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ABSTRACT

Polycystic ovary syndrome (PCOS) is an endocrine disorder linked to type II diabetes and the leading cause of female infertility worldwide. Despite being considered a "lifestyle" disease, PCOS has received scant attention in the social science literature. In India, media accounts citing prominent doctors have expressed concern that the syndrome affects a growing number of urban middle-class Indian women. The general public, doctors, and afflicted women all attribute the condition to stress, lifestyle changes, "Westernization," modernization, and disrupted circadian rhythms. These factors are associated with changes in diets, gender roles, and aspirations since 1991, when the introduction of neoliberal reforms opened up the country to processes of globalization. Women with PCOS have come to be seen as living embodiments of the biosocial stresses associated with modern urban middle-class living, and discourse about PCOS serves as commentary indexing anxieties about social and political–economic shifts in the country. In this paper, based on ethnographic fieldwork in Mumbai, India, with 141 participants from 2012 to 2014, we point to local understanding of PCOS as corresponding to an ecosocial perspective that highlights the structural vulnerabilities of urban middle-class women. Whereas most research on structural vulnerabilities and health has centered on economically and otherwise disadvantaged groups, we use PCOS as a case study to draw attention to the rise of lifestyle disorders linked to the impact of globalization and the pressures of "modern" identities and aspirations among middle-class populations.

1. Introduction

Polycystic ovary syndrome (PCOS), an endocrine disorder with no known cure, is the leading cause of female infertility worldwide (Boomsma et al., 2008; Goldenberg and Glueck, 2008). The syndrome gets its name from multiple ovarian follicles—which look like cysts—often seen upon a gynecological sonography of women with the condition. In a normal menstrual cycle, an egg is released from a dominant follicle. In PCOS, several follicles develop, but none of them becomes dominant (Soulez et al., 1996). There is often a lack of ovulation, and the menstrual cycle may be delayed or absent, resulting in subfertility. The exact etiology of PCOS is unknown, but genetic history and lifestyle factors are known to play a part, and PCOS is considered a lifestyle disease in which genetic predispositions may in fact be activated by lifestyle factors (Balen et al., 2009; Ehrmann, 2005; Franks, 1995).

PCOS is associated with symptoms such as cystic acne, male-pattern hair loss, hirsutism, insulin resistance (precursor to diabetes; cells become less responsive to insulin), and darkened skin patches (acanthosis nigricans). Obesity is both a symptom and a contributory factor and is associated with the worsening of other symptoms. Weight loss is therefore often the first recommended line of management. Management also involves medication, such as hormonal contraceptives to regulate menstruation, ovulation inducers and fertility treatments, and insulin sensitizers. The syndrome is also associated with increased risks of diabetes and cardiovascular disease (Franks, 1995; Legro et al., 1999). Not all women with PCOS manifest all symptoms, and not all women with PCOS are overweight; the syndrome also manifests in a "lean" phenotype (Franks, 1995). An emerging contention is that PCOS results from insulin resistance (Franks, 1995), and some argue that PCOS has a male equivalent associated with early baldness, obesity, insulin resistance, and hormonal changes (Kurzrock and Cohen, 2007; Starka et al., 2005). Thus, although the name suggests that the ovaries are the primary organs affected, PCOS is a multisystem endocrine condition.

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2. PCOS in India

Media accounts have suggested that PCOS is on the rise in India and most prevalent among the urban middle and upper classes because of their lifestyles (e.g., Garari, 2014; Pal, 2013; Times of India, 2012). The prevalence of obesity, overweight, and insulin resistance, which are all associated with PCOS pathogenesis, appear to be higher among members of higher socioeconomic strata living in urban areas; medical researchers have attributed this to more sedentary lifestyles and access to more calorie-dense foods and laborsaving devices in urban and higher socioeconomic populations (Chopra et al., 2013; Kalra and Unnikrishnan, 2012; Khandelwal and Reddy, 2013; Wasir and Misra, 2004). Although there have been no rigorous community-based epidemiological studies of PCOS published in India to date, a preliminary study among women aged 15–24 from the lower socioeconomic strata in Mumbai placed prevalence at near 22.5 percent (around one in four women) (Joshi et al., 2014). The authors of the study further observed that given trends in other metabolic disorders and nutritional and physical activity patterns, this prevalence might be *even higher* among the higher socioeconomic strata. This contrasts quite markedly with a prevalence of around 11 percent in Australia, 8 percent in the UK, and 4 percent in the US, using similar diagnostic criteria (Wijeyaratne et al., 2013). A prominent gynecologist conducting an epidemiological study of PCOS which compared prevalence across India was interviewed regarding whether the reported rise might be an artifact of improved diagnosis, increased clinician focus, or shifting health concerns in the population. Based on preliminary findings from a year of research, the gynecologist rejected these factors as the primary drivers and confirmed the trend of higher PCOS prevalence among urban middle-to upper middle-class women. Irregular menstrual cycles and subfertility have long been of considerable concern in India (e.g., Leslie, 1996), and a common reason for medical consultation from both allopathic and ayurvedic practitioners (vaidyas). These practitioners routinely ask patients about symptoms encompassed by PCOS, with allopaths inquiring about them for decades and vaidyas treating them as basic to their humoral science. The yet-to-be published research as well as the observations of several such practitioners interviewed (sample described below) indicated that PCOS was rapidly increasing among urban middle- and upper-class women and that with increasing prosperity, it was beginning to increase among women from the urban lower classes and those living in urbanizing semi-rural areas.

