Gender Differences in Self-Reported Heart Disease and Multiple Risk Factors in India: Evidence from the 71st Round of the National Sample Survey Office, 2014

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Abstract

This study examined gender differences in the prevalence of heart disease in India in terms of type of care sought and biological risk factors. The analysis included 142,620 people aged 30 and above from the National Sample Survey Office's 71st round of 2014. While men and women have the same prevalence of seven per 1,000 persons, using a form of prevalence odds ratio the analysis indicated that women were likely to seek care at lower levels of service provision, even though they carried a higher level of multiple morbidities. This difference is not because of the survival effect of women living longer with heart diseases when compared to men. It is possible that women with heart disease complicated by multiple co-morbidities have limited treatment options. Nevertheless, these constraints are not entirely biological and therefore whether these are a consequence of gender discrimination in care options needs further examination.

Introduction

Cardiovascular disease is the leading cause of morbidity and mortality in South Asia in general (Yusuf et al. 2004). India, a major component of the South Asian region, has experienced rapid health transition, demonstrated by the increasing prevalence of chronic diseases (Yadav and Arokiasamy 2014). This process of transition can be seen with the shifting of the onset of cardiovascular diseases to younger ages, especially working ages in India (Chauhan and Aeri 2013; Prabhakaran et al. 2016; Srivastava and Mohanty 2013) and also increasing prevalence of Non-Communicable Diseases (NCDs) in rural areas (Joshi et al. 2006).

Gender differences in heart disease have been widely discussed (Maas and Appelman 2010; Milner et al. 1999; Möller-Leimkühler 2007; Ryan et al. 1994) and are an established fact globally. The social labelling of heart disease as a male or overtly masculine disease has led to ignoring the burden of heart disease among women (Emslie et al. 2001; Lockyer and Bury 2002). The exposure to endogenous oestrogen during the premenopausal period delays the onset of heart disease among women (Lerner and Kannel 1986) but this effect tends to taper off after menopause and the risk of having heart disease becomes more or less the same for both men and women (Habib 2011; Prabhavathi et al. 2014). This natural protection for women from cardiovascular disease at younger ages results in relatively higher incidence of heart disease among men (Lerner and Kannel 1986). However, after the reproductive ages for women, the risk of developing heart disease is more or less similar for both males and females (Swiger et al. 2014). Some risk factors of heart disease, such as smoking and alcohol, are seen as predominantly male behaviours but recently the importance of non-traditional risk factors of heart disease in women, such as pre-term delivery, gestational diabetes, hypertensive disorders in pregnancy, etc., are receiving greater importance (Garcia et al. 2016).

Gender and sex are used synonymously in epidemiological and social science literature, but sex refers to factors that are biologically determined whereas gender explains the socially constructed norms, behaviours and attitudes. It is possible that women are not diagnosed with heart disease as frequently as men are because of the known biological differences. In addition to this, the risk factors are not same for men and women.

Women with heart disease tend to report more co-morbidities when compared to men and this causes difficulties in choosing treatment options (Möller-Leimkühler 2007). After middle age, women may experience a higher buildup of risk factors such as diabetes or hypertension which results in a complicated diagnosis for heart disease (Ramachandran et al. 2003). Women with diabetes mellitus may have a higher risk of cardiovascular disease, and women tend to have higher prevalence as well as less control of hypertension (Garcia et al. 2016). Women with coronary artery disease tend to report atypical symptoms when compared to men (Kumar et al. 2011). Gender-related factors also play a role in diagnosis and treatment for heart disease (Barrett-Connor 1997; National Heart Foundation of Australia 2011; Ramakrishnan et al. 2011).

