prevalence of Any Difficulty With Physical Tasks	71.3	88.0***	50.3	76.2***
Level of Difficulty Performing ADLs (range 0–14)	0.7 (0.6–0.9)	1.3 (1.0–1.5)	0.9 (0.7–1.0)	1.1 (0.9–1.3)
Prevalence of Any ADL Difficulty	22.4	28.5*	32.0	46.8***
Level of Difficulty With IADLs (range 0–10)	1.9 (1.7–2.1)	2.8 (2.6–3.1)	2.0 (1.8–2.2)	3.4 (3.2–3.7)
Prevalence of Any IADL Difficulty	49.1	63.0***	62.7	90.0***
n	474	548	634	555

Note: *p* values are based on the Rao and Scott (1981, 1984) corrected chi-squared test of association, which adjusts estimates for the age-stratified, cluster-sample design. Standard errors are in parentheses.

Source: Authors' calculations of data from Andrews (1998).

$^{*}p < .05$; $^{***}p < .001$

difficulty with these tasks and activities, for women and men by study site. The mean scores for the level of difficulty with physical tasks and both kinds of daily activities are higher for women than for men in both sites, as are the frequencies of reporting any difficulty executing physical tasks or performing ADLs or IADLs. The Egyptians more often reported any and higher levels of difficulty with physical tasks than did the Tunisians, whereas the Tunisians more often reported any difficulty performing ADLs and IADLs. The reported levels of difficulty with ADLs and IADLs are similar for men in the two sites. The reported levels of difficulty with ADLs are similar for women in the two sites, and the reported levels of difficulty with IADLs are higher for Tunisian women than for Egyptian women.

Multivariate Analysis of Any Difficulty With Physical Tasks and Daily Activities

Table 3 shows the unadjusted, partially adjusted, and fully adjusted log odds and odds for women versus men of reporting any difficulty executing physical tasks and performing ADLs and IADLs. In both settings, the unadjusted odds of all three measures of disability are higher for women than for men. In Egypt, women have 3.0 times higher unadjusted odds of reporting any difficulty executing physical tasks, 1.4 times higher unadjusted odds of reporting any difficulty performing ADLs, and 1.8 times higher unadjusted odds of reporting any difficulty performing IADLs. In Tunisia, these unadjusted odds are 3.2, 1.9, and 5.4, respectively. Except for performing IADLs in Egypt, women's greater relative odds of reporting any difficulty executing physical tasks or performing ADLs or IADLs tend to decrease in magnitude with adjustment for reported underlying illness: the odds of reporting any difficulty executing tasks for women versus men decline from 3.0 to 2.6 in Egypt and from 3.2 to 2.4 in Tunisia; in both cases, partially adjusted relative odds remain significantly different from 1.0. The odds of reporting any difficulty performing ADLs for women versus men decline only slightly in Egypt (from 1.4 to 1.3) but decline from 1.9 to 1.3 in Tunisia; in both cases, partially adjusted relative odds do not differ significantly from 1.0. The odds of reporting any difficulty performing IADLs for women versus men decline from 5.4 to 3.3 in Tunisia but remain significantly different from 1.0.

Each Model 5 for Egypt and Tunisia in Table 3 shows the log odds and odds for women versus men of reporting any difficulty executing physical tasks and performing ADLs and IADLs, after adjusting for reported underlying illness and all available measures of the immediate and macro-level environment. With these adjustments, the change in women's relative odds of reporting any disability varies across the study sites. In Egypt, controlling for measures of the immediate and macroenvironment tends to reduce women's relative odds of reporting any difficulty executing physical tasks (e.g., from 2.6 to 2.2) and performing IADLs (e.g., from 2.0 to 1.7). Estimates for interim Model 3 show that controlling for measures of family structure accounts for much of the reduction in women's relative odds of reporting any difficulty executing physical tasks and performing IADLs in Egypt. Women's fully adjusted odds of reporting any difficulty executing physical tasks and performing IADLs remain significantly higher than those of men, however.

In Tunisia, controlling for differences between women and men in measures of the immediate and macroenvironment tends to increase women's relative odds of reporting any difficulty executing physical tasks (e.g., from 2.4 to 2.8) and performing IADLs (e.g., from 3.3 to 3.8). Estimates from interim Model 4 show that controlling for women's and men's immediate environments accounts for much of the increase in women's relative odds of reporting any difficulty executing physical tasks and performing IADLs in this setting. Women's fully adjusted odds of reporting any difficulty executing physical tasks and performing IADLs remain significantly higher than those of men, however.