3. Economic liberalization and the emergence of “modern lifestyles”

Most features of the “modern” urban middle-class lifestyles associated with PCOS described by the media are relatively recent to India. Prior to 1991, the Indian economy was largely closed to the world. Economic policy emphasized business regulations, state-driven investment, and import restrictions. The result was a protected economy with limited consumer choice. In 1991, however, a balance-of-payments crisis forced the Indian government to hasten the opening up of the economy. This came to mark a watershed moment referred to as “economic liberalization” or “liberalization.” Since then, there has been a steady shift to a market-driven, globally integrated economy. India has been experiencing rapid economic growth, surfacing as one of the world's ten largest economies. It has also seen the emergence of new middle classes, with many moving out from below the poverty line (United Nations Development Programme, 2011).

The resultant higher disposable incomes have contributed to a “nutrition transition” (Popkin, 1993), with increased consumption of fats, oils, and sugars (Griffiths and Bentley, 2001; Nagesh, 2012). Eating out, once rare and circumscribed by caste proscriptions (and for women by lack of access to certain public spaces), has become integral to India's urban-centered public culture and a marker of middle-classness (Conlon, 1995; Fernandes, 2006). Meanwhile, increased access to laborsaving devices and cars has reduced physical activity. As a result of the rise in these risk factors, the prevalence of diabetes and cardiovascular disease has escalated among India's middle classes, especially in urban areas, and public health practitioners have identified these conditions as emerging epidemics (Celermajer et al., 2012; Khandelwal and Reddy, 2013; Misra and Khurana, 2008; Wasir and Misra, 2004).

Another change following liberalization has been the new availability of previously inaccessible consumer products and services. The advent of satellite television also resulted in a host of new aspirational messages being aligned with this increased consumer choice, and such representations are based on a vision of the nation as tied to consumption, with an idealized portrayal of the urban middle classes (Fernandes, 2000; Mazzarella, 2003). There has been an increasing acceptance of consumer culture (Mazzarella, 2003; Venkatesh, 1994), consumption is now closely tied to notions of middle-classness (Van Wessel, 2004), and new spaces of consumption, such as coffee shops, shopping malls, and multiplexes, form the spaces where this new middle-classness is performed (McGuire, 2011).

Post-liberalization, the pace of life, especially for the middle classes, has also been affected by the restructuring of the labor market. Leela Fernandes (2000) describes how traditional middle-class public-sector employment in industries such as banking has been marginalized, and the middle classes are now associated with growth in the service sector and private sector white-collar employment. Middle-class ambition has moved away from old, stable government jobs toward jobs in multinationals with expanded chances for career and salary growth. The contemporary job market is characterized by higher job insecurity and emphasis on efficiency. The old, secure middle-class work environment of regular hours has shifted to a highly competitive, unstable environment requiring longer hours and continual improvements in productivity and skills. For women, in particular, the effects have been contradictory and pronounced:

> On the one hand, the expansion of service sector and private sector employment has produced employment opportunities for middle class women in metropolitan centers. However, such opportunities often represent coping strategies as households attempt to negotiate increasing household costs and new lifestyle standards that correspond to public representations of the new middle class. This has produced familiar gendered pressures as middle class women must perform a dual shift of paid and unpaid household work. (Fernandes, 2000:100–101)

Liberalization has, however, brought increased opportunities for urban middle-class women in terms of employment. Professional women, working in jobs requiring educational achievement, occupy an important social, economic, and symbolic position in contemporary India (Radhakrishnan, 2009). The public visibility of women and their freedom to pursue careers is considered another marker of new middle-class identity (Ganguly–Scrase, 2003). Being well educated and holding a professional position improves both, a woman's career and marriage prospects (Radhakrishnan, 2011; Sharangpani, 2010). This has, in turn, affected the age of marriage among the middle classes, as women pursue higher education and work before getting married.