Women seem to experience heart disease at younger ages with a burden of higher co-morbidity (Kalra et al. 2016). The process through which socio-economic disadvantages operate for long-term ailments are very different for men and women (Sen and Iyer 2012). Gender differences manifest in variations in economic status, marital status and position within the household including marital status. These characteristics affect purchasing power and thus health-seeking behavior and therefore health outcomes (Vlassoff 2007). Women are less likely to use household resources for their healthcare (Kumar et al. 2011). There is reason to believe that women receive less than optimal care in terms of guideline-directed medical prescriptions for cardiovascular disease when compared to men (Kalra et al. 2016). Marital status also affects men and women differently, and the burden of care-giving was found to increase the risk of coronary heart disease among married women (Lee et al. 2003; Eaker et al. 2007). The intersections of biology, socio-economic characteristics and systemic bias seem to produce gendered variations in men and women's experiences of heart disease (Wenger 2012).

It is imperative that the gendered nature of the disease experience, especially for heart disease that are endured life long and need continuous care, be explicated. With this perspective, the specific objectives of this paper are to examine gender differences in the prevalence of heart disease in India, the attendant socio-economic and biological risk factors and treatment options sought.

Data and Methods

Data sources

The required data were obtained from the National Sample Survey Office (NSSO)'s 71st round, 2014 "Social Consumption in India: Health." The NSS is a multistage sample survey conducted all over India during January–June 2014. It includes 333,104 individuals of all ages. The survey collected self-reported morbidity, hospitalization and healthcare-related expenditure details of all members of the selected households. Acute ailments had a reference period of 15 days prior to the date of survey and hospitalizations had a reference period of 1 year prior to the date of survey (NSSO 2015). There are 60 morbidity categories included under the NSS, and the category "Heart disease: chest pain, breathlessness" was used for this analysis of heart disease. These self-reported symptoms are indicative of heart disease but there is no means of directly establishing clinical disease from this data source. Moreover, they include congenital and rheumatic heart disease, but these conditions are likely to comprise a negligible proportion of this group. For this reason, we will refer to the reported heart disease from the NSSO data as "heart disease-like symptoms." The same disease category has been used by others to study heart disease in India (Karan et al. 2014).

Methods

Individual unit level data were extracted from various blocks and merged to create the required data files for analysis. The analysis

file included individual characteristics of those who were alive at the time of survey and those who had died during the reference period of one year prior to the date of survey and their reported morbidity. Those aged 30 and above were considered for the estimation of the prevalence of self-reported heart disease and its associated risk factors. The prevalence rate for heart disease (proportion of persons with heart disease) was calculated by including the morbidity status of those who had died.

A total of 142,620 persons including 1,919 who were dead were included in the analysis. There were 72,908 males and 69,712 females in the data set. The prevalence of heart disease by age-sex, marital status, educational status, caste, household size and expenditure class based on Monthly Percapita Consumer Expenditure of the household of the sick person were estimated.

The distribution of people with heart disease by gender, the type of treatment sought, the site of treatment and the experience of co-morbidities by sex were examined to identify variations indicative of gendered differences. To enable comparisons by gender, we have computed a form of prevalence odds ratio (POR) by specific characteristic/multiple morbidity for each sex.

The odds of people with heart disease-like symptoms by care-seeking sites and multiple morbidity experiences for each level of a characteristic is standardized against the characteristic-free odds to express the effect of the specific characteristic. By characteristic-free odds, we mean the overall odds of using that health site for care or having the specific multiple morbidities with heart disease-like symptoms on the whole (regardless of any specific characteristic). Thus, the PORs for each care-seeking category/experience of multiple morbidity category as the ratio of the odds of seeking care/having multiple morbidities by age, marital status, educational status, caste, household size and household expenditure against the overall odds of seeking care at that facility/having that specific set of multiple morbidities for each sex was computed. These ratios, therefore, are not the conventional conditional ORs, but are averaged out across the population to render comparisons possible across multiple variables.