Table 3. Unadjusted, Partially Adjusted, and Fully Adjusted Relative Log Odds and Odds (Female Versus Male) of Reporting Any Difficulty Executing Physical Tasks and Performing ADLs and IADLs, by Study Site

	Egypt (n = 1,022)					Tunisia (n = 1,189)				
Model Estimates	OR	β	*SE*	*p*	Model *F*	OR	β	*SE*	*p*	Model *F*
Difficulty Executing Physical Tasks										
Model 1: F only	2.96	1.08	(0.19)	***	***	3.17	1.15	(0.13)	***	***
Model 2: F + U	2.61	0.96	(0.20)	***	***	2.40	0.88	(0.15)	***	***
Model 3: F + U + S	2.08	0.73	(0.26)	**	ns	2.56	0.94	(0.17)	***	ns
Model 4: F + U + S + E	2.31	0.84	(0.26)	***	***	2.84	1.05	(0.18)	***	**
Model 5: F + U + S + E + M	2.18	0.78	(0.26)	**	ns	2.77	1.02	(0.19)	***	ns
H-L goodness of fit (Model 5):					ns					ns
Difficulty Performing ADLs										
Model 1: F only	1.38	0.32	(0.15)	*	*	1.87	0.63	(0.12)	***	***
Model 2: F + U	1.30	0.26	(0.18)	ns	***	1.30	0.26	(0.15)	†	***
Model 3: F + U + S	1.19	0.17	(0.21)	ns	ns	1.34	0.29	(0.17)	†	ns
Model 4: F + U + S + E	1.30	0.26	(0.24)	ns	***	1.46	0.38	(0.17)	*	**
Model 5: F + U + S + E + M	1.22	0.20	(0.24)	ns	*	1.36	0.31	(0.19)	ns	ns
H-L goodness of fit (Model 5):					ns					ns
Difficulty Performing IADLs										
Model 1: F only	1.76	0.57	(0.14)	***	***	5.35	1.68	(0.16)	***	***
Model 2: F + U	1.96	0.67	(0.17)	***	***	3.30	1.19	(0.18)	***	***
Model 3: F + U + S	1.65	0.50	(0.21)	*	*	3.72	1.31	(0.20)	***	ns
Model 4: F + U + S + E	1.90	0.64	(0.23)	**	***	4.97	1.60	(0.22)	***	***
Model 5: F + U + S + E + M	1.72	0.54	(0.25)	*	***	3.78	1.33	(0.23)	***	***
H-L goodness of fit (Model 5):					ns					*

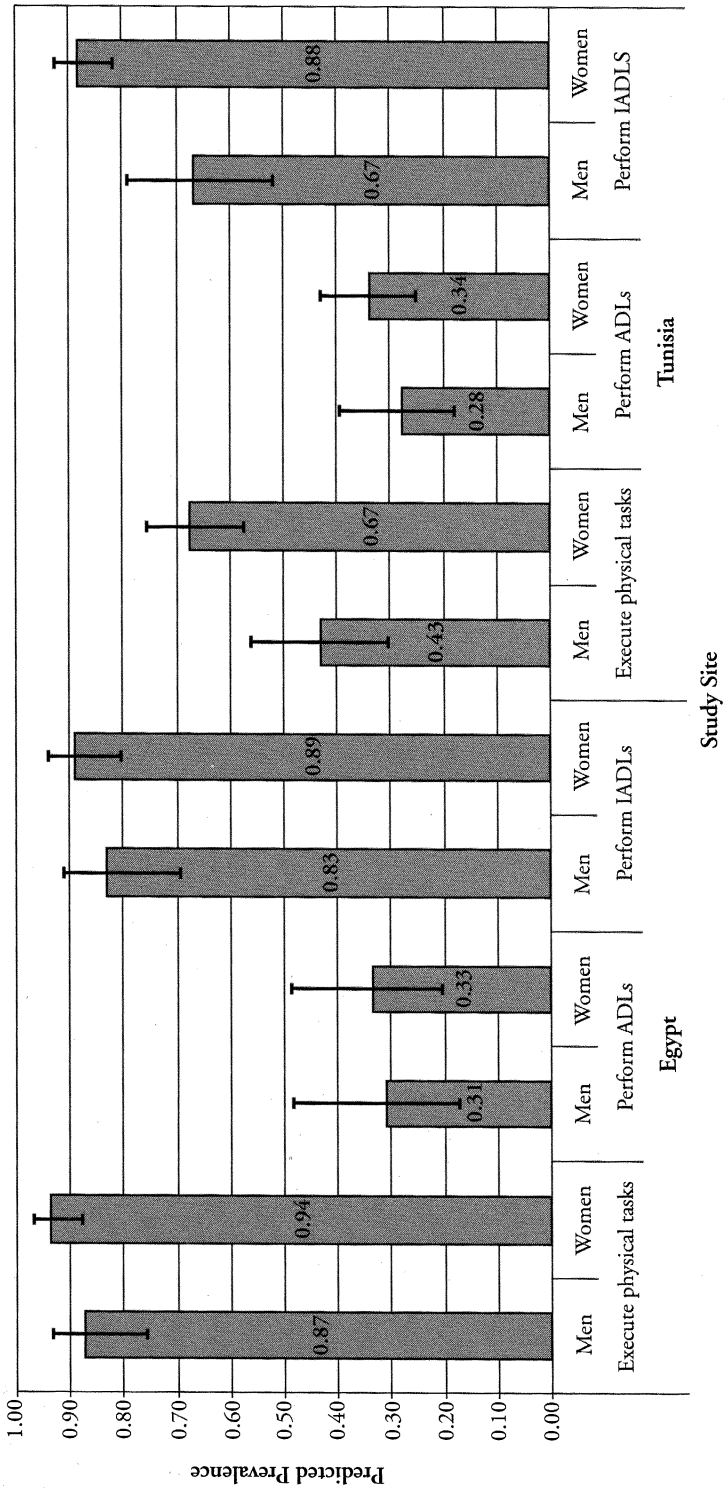
Notes: See the Analytic Methods section for a detailed description of the variables included in the vectors U, S, E, and M Models 1–5. U denotes reported underlying illnesses, cognitive impairment, and age. S denotes measures of the availability of kin. E denotes measures of the immediate environment. M denotes measures of the macroenvironment. H-L goodness of fit refers to the Hosmer-Lemeshow goodness-of-fit statistic.