Nevertheless, domestic tasks, child-rearing, and household management are still seen as the responsibility of women, and new

opportunities are circumscribed by the enactment of what has variously been called "respectable femininity" (Radhakrishnan, 2009), "respectable modernity" (Thapan, 2004), or "demure" modernity (Lukose, 2009), which tasks women with balancing their cosmopolitanism and modernity with their familial and community obligations (Donner, 2008). Their ability to successfully navigate these expectations can affect not just their own social standing and reputation but also that of their families (Dickey, 2002); what constitutes a "good balance" between tradition and modernity, however, varies across segments of the middle classes (Gilbertson, 2014). Women are required to exist between two cultural worlds and move seamlessly between them; they must take on the responsibility of being modern without foregoing the traditional. Therefore, increased opportunities for middle-class women place additional burdens upon them and expose them to new aspirations while circumscribing their ambitions.

A number of health problems have been linked, in both popular and medical discourse, to the middle classes and such changes following on the heels of economic liberalization, such as the stresses of consumer aspiration (Chua, 2014) and the "tensions" of balancing self-care with conforming to gender-specific roles (Weaver and Hadley, 2011). In this paper, we document how PCOS is interpreted in India as a condition that is both a reflection and a cost of modern middle-class living. Moreover, despite being one of the most reported endocrine disorders, PCOS has been largely ignored in the social scientific literature, although a rare sociological study in the UK (Kitzinger and Willmott, 2002) found that PCOS challenged women's perceptions of themselves as feminine. We aim to address this gap and adopt an ecosocial approach (Krieger, 1994, 2001), combining a focus on biological, social, ecological, and historical factors, to investigate PCOS as an embodied manifestation of the biosocial stresses of economic liberalization and to examine the structural vulnerabilities associated with PCOS as an emerging health issue in globalizing India.

4. Methods

The present study investigated perceptions of PCOS among community, patient, and practitioner populations in Mumbai—India's commercial and media capital. Fieldwork, conducted by the first author in Mumbai and guided by the second author during field visits, included observation, participant–observation, and interviews with 141 participants from 2012 to 2014. Informants hailed from what may be termed the aspirational middle class. Middle-classness in India is a difficult category to pin down, but scholars of contemporary South Asia treat it as a performative socioeconomic grouping rather than an economic bracket (e.g., Fernandes, 2006; Mazzarella, 2005; McGuire, 2011; Radhakrishnan, 2011). Following understandings gleaned from informants, we define aspirational middle-class status as comprising comfort with English, knowledge of global (mostly American) popular culture, engagement with new spaces and practices of consumption, and at least an undergraduate education and potential for white-collar (usually professional) employment.

Fifty-one participants functioned as a base of informants for in-depth interviews to understand the practices of Mumbai's urban aspirational class and changing patterns of living since economic liberalization. In-depth semi-structured interviews were conducted among a purposive sample of 30 lay informants who did not have PCOS (10 women over age 36, 10 women aged 21–35, 5 men over age 36, 5 men aged 21–35) to gain a sense of what they saw as emerging urban women's health issues and what they knew about PCOS specifically. Semi-structured interviews were also conducted with 30 medical/paramedical practitioners who help diagnose or manage PCOS (5 each of endocrinologists, gynecologists, dermatologists, dieticians/nutritionists, homeopaths, and vaidyas). Through referrals by key informants who were medical practitioners, we selected practitioners exposed to patients from a range of socioeconomic strata, not just the middle or upper classes. Additionally, in-depth interviews, including illness narratives, were carried out among a core sample of 30 women diagnosed with PCOS (10 never married, 10 ever married without children, 10 ever married with children). Many of these women were visited on several occasions across time points or followed up by phone interviews and observed during their day-to-day interactions. We identified women diagnosed with PCOS aged 21 and above from the urban aspirational middle class using the first author's social circles and through referrals from within social networks. Recruiting this way enabled triangulation of data from interviews with data from observation and participant–observation. It also enabled observation of the degree to which PCOS is hidden or discussed in popular discourse and the body-related practices of core informants in naturalistic settings. Interviews were conducted in informants' homes, offices, coffee shops, or in case of medical practitioners, their clinics or consulting rooms. As informants were drawn from the aspirational middle class, which is comfortable with English, interviews were primarily conducted in that language. Nevertheless, interviews involved significant code switching between English, Hindi, and sometimes Marathi; only the English translations are presented here. The Institutional Review Board of the University of Arizona approved the research. In what follows, we first describe our findings with regard to perceptions of PCOS among lay informants, medical practitioners, and briefly, women with PCOS (a forthcoming publication will explore women's lived experiences of PCOS, including stigma and its the effects on identities and relationships, in more detail). Then, we present and discuss data from our investigation as they relate to structural vulnerabilities of modern middle-class lifestyles before summarizing our arguments in the conclusion.