When making comparisons of effect modifiers on prevalence using cross sectional data both POR and prevalence rate ratios have been used (Thompson et al. 1998). This choice depends on the relevance of measure, its meaningfulness and the availability of appropriate software (Zocchetti et al. 1997). Here we preferred POR because they are a function of both the prevalence of the condition and the exposure (Osborn and Cattaruzza 1995; Zocchetti et al. 1997; Bhopal 2008). The exposure here represents the various socio-economic characteristics and existing co-morbidities. The effort is to examine the variation in exposure by sex and therefore we chose POR. In addition, PORs better demonstrate Incidence Density Ratios when dealing with chronic conditions (Zocchetti et al. 1997). This does not, however restrict confounding, but here PORs are being computed for each level of known confounders, viz. socioeconomic characteristics and experience of co-morbidities. Unknown confounders may still affect the PORs, but the aim of the exercise is to compute PORs across men and women and unravel the gendered nature of the outcomes.

Females in India live longer than males and that in itself could result in females living for longer periods with the disease. To further examine the possibility that there may be a variation in the life years lived subsequently with heart disease-like symptoms for men and women, Sullivan's method (1971) for adjusting years lived into two mutually exclusive states has been used. This serves to estimate the percentage of life expectancy lived with heart

disease-like symptoms to the total life expectancy for males and females. The product of the person years lived and the prevalence rate for each sub-group (age-sex) provided the person years lived with heart disease. This product was used to estimate the expected years of life lived with heart disease.

Results

Prevalence of heart disease-like symptoms

The prevalence of heart disease-like symptoms by age and sex depicts a typical picture with increase in prevalence related to age (Table 1).

Overall, the prevalence of heart disease for men and women seems to be the same. The age pattern of prevalence shows an increasing trend by age as expected for both sexes. Women who were not currently married seem to have a higher prevalence of heart disease when compared to men in the same category (12 vs. 7 per 1,000). Not much variation in prevalence is seen by education status on household size. But, those belonging to other backward castes (OBCs) and higher caste groups have higher prevalence proportions for both men and women. Men in households with expenditure above the 60th percentile seem to have higher prevalence when compared to women.

Table 1. Prevalence (per 1,000 persons) of heart disease-like symptoms in India by background characteristics and sex, 2014

Background characteristic	Heart disease		
	Males	Females	Total
Age			
30–39	2	2	2
40–49	3	5	4
50–59	11	9	10
60–69	18	15	16
70+	24	24	24
Marital status			
Currently married	7	6	7
Others	7	12	11
Educational status			
Up to primary	8	7	8
Secondary	6	6	6
Higher secondary and above	7	6	6
Caste			
SC/ST	4	5	5
OBC	8	7	7
Others	9	9	9
Household size			
1–5	8	8	8
>5	6	5	5
Expenditure			
Up to the 60th percentile	5	6	6
More than the 60th percentile	11	8	9
Total	**7**	**7**	**7**

OBC = other backward caste; SC = scheduled caste; ST = schedule tribe.

Seeking treatment for heart disease-like symptoms

Treatment options do vary by sex with men more likely to seek allopathic care (modern medicine-based care, as defined by NSSO) when compared to women (Table 2).

A higher proportion of women seem to be seeking care using the Indian system of medicine or receive no care at all. Even when care is sought, men are more likely to seek care in better-equipped public or private hospitals when compared to women. Women tend to use public and private units that are more basic. However, women seem to carry a higher burden of multiple morbidities when compared to men. This extra burden of multiple morbidities including hypertension and diabetes mellitus could be a function of age. Therefore, we standardized the distribution of women with co-morbidities using the age distribution of men. The pattern of co-morbidities for women after standardizing using the male age distribution was 82.3% for heart disease only; 5.2% for heart disease and diabetes mellitus; 5.8% for heart disease and hypertension and 6.7% for heart disease, diabetes mellitus and hypertension. Clearly, the level gets tempered but the pattern of higher burden of co-morbidities among women does not change.

