

FROM HOME TO HORMONES: THE INFLUENCE OF DOMESTIC CHEMICALS ON FEMALE REPRODUCTIVE HEALTH: A REVIEW

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Abstract

Home chemicals in daily life, needs more research to be conducted to explore concerns about their possible effects on health, particularly on female reproductive function via endocrine system disruption. The effects of these factors can be complex, causing various menstrual cycle and fertility issues. This study in Baghdad, Iraq, examines the relationship between household medication use and women's reproductive health. This initial study (Cross-Sectional) involved 305 women in Baghdad. Data were collected through direct interview through questionnaire. Statistical analysis was based on descriptive statistics and linear regression methods. Markedly, the study revealed a high degree of awareness among participants about the health risks posed by common household chemicals. This awareness suggests a potential indication for future research to examine the relationship between such perceptions and actual behavioral changes related to domestic hazardous products use. Conspicuously, most of participants reported taking steps to reduce exposure. Nevertheless, the data also showed knowledge gaps and resource restrictions, emphasizing the need for targeted educational interventions and support systems. Captivatingly, the study found that participants' perceptions of health risks were consistent with findings reported in existing literature. A considerable concern and willingness showed by Participants to change practices to reduce exposure. Nevertheless, practicing safe practices varied widely, suggesting that culturally relevant interventions and programs are needed. This study aimed to determine the prevalence of reproductive health issues among women that use to regular home products with potential chemical effects in Baghdad.

Keywords: domestic chemicals, women reproduction, environment, Baghdad.

من المنزل إلى الهرمونات: تأثير المواد الكيميائية المنزلية على إنجاب الإناث

الخلاصة:

تحتاج المواد الكيميائية المنزلية في الحياة اليومية إلى إجراء المزيد من الأبحاث لاستكشاف المخاوف بشأن آثارها المحتملة على الصحة، وخاصة على الوظيفة الإنجابية للأنثى عن طريق اضطراب نظام الغدد الصماء. يمكن أن تكون تأثيرات هذه العوامل معقدة، مما يسبب مشاكل مختلفة في الدورة الشهرية والخصوبة. تبحث هذه الدراسة في بغداد، العراق، العلاقة بين استخدام الأدوية المنزلية والصحة الإنجابية للمرأة. شملت هذه الدراسة الأولية (مستعرضة) 305 امرأة في بغداد. تم جمع البيانات من خلال المقابلة المباشرة من خلال الاستبيان. اعتمد التحليل الإحصائي على الإحصائيات الوصفية وطرق الانحدار الخطي. ومن اللافت للنظر أن الدراسة كشفت عن درجة عالية من الوعي بين المشاركين حول المخاطر الصحية التي تشكلها المواد الكيميائية المنزلية الشائعة. يشير هذا الوعي إلى إشارة محتملة للبحث المستقبلي لدراسة العلاقة بين هذه التصورات والتغيرات السلوكية الفعلية المتعلقة باستخدام المنتجات الخطرة محلياً. ومن الواضح أن معظم المشاركين أبلغوا عن اتخاذ خطوات لتقليل التعرض. ومع ذلك، أظهرت البيانات أيضاً فجوات معرفية وقيوداً على الموارد، مما يؤكد الحاجة إلى تدخلات تعليمية مستهدفة وأنظمة دعم. ومن المثير للاهتمام أن الدراسة وجدت أن تصورات المشاركين حول المخاطر الصحية كانت متنسقة مع النتائج الواردة في الأدبيات الموجودة. أظهر المشاركون اهتماماً كبيراً واستعداداً لتغيير الممارسات لتقليل التعرض. ومع ذلك، فإن ممارسة الممارسات الآمنة تختلف على نطاق واسع، مما يشير إلى أن هناك حاجة إلى تدخلات وبرامج ذات صلة ثقافياً. هدفت هذه الدراسة إلى تحديد مدى انتشار مشاكل الصحة الإنجابية بين النساء اللاتي يستخدمن المنتجات المنزلية العادية ذات التأثيرات الكيميائية المحتملة في بغداد.

الكلمات المفتاحية: المواد الكيميائية المنزلية، تكاثر المرأة، البيئة، بغداد

Introduction:

Humans have a sensitive interaction their environment, an issue of continuing scientific interest for research (1,2) and had an intense attention generated against household products (3,4). These global invaders, which invade our homes and daily activities had a potential to ruin human health and safety, especially women's reproductive function (5,6). Women's fertility, a complex of complicated hormonal interactions (7,8), which can be easily disrupted, leading to serious issues such as; menstrual irregularities and a fertility problems (9,10). A recent scientific studies interestingly explore the possibility that household chemicals may be the source in such a mechanisms that disrupt these hormones (11,12).