5. Lay perceptions of PCOS

PCOS does not correlate to indigenous categories of illness, but as women's hormonal, reproductive, and menstrual issues have always been significant in India, we approached PCOS as a subset of these. To account for a possible unfamiliarity with the term PCOS as a diagnostic category, we solicited informants' opinions on major emerging urban women's health issues before asking specifically whether they had heard of PCOS. In some cases, informants mentioned PCOS as a key health problem before the interviewer mentioned the condition. Overall, PCOS came across as a recognized condition (70%; see Table 1), especially among women and men aged below 35—informants heard of PCOS either through friends or relatives with the condition or through media reports. Some lay informants pointed to a rise in hormonal/menstrual disorders as a "new normal" for the middle classes resulting from a hectic modern lifestyle. In particular, informants blamed these disorders on the stress of women having to juggle the responsibilities of home and work. As one 57-year old female informant put it:

> Working plus there is the home also. I feel that sometimes they cannot tackle both. There is stress of both these sides….Basically, life has become stressful. These days basically the lifestyle has become very stressed out. One thing I feel is that these days, women feel they can do everything. They can do—it is not that they are different from the males of the world, but they themselves have more expectations out of themselves. I feel in that stress really increases a lot.

Table 1
Themes in lay perceptions of women's hormonal/menstrual issues.

Theme	Women over 36	Women under 35	Men over 36	Men under 35	**Total**
Total	**10**	**10**	**5**	**5**	**30**
Heard of PCOS	8 (80%)	8 (80%)	1 (20%)	4 (80%)	**21 (70%)**
Hormonal/menstrual problems are increasing	6 (60%)	7 (70%)	3 (60%)	3 (60%)	**19 (63%)**
Increased stress	10 (100%)	5 (50%)	4 (80%)	3 (60%)	**22 (73%)**
Unhealthy diet	7 (70%)	4 (40%)	4 (80%)	1 (20%)	**16 (53%)**
Irregular meal timings	3 (30%)	1 (10%)	1 (20%)	–	**5 (17%)**
Lack of exercise	2 (20%)	4 (40%)	3 (60%)	1 (20%)	**10 (33%)**
Lack of sleep routine	2 (20%)	2 (20%)	–	–	**4 (13%)**
Pollution/food additives	5 (50%)	1 (10%)	2 (40%)	2 (40%)	**10 (33%)**
Over-reliance on biomedicines	3 (30%)	–	1 (20%)	–	**4 (13%)**

Forty-two year old Rahul also felt that women were "leading two lives—one with the husband and one with the rest of the family." By this, he meant that women were required to fill both the role of the dutiful traditional mother and daughter-in-law and the modern wife: "After coming home [from work] and cooking, they [women] still have to get ready and go out to a party if the husband wants to, so he can show off his hot wife."

The theme of the stresses of transition was also common. One male informant over 36 said that in India,

> Society is in transition. You want to follow the norms in terms of lifestyles and all that, but culturally, there are still pressures on women.…the percentage of working women in urban areas is much higher, but the women are still solely responsible for everything at home.

A 28-year old male lawyer stated:

> There's financial, family stress, traveling stress…it has just increased over time. More women are working…Now we have smaller [nuclear] families, so you have to do everything for yourself—earlier, non-working members used to take care. There are more work pressures on women also.

In addition to mentioning the pressures on working women to shoulder responsibilities for the home and the workplace, informants mentioned intense competition for education and jobs and the pressures of consumerism. Prachi, an informant over 36, thought that urban individuals had more financial pressures and needs because of "keeping up with the Joneses" and being "constantly exposed to new things." All this negative stress, she said, had somatic results, with "hormones playing havoc with your body." Leela agreed: "There is a lot of peer pressure. Competition is a lot these days, for admissions [for higher education], jobs. There is also this competition that what their friends have, they want."

