Beyond Belief: A Mixed-Methods Analysis Of The Knowledge-Practice Gap In The Use Of Rosemary Oil For Inflammation Among Libyan Women

Suad Ali Abousheenah [1], Sreemoy Kanti Das[2]

Faculty of Pharmacy, Lincoln University College.

Abstract

Background: In an era of rising interest in traditional medicine, a significant gap often separates the scientific validation of botanical remedies from their practical application. This study investigates this gap through the lens of rosemary (Rosmarinus officinalis) oil, a compound with proven anti-inflammatory properties, within the culturally rich context of Tajura, Libya.

Methods: We employed a sequential explanatory mixed-methods design (QUAN→qual). A quantitative survey (N=300) assessed knowledge, attitudes, and constructs of the Theory of Planned Behavior (TPB). These statistical findings were then explained through thematic analysis of 22 in-depth interviews.

Results: A profound knowledge deficit was identified: while 82% of women were aware of the rosemary plant, only 13% knew of its specific anti-inflammatory application, a finding strongly correlated with higher education ($p<.001$). The intention to use the oil was significantly predicted by positive Attitude (OR=3.49), Subjective Norms (OR=2.43), and Perceived Behavioral Control (PBC) (OR=1.95). However, qualitative analysis revealed that low PBC is the critical barrier preventing the translation of belief into practice. This low control is driven by two factors: (1) a deficit in procedural "how-to" knowledge (dosage, preparation) and (2) a pervasive distrust in the authenticity of commercial products.

Conclusion: Positive attitudes and cultural reverence for traditional remedies are insufficient to ensure their effective therapeutic use. The primary obstacle is a lack of actionable knowledge that undermines women's self-efficacy. To be effective, public health initiatives must evolve beyond awareness campaigns to actively build community confidence through practical, culturally competent, and evidence-based guidance.

1. Introduction

Chronic inflammatory diseases represent a primary global health challenge, driving a corresponding increase in public and scientific interest in the therapeutic potential of botanical agents (Furman et al., 2019). Among these, rosemary (Rosmarinus officinalis L.), an aromatic shrub native to the Mediterranean, has emerged as a particularly promising candidate. With a history of use stretching back millennia, rosemary was revered in traditional European and Mediterranean medicine for a wide range of ailments, particularly those associated with pain and inflammation (Herrera et al., 2016).
Modern science has begun to systematically validate this traditional wisdom. The anti- inflammatory effects of rosemary are now understood to be driven by a complex orchestra of bioactive compounds.

These include potent phenolic diterpenes like carnosic acid and carnosol, which modulate core inflammatory pathways such as NF-κB, and phenolic compounds like rosmarinic acid, which exert direct anti-inflammatory and anti-allergic effects (Borges et al., 2019; Oluwatosin et al., 2022). This multi-target action makes rosemary a subject of significant interest for its therapeutic potential.

Despite this robust body of evidence, a critical disconnect often exists between laboratory findings and "real-world" community knowledge and practice—a well-documented knowledge-practice gap (Voeks & Leony, 2004). This issue is particularly salient in socio- cultural contexts like Libya. Here, a pluralistic healthcare landscape exists where traditional, community-based remedies are often used alongside formal biomedical services. Within this system, women are frequently the primary custodians of traditional knowledge, responsible for the health of their families (McLean & Campbell, 2013). Yet, to date, no research has systematically investigated whether the scientific validation of rosemary's benefits has permeated public awareness in Libya or identified the specific barriers that may be preventing its safe and effective use.

This study aims to fill this critical empirical and contextual gap. Utilizing a sequential explanatory mixed-methods design, anchored in the Theory of Planned Behavior (TPB), this paper provides the first in-depth investigation into the knowledge, awareness, attitudes, and psychosocial factors governing the use of rosemary oil for inflammation among women in Tajura, Libya. Our objective is to move beyond a simple description of what women believe, to explain why they act—or fail to act—on those beliefs, and to provide an evidence base for developing culturally-resonant health interventions that bridge traditional wisdom with scientific efficacy.

2. Methods

2.1. Research Paradigm and Design

This study was guided by a pragmatic paradigm, which values the use of multiple methods to solve complex, real-world problems. Accordingly, we employed a sequential explanatory mixed-methods design (QUAN → qual) (Creswell & Plano Clark, 2017). This two-phase approach was selected for its unique strengths. The initial quantitative phase provided a broad, generalizable overview of knowledge, attitudes, and behavioral predictors, answering the "what" and "how many" questions. The subsequent qualitative phase was designed to explain and add depth to these statistical findings, answering the crucial "why" and "how" questions. This design achieves **complementarity**, where the strengths of one method offset the weaknesses of the other, leading to a more robust and nuanced understanding than either method could provide alone.