The examination of gendered care using PORs for different levels of care by characteristics indicates that older women with heart disease are more likely to see an ancillary healthcare worker in the neighbourhood when compared to men. Currently, married men and women do not seem to vary by level of care sought for heart disease-like symptoms; women who are not currently married are more likely to use peripheral facilities such as health sub-centre (HSC)/primary health centre (PHC) or a private doctor when compared to similar men. Higher levels of education (higher secondary and above) for women facilitates the seeking of care at private hospitals. Women in scheduled caste/schedule tribe groups seem to seek care in the better-endowed public and private hospitals when compared to men in the same group. Upper caste men are more likely to use private hospitals when compared to women in the same

Table 2. Distribution of people with heart disease-like symptoms by nature of treatment, level of care and experience of co-morbidities by sex, India, 2014

Treatment options	Males	Females	Total
Nature of treatment			
Allopathy	97.6 (763)	95.4 (640)	96.5 (1,403)
Indian system of medicine	0.4 (6)	1.0 (5)	0.7 (11)
Homoeopathy	0.5 (5)	0.7 (9)	0.6 (14)
Yoga and naturopathy	0.1 (1)	0 (0)	0 (1)
No treatment	1.4 (14)	2.6 (7)	2.0 (21)
Other	0 (2)	0.3 (2)	0.1 (4)
Total	100 (791)	100 (663)	100 (1,454)
Level of care			
HSC/AMN/AWW	0.5 (11)	0.4 (9)	0.5 (20)
PHC/dispensary/CHC/mobile medical unit	2.5 (20)	3.7 (28)	3.1 (48)
Public hospital	20.5 (181)	15.9 (143)	18.3 (324)
Private doctor/clinic	34.5 (197)	39.3 (187)	36.8 (384)
Private hospital	42.0 (350)	40.6 (268)	41.3 (618)
Total	100 (759)	100 (635)	100 (1,394)

AMN = auxillary nurse midwife; AWW = angan wadi worker; CHC = community health centre; HSC = health sub-centre; PHC = primary health centre.
Note: Figures in parenthesis are an unweighted number of cases.

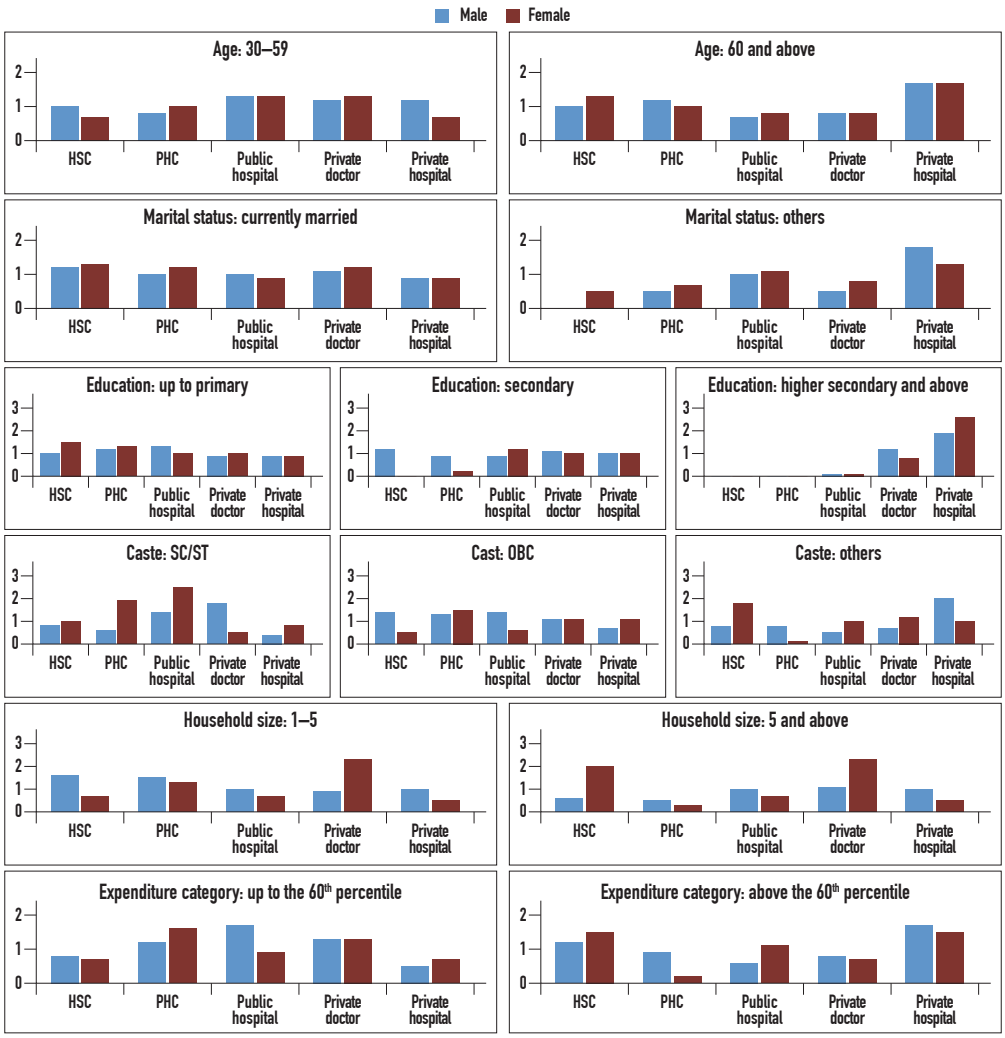
group. Care seeking for NCDs by women in larger sized households (>5 members) seems to be concentrated in smaller public sector health-care units. When compared to men, women also seem to use individual private doctors across all household sizes, small and large.

