



## Dynamics of social-ecological systems: gender influence in local medical systems

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### ABSTRACT

Studies have reported that gender influences the variation of knowledge of local medical systems. However, most of the ethnobiological studies that analyze the variation of knowledge have focused on analyzing only the richness of known resources. Therefore, in this review we discuss the importance of analyzing the variation of knowledge between genders with a multifactorial and non-unidirectional perspective. It also presents proposals for future studies that analyze the influence of gender on local medical systems, considering the dynamics of social-ecological systems.

**Keywords:** Ethnobiology, Medicinal Plants, Intracultural Variation, Biosocial Model

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### INTRODUCTION

The gender is one of the many factors that influence the variation of knowledge and use of plant diversity (Howard 2006). Different studies have shown this variation, however, most ethnobiological studies of the local medical systems that analyze the variation of the knowledge have observed this phenomenon only by analyzing the total of medicinal plants known for each gender (Torres-Avilez et al. 2016). Howard (2006) indicates this as an error that occurs in the

analysis of variation of knowledge in relation to the knowledge and use of natural resources. In addition, the author indicates that the diversity of uses and knowledge are underestimated; the studies also show incorrect identification of the species, as well as the lack of analysis that contribute to the understanding of the relationships between people and plants.

Ethnobiological studies in different communities around the world have shown that women have a greater knowledge of medicinal plants (see, for example, Camou-

Guerrero et al. 2008). Other studies indicate that men have a greater knowledge (see Albuquerque et al. 2011) and others that there is no variation (Almeida et al. 2010). In the same sense a meta-analysis and systematic review of studies analyzing the variation of knowledge in local medical systems showed that knowledge between genders in local medical systems is not unidirectional (Torres-Avilez et al. 2016). Men and women may have a greater knowledge or may have no variation and have a homogeneous knowledge, this variation has been observed in different scales (Torres-Avilez et al. 2016).

Most studies in which variation in knowledge of local medical systems between genders has been observed suggest that this heterogeneity of knowledge is due to the variation of the social role between genders. Thus, gender in ethnobiological studies is being perceived in a stereotyped context, suggesting a single direction and a pattern, where women as housewives tend to know more for their role in the health care of the family. However, most studies have not analyzed the social role, which may be generating errors in the interpretation of results. This leads us to think, how to argue non-variation or a variation that comes out of a stereotyped context based on the social role? Therefore, this review aims to show the complexity of the gender variable. Firstly, we try to understand gender from a psychological and sociological perspective. Then we analyze the context of the gender variable in ethnobiological studies and the types of analyzes that have been performed to evaluate it. Thus, this review allows the understanding of gender in a broader way in the context of local medical systems, which would allow better strategies for the management and conservation of medicinal plant resources.

## **Gender in future studies of local medical systems**

Often, ethnobiological studies that analyze the variation of knowledge of medicinal plants in relation to gender, only analyze the variation between genders, considering the richness of the known medicinal plants and the diseases that are treated by them, leaving aside intrinsic factors of gender. Thus, it is important that ethnobiological studies adopt a definition of gender that allows to recognize the important components that must be analyzed in gender as a factor of variation. Wood and Eagly (2015) point out that there are various definitions of gender identity. However, in ethnobiology, gender must be considered more broadly, which will allow us to understand the variation of knowledge considering other perspectives.

Gender is generally recognized through the masculine and feminine identity associated with affection, cognition and behavioral style between men and women, being this a cultural deficiency of stereotyped gender (Ridgeway and Correll 2004, Wood and Eagly 2015). We observe that ethnobiological studies consider gender through masculine and feminine identity, since studies carried out with the variation of knowledge, tend to indicate that gender variation is unidirectional, in which women as housewives and caregivers of the family are the ones that have a greater knowledge (Camou-Guerrero et al. 2008, Srithi et al. 2012). Following the previous line of thought, a pattern would be observed in the variation of the knowledge of medicinal plants, where women would always be the holders of knowledge. However, Torres-Avilez et al. (2016) observed that there is no pattern in the knowledge of medicinal plants between genders at the global, continental and

country levels. Therefore, trying to understand gender through male and female identity results that it is difficult to argue the non-variation of knowledge between genders or the no unidirectionality in relation to a specific gender.

Ridgeway and Correll (2004) mention that among the basic components that maintain and change the gender system are cultural beliefs about gender and social contexts. Cultural beliefs about gender are hegemonic, effect of rules or institutions for the social structure of the difference and inequality that are understood as gender. However, these are stereotyped and the social context contributes to keep it that way (Ridgeway and Correll 2004). However, there are less differentiated hegemonic beliefs, that is, where men and women have equality to perform activities in the community.

Due to stereotypes established for each gender and the presence of hegemonic or less hegemonic beliefs in gender identities, we consider that gender in ethnobiological studies have to be seen through a biosocial model (Torres-Avilez et al. 2016). The biosocial model comes from psychology and considers that the attributes of men and women arise from the flexibility of a dynamic interaction between biology, local culture, ecology and economics. It directs the division of labor, influencing the social construction of gender, mediated by hormonal regulation, self-regulation of gender identity and social regulation, affected by sex cognition and behavior (see Wood and Eagly 2012).