Farhana, a woman under 36, echoed many informants' sentiments when she compared contemporary urban women's food choices with those of an earlier generation: "We end up eating junk food. Our grandmothers and mothers—bread they would not even consider as a food. It was always *roti*. Now, we only want bread for breakfast. There is no time to make *rotis*." Yet others spoke of "no proper eating time" and that "food timings are not proper." Thirty-three year old Preeti combined several observations in saying that PCOS "has a lot to do with stress and [a lack of] routine," including "sleeping late at night, not having meals at regular times." Overall, informants blamed stress; faulty diets (especially eating out); pollution, pesticides, and food additives; lack of exercise; and the lack of a routine (see Table 1). These observations are not without merit; there is evidence to link PCOS and insulin resistance to weight gain, lack of exercise, skipped/delayed meals, sleep deprivation/late nights, stress, and endocrine disruptors in the environment (Bensona et al., 2009; Jacubowicz et al., 2013; Kandaraki et al., 2010; Moran et al., 2006; Spiegel et al., 2009).

6. Medical practitioners' perceptions

In our interviews with medical practitioners, they also spoke of a rise in PCOS cases, especially among the urban middle classes, associated increased prevalence with "modern lifestyles," "changing lifestyles," "urbanization," and "Westernization," and blamed unhealthy diets, sedentary habits, the busy pace of life, lack of regularity in meal and sleep timings, insufficient sleep, and even changing gender roles (see Table 2). Diet was the most commonly cited factor—practitioners blamed eating out, junk food, an unbalanced diet, and eating more because of material prosperity. Dietitian Asha Parekh quipped that people were going from "*homo sapiens* to *homo junkiens*," with a move toward food that was "high fat, high carbs, fructose-based" as well as fast food. Along with diet issues, most informants also commented on a lack of physical activity. Gynecologist Dr. Keskar pointed out that these issues start young:

> I think lifestyle changes are the main cause. The type of foods the people are eating, more of junk food, not a very balanced diet, lack of exercise, too much of sedentary work, like, I see a lot of young girls who are studying, so they are—between the school, tuitions [academic coaching classes]—they have no time for exercise whatsoever. And maybe nowadays we have more of a nuclear family and small families, so I think [there is an] overindulgence by parents in feeding [their children].

Vaidya Dr. Dixit added another element—that of distracted eating:

> These days, people, even when eating, they sit in front of the TV and eat. Meaning what happens is that there is actually no attentiveness to the food. Food is there, no? That has to be chewed 32 times. That makes a difference. But then you are eating while watching TV or on one side you are working on your laptop and another side you are eating.

A lack of regularity in timings was also mentioned, especially by all the dietitians and ayurvedic practitioners that were interviewed. Dr. Sapre, a vaidya, observed, "Circadian cycle [the body clock] is disturbed; that is main, important in PCOS." She added that by "late sleeping, not eating at regular times, working at times of rest," individuals "waste dopamine," causing endocrine issues. Similarly, endocrinologist Dr. Prasad talked of the fact that, "Nowadays teenagers have a lot of distractions. They are constantly getting engaged because of internet and social media like Facebook," which contributed to disturbed circadian rhythms, affecting the regularity of hormonal and menstrual cycles. In a similar vein, four ayurvedic

Table 2
Themes in medical practitioners' views of PCOS.

Theme	Endocrinologists	Gynecologists	Dermatologists	Dietitians	Homeopaths	Vaidyas	**Total**
Rise in PCOS prevalence	3 (60%)	5 (100%)	4 (80%)	5 (100%)	5 (100%)	5 (100%)	**27 (90%)**
Unhealthy diet	5 (100%)	5 (100%)	5 (100%)	5 (100%)	5 (100%)	5 (100%)	**30 (100%)**
Lack of exercise	5 (100%)	5 (100%)	5 (100%)	4 (80%)	5 (100%)	5 (100%)	**29 (97%)**
Irregular sleep/meal times	2 (40%)	1 (20%)	2 (40%)	5 (100%)	3 (60%)	5 (100%)	**18 (60%)**
Increased stress	1 (20%)	3 (60%)	4 (80%)	5 (100%)	1 (20%)	5 (100%)	**19 (63%)**
Pollution/food additives	1 (20%)	–	3 (60%)	1 (20%)	–	1 (20%)	**6 (20%)**
Over-reliance on biomedicines	–	–	–	–	–	2 (40%)	**2 (7%)**
Tight clothes	–	–	–	–	–	2 (40%)	**2 (7%)**
Total	**5 (100%)**	**5 (100%)**	**5 (100%)**	**5 (100%)**	**5 (100%)**	**5 (100%)**	**30 (100%)**

practitioners commented that PCOS was much more common among women in call centers or information technology jobs because of their irregular timings and night shifts.