Men in households whose expenditure falls below the 60th percentile are more likely to use public hospitals when compared to women. In households with expenditure in the higher percentile (>60th), women are more likely to use the public facilities and men use private facilities (Figure 1).

Co-morbidities and heart disease-like symptoms

The POR for co-morbidities experience by characteristics are shown in Figure 2. In the younger ages, multiple co-morbidities seem to affect men but at higher ages (>60) women are more likely to be affected. The burden of co-morbidities of heart disease with diabetes mellitus and hypertension seems to be very high for women not currently married and also women educated up to higher secondary and above when compared to men in similar categories.

Figure 1. Prevalence odds ratio by characteristics for utilization of specific facilities by sex for self-reported heart disease, India, 2014

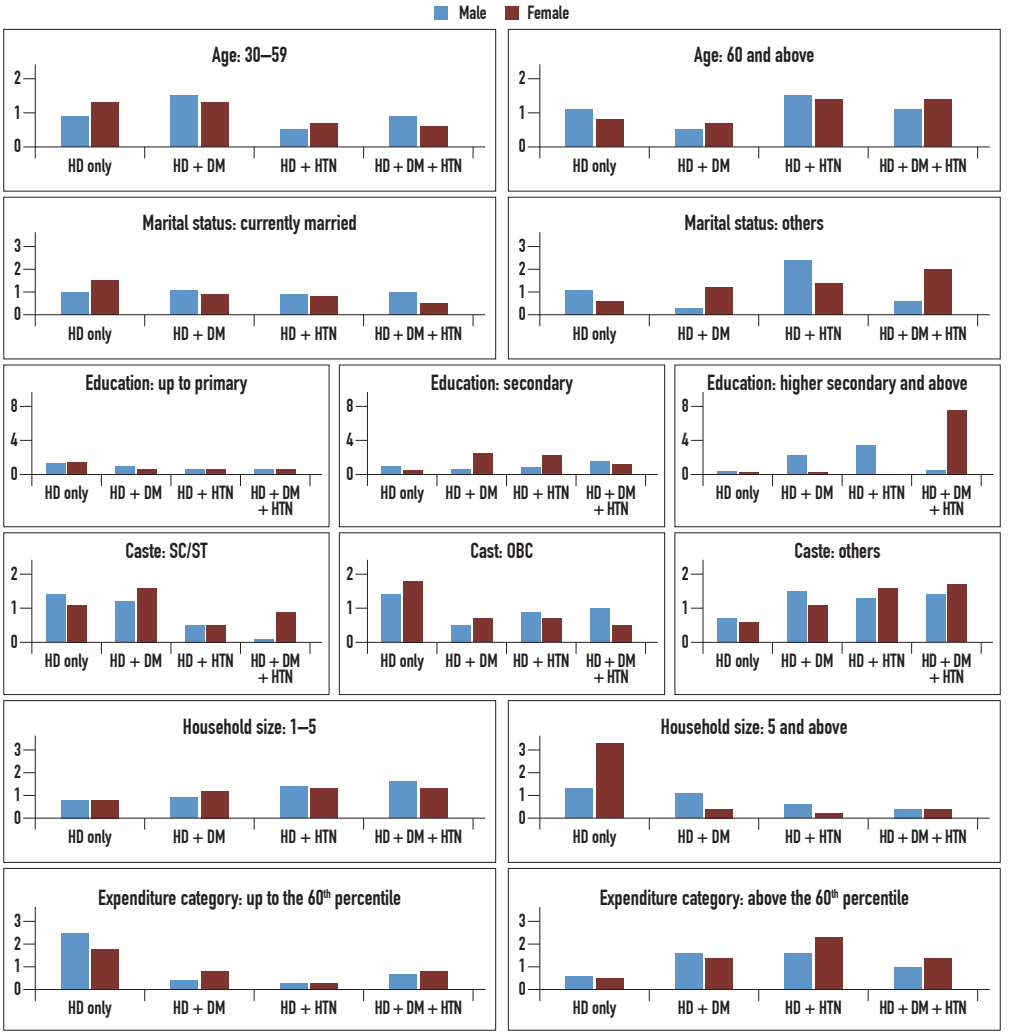


HSC = health sub-centre; OBC = other backward caste; PHC = primary health centre; SC = scheduled caste; ST = schedule tribe.

The burden of co-morbidities seems to be higher among men of mid-level castes when compared to women. Among the higher castes, the burden of multiple co-morbidities is higher for women. Women living in households with higher expenditure levels (>60th percentile) tend to carry the burden of co-morbidities to a greater extent when compared to men in the same group.

The burden of heart disease is more among women especially when one considers the added burden of co-morbidities such as diabetes and hypertension. Older women, currently not married, belonging to middle and upper castes, better educated and in better households carry a higher extent of this burden than their male counterparts. This should mean that such women would seek healthcare in settings with improved facilities such as public and private hospitals rather that HSCs or PHCs or private clinics. But this is not true. Men seem to use facilities providing a higher level of care and women seem to use basic healthcare facilities.

Figure 2. Prevalence odds ratio by characteristics for presence of co-morbidities with HD by sex, India, 2014



DM = diabetes mellitus; HD = head disease; HTN = hypertension; OBC = other backward caste; SC = scheduled caste; ST = schedule tribe.