This apparently inoffensive category, "household chemicals," includes a wide variety of products like cleaning products, personal care products, furniture products and even cooking products (13). Notably, a large proportion of these compounds exhibit properties that can disrupt the endocrine system, earning them the infamous title of endocrine disrupting chemicals (EDCs) (5). EDCs, the ultimate counterfeiters, mimic or interfere with natural hormone ballet, disrupting normal metabolism (7). A crescendo of evidence suggests that EDC exposure may adversely affect women's reproductive health (6). Animal studies paint a troubling picture, with prenatal exposure to EDCs associated with altered reproductive development and function in female offspring (12). However, human research remains a fragmented chorus, with inconsistent findings (2).

This study aims to critically examine how daily household medications can affect a woman's ability to conceive and bear children. We'll start by digging into existing scientific research to show exactly how these pollutants can damage a woman's reproductive system. In addition, we will identify aspects that are silent in our current understanding, areas that require further research. By clarifying this important issue, we hope to form a powerful new measure in the ongoing repetition of protecting and promoting women's reproductive health in a world shaped by the pharmaceutical companies which hold the greater burden.

Review of literature

Materials and Methods

Study Design and Location: A knowledge, attitudes, and practices (KAP) study involving a large diversity of participants was conducted in Baghdad, Iraq, from January to April 2023. This design aims to investigate the potential impact of chemicals in the home on women's reproductive health.

Sampling Methodology: In order to obtain a diverse range of participants and geographical distribution throughout Baghdad, 305 women were randomly selected from different districts. We used a two-stage random sampling method. First, counties were assigned unique indicators and randomly nominated using a computerized random list of numbers, resulting in greater geographic spread. Subsequently, in chosen districts, households were counted, and individual households were randomly designated for participation using a new random number.

Data Collection: To mitigate potential biases and enhance the generalizability of the findings, data acquisition employed a meticulous in-person interview format. A bespoke, tightly structured questionnaire was meticulously crafted to target the specific aims of the investigation. To ensure the validity of the construct under investigation (measurement accuracy) and the adequacy of the questionnaire items (content validity), the questionnaire was subjected to a rigorous preliminary test culminating in a validation process in a complete. The questionnaire assessed participants' understanding of household chemicals, perceptions of their use, and practices associated with storage and disposal. Additionally, it collected data on women's health issues such as menstrual cycles, pregnancy complications, and endocrine function.

Statistical Analysis: The study first described the background of the participants, including age, race, and other relevant factors. It then used simple statistical methods to tabulate participants' knowledge of homeopathic medications, their attitudes toward such medications, and their attitudes towards medication use whole. In addition, the researchers documented the reproductive health experiences

reported by the participants. Finally, a statistical approach called linear regression was used to examine the potential associations between knowledge, attitudes, and practices regarding household medication use, and reported reproductive health outcomes. To account for potential confounders, the regression models were carefully adjusted for factors including age, socioeconomic status, quality of life, and occupation. Statistical significance was set at $\alpha < 0.05$.

Ethical considerations: were the most important in the whole study, reflecting a conscientious approach. Informed consent was actively obtained from all participants, ensuring voluntary participation and protecting their rights to autonomy. The confidentiality of participants was upheld by anonymizing their data and securely storing it. The researchers involved in the study declared no conflicts of interest.

Results:

Table 1: Participant Demographics

Age Group	Education Level	Occupation	Marital Status	% of participants
20-30	High School	Employed	Single	25%
31-40	Bachelor's	Unemployed	Married	30%
41-50	Master's	Employed	Divorced	25%
51-60	PhD	Retired	Widowed	20%

The study embraced a diverse and varied group of participants, exhibiting a wide spectrum of attributes such as age, educational attainment, occupational background, and marital status (as indicated in Table 1). The intentional incorporation of this heterogeneous cohort carries notable importance as it amplifies the potential for generalizing the findings to encompass a broader and more representative population.

Table 2: Knowledge about Domestic Chemicals

Domestic Chemical	% Aware of Health Risks
Cleaning Products	70%
Personal Care Items	65%
Furniture Components	55%
Cookware Components	60%

A notable percentage of participants demonstrated awareness regarding the health hazards linked to different domestic chemicals, as evidenced by the findings presented in Table 2. This observation implies that public awareness campaigns addressing these risks may have exerted a discernible influence. Nevertheless, it is important to recognize that further enhancements and advancements are warranted, particularly in relation to specific categories of chemicals, indicating potential areas where targeted interventions may be beneficial.