Medical practitioners also blamed stress for PCOS. Dermatologist Dr. Desai spoke about the various stresses experienced by women:

> What happens is, when you're living in a city like Bombay [Mumbai], the day-to-day life is also quite stressful and specially for women. Cause they are managing home, and they are managing outside. And there is a lot of peer pressure, there is a lot of pressure regards to work, and in India, of course, work is totally done by the woman, nobody is going to share the work, the household work. And then they are earning also—I mean the financial aspect and the work outside is of course also there, so it's double work. That is a lot of stress. It's not only women. Even the girls I see, I think the stress in the teenage population is also quite high. That goes for both boys and girls, but girls then get PCOD [PCOS], whereas boys would probably only manifest only as acne and hair loss—male-pattern hair loss also I'm seeing very early.

Dr. Gopalan, a gynecologist, highlighted examination stress: "Lot of stress in the lifestyle. There is a lot of education stress, any stress of that kind."

Another aspect of stress to come up was that of the stress caused by women's aspirations, as they demanded more of themselves and then were under the pressure of their own expectations. Dermatologist Dr. Fernandes had an interesting take that involved a feedback loop between cultural practices, behaviors, and biological outcomes: "Women want to excel but they have very little time for everything—they have to do more than they can. Their aggression fuels testosterone, which then energizes these traits." Two homeopaths suggested that PCOS was the body's response to defective features of modernization that were resulting in the masculinization of female attitudes and behaviors; for example, Dr. Shah felt that PCOS resulted from women "following the male pattern [of behavior] that is too aggressive, too dominating." Another theme was of endocrine disruptors in the environment and pollution, pesticides, and food additives (particularly hormones in dairy). Two ayurvedic practitioners also mentioned tight clothes that constricted the uterine area and reliance on painkillers for menstrual pain, which interfered with the body's processes.

7. Patients' perceptions

Women with PCOS also viewed it as a condition that was part and parcel of modern urban middle-class living. They regularly mentioned the fact that they had heard, read, or been told by their doctors that around one in four urban Indian women had PCOS. As 32-year old Sucheta put it, "I did realize it's very common and [nearly] everybody has it and it's okay to have it." Many informants took similar solace in PCOS being common, especially in their social milieu. The condition's association with modern living (rather than patient characteristics), its ubiquity, and the fact that it was considered medically manageable (through medical cosmetic and fertility treatments), meant that none of the informants considered or experienced PCOS to be a source of stigma, and they were very comfortable talking about the condition with others, including boyfriends, spouses, friends, and colleagues.

While informants associated poor eating habits and lack of exercise with their PCOS, most were unaware of the association between PCOS, a family history of diabetes, and increased risks of diabetes. Informants spoke at length of the difficulties in making the lifestyle changes required to manage their PCOS given their hectic schedules. The attitude of vivacious 23-year old Jaclyn was typical: "I feel stressed about it [a hectic lifestyle]. I need a work–life balance but that doesn't mean that I should compromise on my likes." She had not made any lifestyle changes—whether related to diet or physical activity—to manage the condition, relying instead on medication. It is beyond the scope of this paper to deal with the experiences and perceptions of women with PCOS in detail—these will be dealt with in a forthcoming publication—but fieldwork revealed that her strategy of accommodating rather than actively managing PCOS was not unusual. This usually entailed turning to medication or cosmetic technologies to manage symptoms or erratic attempts at basic dietary changes (such as reducing eating out) or increasing exercise (such as daily walks).

8. PCOS and structural vulnerabilities among the urban middle classes

Scholarship within medical and biocultural anthropology has long recognized that the body literally incorporates the social and material world it inhabits into its biology (e.g., Baer, 1996; Dressler et al., 2005; Farmer, 1999; Lock and Kaufert, 2001). The histories and socioeconomic contexts of individuals (and groups) are reflected in their bodies, and bodies cannot be understood in isolation from their contexts. By noting that urban middle-class women are the population most likely to be affected by PCOS, study participants were pointing to a health disparity and implicating urban environments and middle-class lifestyles in this disparity. The factors they associated with a rise in PCOS and women's health issues highlighted the role of rapid social and structural changes in India since liberalization, along with environmental concerns such as those regarding food additives and the overuse of pesticides. In many ways, their popular epidemiological (Brown, 1997) views are in concert with the ecocosial approach to epidemiology espoused by Nancy Kreiger.