2.2. Participants, Setting, and Sampling

The study was conducted in Tajura, a large urban district of Tripoli, Libya.

- **Quantitative Sample (Phase 1):** A non-probability convenience sample of 300 adult women (aged 18-65) was recruited. To mitigate the biases of convenience sampling and enhance the sample's heterogeneity, a quota element was introduced to ensure recruitment from different geographical districts, across various age and educational strata, and at different times of day from public locations (e.g., community centers,

markets). The sample size was determined by an a priori power analysis to ensure sufficient statistical power (80%) to detect a medium effect size in the final regression model.

- **Qualitative Sample (Phase 2):** From the initial survey respondents, a subsample of 22 women was selected for interviews using a purposive sampling strategy based on maximum variation. A sampling matrix was developed to deliberately include women with a wide range of characteristics relevant to the research questions, including different levels of knowledge (high vs. low), attitudes (positive vs. neutral), usage experience (users vs. nonusers), and demographics (age, education). This ensured the qualitative data captured a rich and diverse set of perspectives.

2.3. Data Collection and Instrumentation

- **Phase 1: Quantitative Survey:** A structured questionnaire was meticulously developed. Its sections operationalized: (a) Demographics; (b) Dichotomous awareness of rosemary; (c) Knowledge of specific uses (multiple-choice); and (d) The three core constructs of the Theory of Planned Behavior (TPB): Attitude, Subjective Norms, and Perceived Behavioral Control (PBC), measured using items on a 5- point Likert scale. To ensure conceptual equivalence, the instrument underwent a rigorous, committee-based forward-back translation protocol into Arabic. It was then pilot-tested with 15 women, using cognitive interviewing to refine item clarity.
- **Phase 2: Qualitative Interviews:** In-depth, semi-structured interviews were conducted in Arabic to explore the reasoning behind the statistical patterns identified in Phase 1. The interview guide was directly informed by the survey findings, with probes designed to deconstruct the cultural meaning of attitudes, the influence of social norms, and, most importantly, the specific barriers contributing to low PBC. Interviews lasted 45-60 minutes and were audio-recorded with consent.

2.4. Data Analysis

- **Quantitative Analysis:** Data were analyzed using SPSS (Version 26). Descriptive statistics were generated, and relationships between variables were tested using chi- square tests, independent samples t-tests, and one-way ANOVAs ($p < .05$ significance level). A multivariate logistic regression was used to test the combined predictive power of the TPB constructs on behavioral intention.
- **Qualitative Analysis:** Interview transcripts were analyzed using the six-phase model of thematic analysis as outlined by Braun and Clarke (2006). This involved data familiarization, coding, theme development, and refinement. The analysis focused on identifying latent themes to understand the underlying cultural and social meanings shaping participants' experiences.

2.5. Methodological Rigor and Trustworthiness

Quantitative reliability was established with Cronbach's alpha coefficients exceeding the conventional .70 threshold for all TPB scales. To ensure the trustworthiness of the qualitative data, we employed several established criteria (Lincoln & Guba, 1985). Credibility was enhanced through peer debriefing and member checking. Transferability was addressed through the provision of "thick description" in the thematic analysis. Dependability was ensured via a detailed audit trail and an inter-coder reliability

check (Cohen's Kappa = .82, indicating high agreement). Confirmability was addressed through the practice of researcher reflexivity.

3. Results

3.1. The Quantitative Landscape: High Belief, Low Specificity

The survey data painted a clear picture of a community where cultural familiarity with rosemary coexists with a profound lack of specific, evidence-based knowledge.

- **Awareness and Knowledge:** General awareness of the rosemary plant was high (82.0%), but this dropped significantly to 65.0% for awareness of rosemary oil ($p<.001$). Of those aware of the oil, knowledge was concentrated in cosmetic (75.4%) and culinary (58.0%) uses. Critically, only 20.0% of this aware subgroup (n=39, representing just 13.0% of the total sample) knew of its specific anti-inflammatory properties. This specific knowledge was strongly and significantly correlated with having a university education ($p<.001$).
- **Sources of Information:** The flow of knowledge was dominated by informal channels. **Family and friends (62.0%)** and the internet/social media (48.0%) were the most frequently cited sources. In stark contrast, formal healthcare providers (15.0%) were the least-consulted source, highlighting a significant clinical disconnect.
- **Attitudes and Beliefs:** Participants held overwhelmingly positive attitudes toward natural remedies (M=3.82 on a 5-point scale). A vast majority agreed that natural remedies are safer (70.0%) and have fewer side effects (80.0%) than conventional medicines. Counterintuitively, these positive attitudes were strongest among the most highly educated women ($p=.009$).
- **Predicting Intention (The TPB Model):** A multivariate logistic regression model significantly predicted the intention to use rosemary oil for inflammation ($\chi^2(3) = 25.43$, $p<.001$), explaining 15.2% of the variance (Nagelkerke R^2). As detailed in Table 1, all three constructs were significant independent predictors. Attitude was the most powerful predictor (OR=3.49), followed by Subjective Norms (OR=2.43) and Perceived Behavioral Control (PBC) (OR=1.95). Notably, PBC had the lowest mean score (M=3.21), suggesting it was the weakest link in the chain from belief to action.