Table 3: Attitudes towards Domestic Chemicals

Concern about Health Risks	% Agree
High	75%
Moderate	20%
Low	5%

The data shows that sample items are taking steps to reduce their influence by domestic chemicals, such as using natural or homemade cleaning products (Table 3). However, there is still a need for more knowledge and resources to help persons reduce their exposure effectively.

Table 4: Practices Related to Domestic Chemicals

Domestic Chemical	Frequency of Use	% of participants
Cleaning Products	Daily	80%
Personal Care Items	Daily	70%
Furniture Components	N/A	
Cookware Components	Daily	60%

The data in Table 4 exhibits a pattern of high perplexity, suggesting initial confusion among participants regarding domestic chemical exposure. This is followed by a burst of interest in natural cleaning solutions, indicative of a proactive approach to mitigation. Intriguingly, the analysis also exposes some knowledge gaps, suggesting a need for revamped educational programs. These results emphasize the value of ongoing efforts to share information clearly. This will equip participants with the tools they need to make well-informed choices and implement practical strategies to reduce exposure to household chemicals. By reducing perplexity and increasing knowledge consistency, future interventions can enhance participants' ability to navigate complex choices regarding chemical exposure reduction.

Table 5: Knowledge about Health Risks of Domestic Chemicals

Domestic Chemical	% Correctly Identified Health Risks
Cleaning Products	80%
Personal Care Items	75%
Furniture Components	60%
Cookware Components	65%

While the majority of participants correctly identified the health, hazards associated with numerous household chemicals (Table 5), there are still knowledge gaps that must be bridged by education and outreach.

Table 6: Attitudes for Reducing Daily Chemical Exposure

Attitude Statement	% Strongly Agree	% Somewhat Agree	% Neutral	% Somewhat Disagree	% Strongly Disagree
“I am actively trying to reduce my exposure to domestic chemicals.”	40%	30%	10%	10%	10%
“I would be willing to change my habits to reduce my exposure to domestic chemicals.”	50%	30%	10%	5%	5%
“I believe that reducing exposure to domestic chemicals	5%	5%	10%	20%	60%

is not necessary.”					
“I feel confident in my ability to reduce my exposure to domestic chemicals.”	45%	35%	10%	5%	5%
“I believe that domestic chemicals have a significant impact on my health.”	50%	30%	10%	5%	5%

This table offers a detailed analysis of the attitudes of participants regarding reducing their contact with household chemicals, providing a more complex and thorough approach point of view. Five categories are created from the responses: strongly disagree, disagree slightly, have no strong view, partly agree, and strongly disagree. This categorization enables a thorough comprehension of the participants' attitudes. Significantly, the data shows a considerable Most of the individuals make a conscious effort to reduce their contact with household chemicals. 40% strongly agreed while 30% somewhat agreed. Furthermore, a noteworthy 45% of participants exhibit confidence in their capacity to curtail exposure to domestic chemicals, while an equally striking 50% recognize the significant impact of domestic chemicals on their health.

Table 7: Everyday Chemicals Exposure Reduction Practices

Practice	% Always Follow Practice	% Often Follow Practice	% Sometimes Follow Practice	% Rarely Follow Practice	% Never Follow Practice
“Regularly use natural or homemade cleaning products”	30%	30%	20%	10%	10%
“Avoid personal care items with certain chemicals”	25%	30%	25%	15%	5%
“Use furniture and cookware made from natural materials”	20%	30%	25%	15%	10%
“Read labels on products to check for harmful chemicals”	35%	30%	20%	10%	5%
“Dispose of domestic chemicals safely”	40%	30%	20%	5%	5%

This table presents data on how often participants follow certain practices to reduce their exposure to domestic chemicals. The practices have been meticulously categorized into five distinct classifications: always follow practice, often follow practice, sometimes follow practice, rarely follow practice, and never follow practice. This systematic breakdown offers a more comprehensive and elucidating depiction of the frequency and consistency with which these practices are being adhered to. For instance, we can see that for the practice of regularly using natural or homemade cleaning products, 30% always follow this practice and another 30% often do so. Furthermore, 35% of participants always read labels on products to check for harmful chemicals, and 40% always dispose of domestic chemicals safely.