Source: Authors' calculations of data from Andrews (1998).

†$p < .10$; *$p < .05$; **$p < .01$; ***$p < .001$, accounting for the multistage, stratified cluster-sample design.

Figure 2 presents, for women and men by study site, the fully adjusted predicted prevalences of any reported difficulty executing physical tasks and performing ADLs and IADLs. Predicted prevalences are estimated for the hypothetical group of older adults having mean or modal values for the following covariates: reported illnesses (1.6), cognitive impairment (score < 19), respondent (self), living sons (≥ 2), living daughters (≥ 2), marital status (widowed), home ownership status (self/spouse), residence (urban), education (none), childhood residence (rural), and prior work (unskilled/did not work). Predicted prevalences are averaged across age among women and men. The left panel of Figure 2 shows that over 80% of the women and men in the Egyptian study site reported any difficulty executing physical tasks and performing IADLs. Although the prevalence

Figure 2. Predicted Prevalence of Reporting Any Disability, Women and Men Aged 60 and Older, by Study Site



of any disability according to these measures is higher among women than among men, the levels are high for both groups. The right panel of Figure 2 shows that, in Tunisia, the predicted prevalence of any reported difficulty executing physical tasks is generally lower than it is in Egypt, and differences between women and men in predicted prevalences of any reported difficulty executing physical tasks and performing IADLs are more pronounced. Predicted prevalences of any reported difficulty performing ADLs hover around 30% for women and men in both settings.

DISCUSSION

This study has added to demographic research on mortality and morbidity among older adults by focusing on disability, which is an important indicator of well-being in later life and may increasingly contribute to the global burden of disease over the course of the epidemiological transition (Murray and Lopez 1997). This study also has enhanced understanding of variation in reported disability among women and men by making explicit the roles of sex and gender in models of disablement (Verbrugge and Jette 1994). Lastly, this study has compared differences among older women and men in the prevalence of three dimensions of disability—any difficulty executing physical tasks, performing ADLs, and performing IADLs—and has examined the extent to which underlying illness and aspects of the immediate and macro-level environment account for these differences across variously gendered social contexts (Yount forthcoming; Yount and Agree 2004). Given the attention that demographers have paid to global disparities in health in early life (UN 1998), this study has addressed important, understudied questions about disparities in disability in later life.

The findings show that the prevalence of any reported difficulty executing physical tasks remains higher for women than for men in both the Egyptian and Tunisian study sites, even after we adjusted for reported underlying illnesses and measures of the immediate and macro-level environment. Controlling only for reported underlying medical conditions reduced but did not eliminate crude differences between women and men in the prevalence of any reported difficulty executing physical tasks. Given that the index of reported underlying illnesses includes arthritis, falls, and other skeletal problems, this finding corroborates hypotheses that the greater prevalence and severity of arthritis and musculoskeletal diseases among older women accounts for some of their greater limitations in mobility (e.g., Crimmins, Kim, and Hagedorn 2002). In fact, controlling only for reported arthritis as the proxy for underlying medical conditions yielded estimated coefficients for female gender that resemble those in Model 2, Table 3 (0.88 for Egypt and 1.00 for Tunisia; results not shown but available on request). Notably, differences between women and men in the prevalence of *reported* underlying illnesses could indicate differences between women's and men's propensities to report illness and physiological susceptibilities to illness (Gijsbers van Wijk et al. 1991; Hibbard and Pope 1986; MacIntyre 1993; Verbrugge 1985). Without objective measures of medical conditions, we cannot fully disentangle the effects of gendered reporting of illness and sex-specific susceptibility to illness.