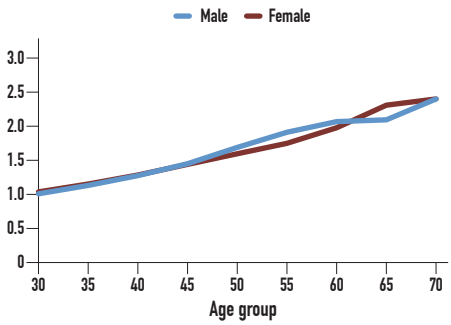
The noted sex differentials noticed in the prevalence of heart disease by characteristics can be explained by the survival effect, wherein more women survive with heart disease compared to men. To check if indeed the survival effect among females affects the proportions of males and females with heart disease-like symptoms, the proportion of life years expected to be lived with the disease for males and females was computed using Sullivan's (1971) method for healthy life expectancy. Computation of the proportion of life expectancy lived with heart disease-like symptoms to the total life expectancy using Sullivan's approach, enabled a comparison by gender of the expected duration to be lived with the disease. The person years lived at various age intervals is divided into the portion ascribable to disease state and the portion ascribable to disease-free state. The years spent with the ailment is the product of years lived under various age groups and prevalence of ailments in those age-groups. The years the cohort is expected to spend in the disease state is computed by dividing the total person years spent in the disease state by the number of persons at the exact age.

Figure 3 indicates the proportion of life years a person is expected to live with disease for males and females by age. While there is a difference in the duration of life expectancy with disease by age, males and females on an average live approximately the same proportion of their life expectancy with heart disease. The difference in the proportion of life years lived with heart disease by sex is marginal. It means females do not have an advantage over males with respect to living with heart disease-like symptoms. There could however be a sex difference in survivorship with diabetes and hypertension.

Discussion and Conclusions

The study analyzed gender differences in the prevalence of heart disease-like symptoms and its attendant risk factors and treatment sought using NSSO 71st round, 2014 data for India. Men and women reported the same prevalence rate for heart disease-like symptoms, with a marginal variation by age. The NSSO surveys identify heart disease based on certain symptoms. But self-reported morbidity is reliable in the case of chronic diseases (Dilip 2007). The category includes congenital and rheumatic heart disease, but the predominant condition in this category is likely to be ischaemic heart disease (Finegold et al. 2013). Allopathic medicine is the most accepted treatment for heart disease, but some of the PHCs/dispensaries may have doctors from other medical streams. There are clear gender differentials in treatment seeking for heart disease-like symptoms. For instance, 2.6 per 100 women did not received treatment for heart disease when compared to 1.4 per 100 men. Women were more prone to seeking care at lower levels of service provision when compared to men, as the proportions seeking treatment from private clinics/doctors or from PHC/dispensary were relatively higher for women and men were more likely to seek care from hospitals – both private and public. This suggests that women may have lesser access to proper diagnostic facilities such as angiography and treatment options such as fibrinolysis or angioplasty.

Figure 3. Percentage of life expectancy to be lived with heart disease-like symptoms by sex, India, 2014



While men and women have more or less similar rates of heart disease-like symptoms, the complicated presentation of multiple co-morbidities among women limits treatment options for them. The risk of heart disease in diabetic women is reported to be thrice that of diabetic men. Moreover, women are also reported to have lower levels of control of hypertension. (Garcia et al. 2016) It is possible that women live for longer durations with heart disease-like symptoms because of their survival advantage over men but that is not validated by the analysis. There is no gender gap in the percentage of years one is expected to live with heart disease. However, there may be gendered differences in the years a person is expected to live with co-morbidities, but that needs to be elucidated. The treatment options for women seem to be lower levels of healthcare when compared to men. This could be because of differences in presentation, diagnosis and treatment in health systems. Similar findings of higher burden of co-morbidities with cardiovascular disease for women combined with less than optimal care have been reported in the PINNACLE India study (Kalra et al. 2016). Peripheral healthcare units may not have the necessary means to deal with the complicated presentations of heart disease that women seem to have. There is also the probability of limited choice of drugs available at such facilities for tailoring adequate regimens for optimal control of these co-morbidities. Such constraints are not biologically determined and are indicative of the gendered nature of care options used by women. More explanations are needed to determine whether these are a consequence of gender discrimination in care options available to women. There is a need for sex-disaggregated data in health information systems to monitor the gendered differentials in screening, treatment-seeking and potential outcomes for heart disease. More focused research on the gendered pathways of this experience and care-seeking for it are needed.

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