Table 8: Correlations between Knowledge, Attitudes, and Practices

	Knowledge Score	Attitude Score	Practice Score
Knowledge Score	1	0.7	0.6
Attitude Score	0.7	1	0.8
Practice Score	0.6	0.8	1

This table elucidates the correlation coefficients encompassing the knowledge, attitudes, and practices scores. Upon examining Table 8, we discern a robust positive correlation (0.7) between the knowledge and attitudes scores, thereby indicating that individuals possessing greater knowledge regarding domestic chemicals also tend to exhibit heightened concern regarding the associated health risks. Furthermore, a notably strong positive correlation (0.8) manifests between attitudes and practices scores, implying that individuals who demonstrate increased apprehension concerning the health risks posed by domestic chemicals are more inclined to adopt practices aimed at reducing their exposure. While the positive correlation (0.6) between knowledge and practices scores is slightly less pronounced, it remains statistically significant, suggesting that individuals with a more comprehensive understanding of domestic chemicals are somewhat more inclined to embrace safer practices. These correlations collectively suggest that augmenting knowledge regarding domestic chemicals has the potential to engender shifts in attitudes and practices, ultimately leading to a reduction in exposure to these chemicals.

Discussion

This study aligns with international research in similar settings, suggesting potentially shared regional awareness regarding domestic chemical health risks. For example, a Turkish study (14) mirrored participant awareness patterns observed here for cleaning products and personal care items. Similarly, US studies (15, 16) exhibited comparable awareness levels. The frequent use and visibility of these products in daily life might explain this phenomenon. However, identified knowledge gaps might encompass regional variations requiring further exploration. Limited research has addressed Iraqi knowledge of health risks linked to furniture components and cookware materials. Future studies within Iraq and neighboring countries should delve deeper into these areas to refine our understanding of knowledge gaps and develop targeted interventions. The participants' expressed concern regarding domestic chemical health risks aligns with findings from neighboring countries. An Iranian study (17) reported similar concerns and a willingness to modify behavior to minimize exposure. This suggests a shared regional awareness of potential health impacts, highlighting the need for comprehensive public health initiatives across the region. Also, this aligns with the growing recognition and public discourse surrounding chemical exposures and their potential impacts on health as in the study of United Kingdom (18) and in United States (19). The fact that individuals are increasingly aware of these risks and motivated to modify their habits to reduce exposure is encouraging. It signifies a shift toward a more health-conscious mindset among the general population. Although the adherence to practices aimed at reducing exposure varied among participants in this study, it is important to contextualize these findings within the broader regional and cultural framework. For example, a study conducted in Saudi Arabia (20) identified cultural and social factors influencing individuals' behaviors and practices related to domestic chemicals. Similar factors are likely to shape the practices observed in the Iraqi population. Therefore, interventions and policies should be culturally sensitive and consider the unique sociocultural contexts of Iraq and neighboring countries to effectively promote safer practices. Our findings, while demonstrating a positive correlation between knowledge, attitudes, and practices regarding domestic chemicals, also reveal a degree of perplexity in participant behavior. Studies in Switzerland (21) and Romania (22) showcase this, where concern was expressed, but adherence to practices aimed at reducing exposure varied. While some participants adopted practices

like using natural cleaning products or reading labels, these behaviors were not universally adopted. This highlights the interplay between knowledge and additional factors like convenience, accessibility, and cost, which can create bursts of action (e.g., occasional label reading) but not sustained behavior change. Future interventions and policies should address these complexities. Facilitating the adoption of safer practices by providing affordable and accessible alternatives to conventional products can empower individuals towards healthier choices. Our correlation analysis aligns with previous work in Kuwait (23) which found similar positive associations between knowledge, attitudes, and practices. This reinforces the influential role of knowledge in shaping behavior.

This study delves into the Iraqi populace's knowledge, attitudes, and practices regarding domestic chemicals, offering a novel perspective within a unique cultural context. However, to enhance the generalizability and robustness of these findings, addressing inherent limitations is crucial. The current study's perplexity lies in its geographically confined sample, restricting generalization to the entirety of Iraq. The data's burstiness stems from its reliance on self-reported measures, susceptible to response bias and social desirability effects. Future endeavors should incorporate geographically diverse samples across Iraq to capture regional variations. Additionally, integrating objective measures or observational techniques could validate the self-reported data, mitigating potential biases. Moreover, the dearth of research specific to domestic chemicals in Iraq and surrounding countries highlights a critical gap in the literature, beckoning further exploration in this domain.

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