Other results from this analysis, however, provide insights to this question. In Egypt, including measures of the immediate environment (especially family structure) in models predicting any difficulty executing physical tasks and performing IADLs reduced differences between women and men in the frequency of these measures of disability. This finding contradicts prevailing assumptions that responses to questions about executing physical tasks are independent of social roles and living conditions. Investigating further the higher percentage of Egyptian women than of Egyptian men who are widowed (see Table 1) revealed that widowed Egyptian women live in child-headed households at over twice the rate of widowed Egyptian men (26.3% versus 11.9%). Thus, widowed women may be more likely than their male counterparts to receive instrumental help from their

children via coresidence. In fact, controlling only for widowhood as the proxy for family structure yielded estimated coefficients for female gender that resemble those in Model 3, Table 3, for executing physical tasks and performing IADLs (0.71 and 0.45, respectively; not shown but available on request). Thus, different living arrangements of widowed women and men may affect their reporting of difficulty performing IADLs *and* executing physical tasks, even though the latter indicator is meant to measure disability in a standard environment.

In Tunisia, including measures of the immediate environment in models predicting any difficulty executing physical tasks and performing IADLs tended to increase differences between women and men in the prevalence of disability along these dimensions. However, the increase with these adjustments in women's relative odds of reporting any difficulty executing physical tasks was less pronounced than the increase in women's relative odds of reporting any difficulty performing IADLs. Thus, the results for Tunisia are more consistent with prevailing expectations that responses to questions about executing physical tasks are less sensitive to social roles and living conditions than are responses to questions about performing IADLs.

With respect to ADLs, the findings show that the reported frequency and level of difficulty performing ADLs are higher for women than for men in both settings; however, controlling only for reported illnesses eliminated any significant differences between women and men in the prevalence of this dimension of disability. Correspondingly, adding measures for the immediate and macro-level environment had little effect on the magnitude of the difference in any ADL disability between women and men. This finding corroborates findings from the United States, which have shown that adjusting for sociodemographic factors (education and income) and risk behaviors (alcohol use, cigarette-pack years, body mass index) does not reduce the magnitude and significance of crude differences between women and men in scores for (largely) ADL disability (Murtagh and Hubert 2004); in the same study, however, differences in ADL disability between women and men disappeared after the authors adjusted for sociodemographic factors, risk behaviors, and reported illnesses.

Another unexpected finding from this study is that although absolute levels of disability—especially difficulty executing physical tasks—tend to be lower for all older adults in Tunisia than in Egypt, disparities in disability between women and men are *greater* in Tunisia. The general pattern of lower levels of disability in Tunisia is consistent with published research showing that levels of disability tend to decline with socioeconomic gains in society, even if short-term trends in disability are not monotonic (Crimmins 2004). The pattern of greater disparities in disability among women and men in Tunisia also is consistent with research showing that the proportion of positive health expectancy relative to total life expectancy for women versus men is lower in Tunisia than in Egypt (see Lamb and Myers 1992, cited in Robine and Romieu 1998). Finally, this pattern is consistent with greater declines during 1970–1990 in the proportion of healthy life expectancy to total life expectancy among poorly educated women than among poorly educated men in the United States (Crimmins and Saito 2001). These patterns raise a provocative hypothesis for future research that overall declines in disability in later life may be accompanied by greater disparities in disability between women and men. This hypothesis is plausible, for example, if trends in risk factors for disability that also are associated with socioeconomic "development" (e.g., obesity) vary by gender (e.g., Larrieu et al. 2004; Popkin 2004).

In conclusion, measures for having any difficulty performing basic ADLs operate most closely to the expectations on which this analysis was based. In Egypt, the finding that differences in levels of disability between women and men are sensitivity to socioenvironmental controls may reflect the more rigid gender roles and more segregated living conditions of women and men in this setting. However, this finding also may reflect differences between women and men in reporting on the dimensions of disability that were

measured in our study. Taken together, the findings suggest that self-reports and outside observations may reflect conceptually distinct dimensions of disability (Murray and Chen 1992). A major limitation of this study is thus that objective measures of disability were not available for analysis. By implication, extensive reliance in current research on self-reported illness and disability may have severely limited our ability to assess differences in old-age disability between women and men across epidemiological, demographic, and social contexts. Objective measures are needed in research on old-age disability to ensure that measured levels of disability among women and men are not simply due to reporting. The collection of subjective and objective measures of illness and disability will allow researchers to gain a better understanding of sex and gender differences in disability and, in so doing, expand the view in demography of what is important about women and the ages at which women matter.

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