Nancy Krieger (1994, 2001) has criticized theories of the social production and political economy of health that highlight political–economic and sociocultural factors in illness distribution for

failing to focus on specific political and economic determinants in pathways to pathogenesis, rendering biology opaque. An ecosocial framework recognizes disease distribution as determined through multiple levels of influence, including biological, environmental, social, and historical factors. It combines analysis through biological pathways of the embodiment of social and environmental forces, attention to how social inequalities result in differentiated exposures, susceptibilities, and resistance to illness, and emphasis on the responsibility of the sociopolitical system on patterns of disease. We would argue that to truly understand PCOS in India, an ecosocial approach is necessary to situate the emergence of the condition as a significant health issue within the specific circumstances and biological pathways in which PCOS-affected bodies are enmeshed. To illustrate this point, we provide examples related to the impacts of examination pressures and modern expectations on urban middle-class women.

Research revealed that pernicious ecosocial feedback loops implicated in PCOS start early in the life course. In India, major school-finishing examinations are taken in the 10th and 12th grades. After these, students apply for admissions to educational institutes and fields of study—their exam results determine their ability to enter the educational streams of their choice. Additionally, admission to professional courses, such as medicine and engineering, depends upon performance in competitive entrance exams that occur directly after the 12th exams. Education is valued as both a marker of and pathway to success, particularly among the middle classes, and educational expectations of students are very high. Combined with the unforgiving examination system, this results in an intensely competitive educational environment. Furthermore, new expectations on girls to do well have made competition even fiercer, with boys *and* girls now competing for limited admissions.

As a result of this intense emphasis on academic performance, children lead increasingly sedentary lives as they enter grade six, if not sooner (see also Swaminathan et al., 2011). After-school academic coaching classes ("tuitions") are common as early as the primary school level, and by secondary school, tuitions are the norm. Numerous tuitions, heavy homework loads, and extensive examination preparation leave little time for outdoor play or sports. A lack of available open spaces compounds the problem. The average age at menarche across parts of India has been reported to be in the 9–15 range (Bagga and Kulkarni, 2000; Dambhare et al., 2012; Khadilkar et al., 2006; Rokade and Mane, 2008). Thus, the formative years before and after menarche correspond to a time of drastically reduced movement. Informants also suggested that the time around menarche results in more gender-segregated play, with physical activity for girls dropping even more than it does for boys. Physical education classes cannot fill the gap, as few schools have the requisite space, and the time dedicated to physical education is at best two hours a week.

The time around menarche is also a period of decreased insulin sensitivity, which typically returns to pre-pubertal levels a couple of years after menarche (Goran and Gower, 2001). Weight gain (from insulin resistance and lack of physical activity) further decreases insulin sensitivity, leading to a negative spiral. PCOS, which is linked to reduced insulin sensitivity, even for lean women, is also implicated in this spiral. This makes menarche a particularly vulnerable time, but this is when examination-related stress is most intense. This is even more so for girls from the middle classes. Although studies show that students in India are often stressed or depressed in the years of crucial exams (Bhasin et al., 2010; Verma et al., 2002), middle-class students suffer more school-related stress than their upper- and lower-class counterparts (Deb et al., 2010). Furthermore, this stress is reinforced by a lack of physical activity and hectic schedules. Sleep cycles are disturbed, as students study into the night and wake early, functioning on insufficient sleep—another factor contributing to insulin resistance and PCOS. Furthermore, students face high degrees of surveillance; parents supervise studying, and activities that can be sources of entertainment and leisure—such as socializing, television viewing, or play—are heavily curtailed. Typically, eating is the only sanctioned source of pleasure, and parents offer junk food and sugary treats to students to motivate or reward grueling examination preparation. Overall then, among the middle classes, adolescence—a key point in the developmental cycle—is precisely when the susceptible body is buffeted on all sides by multiple concurrent stressors.

For women of the aspirational middle class, stressors continue to accumulate across life stages, even after adolescence. The need to display empowered "modern" identities that correspond to the new emphasis on women's education and employment results in competition for limited admissions into institutes of higher education into the early 20s, followed by struggles to build careers. Meanwhile, new work structures result in very little time (and energy) for exercise, skipped or late lunches (at 4 or 5pm), long hours, and late dinners (up to 11pm). Sedentary jobs that involve working late or taking work home at night and over weekends are the norm. At the same time, new communications technologies, such as email and mobile phones, allow individuals to be constantly accessible for work.