Psychology indicates that gender identity may vary depending on other factors such as development, race, social class, social changes (Wood and Eagly 2012). In this sense, several authors have suggested that studies that analyze the variation of the

knowledge of medicinal plants have to be performed in a multifactorial way (Howard 2006, Pfeiffer and Butz 2005; Torres-Avilez et al. 2016).

In the multifactorial studies of gender it has been proposed to analyze the social networks between genders, cultural roles and spiritual taboos, beliefs and social norms related to each gender for the management of ecosystems, differences in access to the resource, and differences in access to external knowledge, with the purpose of better understanding the variation (Howard 2006, Pfeiffer and Butz 2005, Torres-Avilez et al. 2016). Based on the above, a study performed in the Fulni-ô indigenous community, in Brazil, shows that the variation of knowledge between genders in relation to medicinal plants is influenced by the transmission of knowledge, as well as by the social role that each gender develops in the community (Torres-Avilez 2017).

It has been suggested that gender besides being analyzed in a multifactorial approach has to be studied from a systemic point of view (Torres-Avilez 2017). In a study carried out in the Fulni-ô indigenous community, Torres-Avilez (2017) observed that the contribution of social actors in local medical systems is related to gender, being this relationship not directed, but both genera contribute in the functionality of the system. However, one may be more related to the structure and function of the system, so both genders are important in the resilience of the local medical system. Therefore, methodologically, it has been shown the importance of analyzing gender considering not only the structure of knowledge but also the function and functionality. Here, the structure is understood as the richness of known medicinal plants, the function as the total of treated therapeutic targets (perception of the

disease by the inhabitants of the community), and the functionality as the maintenance of both in the system through components of the transmission of knowledge.

### Analyzing gender in local medical systems

Local medical systems are social-ecological systems where a relationship between the available resource and the social structure is considered to satisfy the health problems in the communities. In this sense, ethnobiological studies analyzing the variation of the knowledge of specialists and non-specialists, as well as the variation in relation to age, occupation, ethnicity, income, and gender of knowledge holders, have been performed (Almeida et al. 2010, Estrada-Castillón et al. 2012, Silva et al. 2011, Sop et al. 2012). However, there are few studies being developed to understand the resilience of local medical systems, leaving aside that there is a variation in the available resource in local medical systems because of the environmental deterioration and phenomena to which they are exposed. Additionally, there is the variation of the social structure as a consequence of the social changes directed by globalization (Benz et al. 2000; Halmiton 2004). Among ethnobiological studies that have sought to understand the factors that are associated with the resilience of local medical systems, such as utilitarian redundancy, availability of the resource, the type of disease treated (severe or non-severe), we can mention the studies performed by Ladio and Lozada (2008), Albuquerque and Oliveira (2007), Ferreira Júnior et al. (2012) and Santoro et al. (2015). The studies by Torres-Avilez (2017) and Diaz-Reviriego et al. (2016) analyzed the gender influence of social

actors on the resilience of local medical systems. They observed that each gender can contribute in a different way to the structure and function of the system, so it is suggested that the gender variable is important in analyzes of the resilience of local medical systems. Thus, governance studies of social-ecological systems that analyze when and how people operate in the system, together with the different institutions that guide how people behave (Berkes and Folke 2000), must integrate the gender of social actors (Torres-Avilez 2017).

### Perspectives

Based on this review, we propose that future studies of gender should be based on three perspectives: biosocial, multifactorial and systemic. In such a way that allows to understand in a wider context the influence of gender in the local medical systems.

The perspective of the biosocial model would lead us to understand gender from a wider, non-stereotyped point of view. Understanding gender as a product of factors such as the biology of each sex, culture, economy and local ecology (Wood and Eagly 2012), which also allows us to integrate changes in social structure, so that these factors can interfere in the variation of knowledge in relation to gender.

In relation to the multifactorial perspective, it is important, since there are factors that are closely related to the variable that may be interfering in addition to the factors forming the gender. For example, studies have indicated that gender is a variable that depends on factors such as class, race, age, cultural roles, beliefs, and social norms related to each gender, among others, for ecosystem management (Howard 2006, Pfeiffer and Butz 2005, Torres-Avilez et al. 2016; Wood and Eagly 2015).

A systemic perspective would lead us to understand how the factors that determine the gender variable (gender biology, culture, economy and local ecology) and the factors that are closely related to variables may interfere with or are interfering with knowledge variation of local medical systems. This would lead us to a better understanding of this social-ecological system in relation to its dynamics, allowing a broad comprehension of the factors closely related to the resilience of local medical systems.

## ACKNOWLEDGEMENTS

The Foundation for Support of Science and Technology of the State of Pernambuco Brazil (Fundação de Amparo à Ciência e Tecnologia do Estado de Pernambuco Brasil: FACEPE-APQ-0314-2.03/13) for funding the study, CONACYT (Council of Science and Technology of Mexico) and SIIES (Secretary of Research, Innovation and Higher Education of the State of Yucatan) for the scholarship granted for the completion of doctoral studies in Brazil of WMTA. We are grateful to CNPq for the productivity grant awarded to UPA.

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**Received:** 13 March 2017

**Accepted:** 27 June 2017

**Published:** 14 July 2017