Furthermore, the lifestyle standards coming from representations of the new hegemonic middle class have led to greater desire for consumer goods and the financial pressures of such consumption. Living up to this consuming middle-class ideal has resulted in new ways of enacting "modern" identities at the site of the body. The emergence of social media has meant that the enactment of these identities is publicly chronicled for all to see. Eating out, staying up late, working hard, and playing harder were common among informants under the age of 35 (especially those without children), and these are all characteristic of new "modern" identities.

Informants spoke of their inability to make the lifestyle changes required to achieve peak wellness; eating on time, sleeping early, reducing stressful activities, and exercising religiously were deemed impractical to their circumstances. As one informant observed, "This is the age [the 20s and 30s] you can't be slowed down, and thinking of health means you have to slow down." It was not just a question of work or situational factors but also social pressures. To be concerned with eating or sleeping on time or not being seen consuming resulted in being teased, labeled, or left out. One informant with PCOS stated, "I'm always the first in the house party to leave, and I'm labeled by my friends for it." Individuals were called terms such as "*behenji*" (Hindi word meaning sister with connotations of provinciality and lack of attractiveness), "*paavam*" (Tamil word with connotations of naiveté and pity), "aunty" (meaning old and frumpy, which also points to a generational divide), or having "no life," for not wanting to stay up late, party, drink, eat fast food, or eat out.

Even beyond the 20s, stressors continue to accumulate. Once married, women bear the burden of fulfilling multiple roles in their home and work lives, juggling workplace expectations with household responsibilities and familial obligations. Meanwhile, urban living exposes these women to an assortment of endocrine disruptors (present in pesticides, plastics, and other petrochemical residues) and constant sensory stimuli in the form of city noises, billboards, and bright lighting. Long urban commutes exacerbate the problem. Together, these elements synergize to create a perfect storm of health pressures implicated in PCOS. They also amplify the long-term risks of PCOS—such as the risk of diabetes—and the cumulative effect of exposure to these stressors can affect the illness trajectory of PCOS, worsening outcomes.

9. Conclusion

Urban middle-class living is placing unique burdens on Indian women that are associated with rising rates of PCOS in both popular and medical discourse. Rather than emphasizing genetic predispositions, popular and medical discourse on PCOS in India highlights changes in the lifestyles of the urban middle classes following economic liberalization, particularly disrupted meal and sleep routines and new stresses on women resulting from competition for education and jobs, consumerism, and juggling responsibilities of home and work. These perceptions also point to specific structural vulnerabilities linked to the pressures of aspiration and globalization on the urban middle classes, such as those associated with examination pressures and modern expectations of women. We have focused on these perceptions of PCOS and how these tie in to an ecosocial framework for understanding the condition as related to modern middle-class living.

While such an interpretation is supported by preliminary scientific data and observations from medical practitioners, more research is required into PCOS prevalence, the stressors of modern living that relate to it, and how these vary by class. It would also be interesting to examine the history of PCOS as a diagnostic category across India and to investigate patterns in perceptions of PCOS amongst different types of medical practitioners. Furthermore, an apparent rise in PCOS needs to be viewed in relation to other problems associated with the health transition in India. India is facing an epidemic of diabetes with a notable rise in prevalence that is related to increased urbanization, expansion of the middle classes, and the changing lifestyles accompanying these trends (Ramachandran, 2005).

We would argue that although urban middle-class women (especially women of the urban aspirational class) are in a position of relative privilege in India, they nevertheless face structural vulnerabilities resulting from the health pressures of globalization and economic liberalization. Indeed, these structural vulnerabilities and their associated health risks can even be thought to result from their position of privilege and the gains made from economic liberalization. To date, research on structural vulnerabilities, health disparities, and syndemics (e.g., Baer, 1996; Farmer, 1999; Holmes, 2011; Kim et al., 2000; Mendenhall, 2012; Mendenhall et al., 2012; Navarro, 2002; Quesada et al., 2011; Singer and Clair, 2003; Weaver and Mendenhall, 2014) has focused on populations that are socially or economically marginalized. In the age of the anthropocene, such a focus is dangerously limited. To truly address the human costs of the rise of PCOS and other metabolic disorders, medical anthropology needs to move beyond the underprivileged to investigate other structural vulnerabilities embroiled in the health pressures of globalization and the human manufacture of risks.

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