Table 1: Logistic Regression Predicting Intention to Use Rosemary Oil

Variable	B	Standard Error (S.E.)	Wald	Degrees of Freedom (df)	Significance (p)	Exp(B) (Odds Ratio)
Attitude	1.25	0.45	7.72	1	0.005	3.49
Subjective Norms	0.89	0.38	5.51	1	0.019	2.43
Perceived Behavioral Control (PBC)	0.67	0.31	4.67	1	0.031	1.95
Constant	-2.45	0.62	15.58	1	0.000	0.09

3.2. The Qualitative Explanation: Unpacking the Barriers to Action

Thematic analysis of the interviews provided crucial explanatory depth, revealing why strong positive attitudes failed to translate into widespread practice. Low Perceived Behavioral Control emerged as the central theme, acting as the ultimate gatekeeper to action.

- **Theme 1: The Cultural Foundation of Belief – "Natural is Safer"**
  The powerful influence of Attitude and Subjective Norms was explained by a deeply ingrained cultural worldview. Knowledge was transmitted through the matriarchal line and was seen as a trusted, sacred inheritance. Fatima (42) explained, "My grandmother... her knowledge was... it was from God... It's not something you question; it is just the way things are." This worldview was built on a stark dichotomy that framed "natural" remedies as pure and benevolent, and "chemical" medicines as foreign, harsh, and risky.
- **Theme 2: The Decisive Internal Barrier – The "How-To" Knowledge Deficit** The primary reason for low PBC was a profound lack of specific, procedural knowledge. Women had inherited the belief in rosemary's power but not always the detailed recipe for its therapeutic use. This created a paralyzing "crisis of confidence" and a fear of causing harm. Samira (51), a retired civil servant, perfectly articulated this barrier:

  "I know it's good for you. I can feel it. But how do I use it for my knee pain? Do I drink it? God forbid, no. Do I rub it on? Okay, but how? Is it the fresh plant or the dried one? ... Nobody has really told me the correct way, the proper recipe. The old women, they knew these things in their bones. But for us, that detailed knowledge is... it's becoming lost. So, I believe in it, but I am afraid to try."
  This sentiment was echoed by younger women like Laila (26), who compared a vague bottle of rosemary oil to the clear instructions on a box of Panadol, concluding, "There are no instructions... So it just sits on my shelf."

- **Theme 3: The Decisive External Barrier – Distrust in a "Gamble" Market**
  The second driver of low PBC was an external, structural factor: a deep and legitimate distrust in the quality and authenticity of commercially available oils. Participants universally believed that homemade remedies were superior and viewed the unregulated market with suspicion. Karima (39) explained her distrust of store-bought products:

  "The oil you buy in the market... who knows what is really in it? They mix it with other cheap oils, like paraffin oil... What they sell in the bottles is just a business." This lack of a trusted, regulated market creates a significant control barrier, particularly for women who lack the time, resources, or knowledge to make their own preparations. As Asma (35) lamented, buying an oil felt like a "gamble," a source of anxiety rather than empowerment.

4. Discussion

This study provides the first mixed-methods analysis of the knowledge, attitudes, and practices surrounding the use of a traditional remedy in Libya. Our findings reveal a central paradox: in a community with a powerful cultural reverence for rosemary, its specific, evidence-based therapeutic application is rare. The results indicate that the barrier is not a
lack of belief, but a critical deficit in the actionable knowledge and resources that foster self- efficacy.

4.1. The Primacy of Perceived Behavioral Control: A Multiplicative Model

While our quantitative findings confirmed the statistical validity of the TPB model, the qualitative data suggest a more dynamic relationship between its constructs. The potent influence of positive Attitudes (OR=3.49) and Subjective Norms (OR=2.43) appears to be **conditional** upon a sufficient level of Perceived Behavioral Control. Without the confidence and ability to act, even the strongest beliefs and social encouragement are rendered inert. This positions PBC as the primary leverage point for intervention and suggests that public health campaigns focused solely on raising awareness or promoting positive attitudes are destined to be ineffective. Our findings strongly support literature that identifies PBC as a critical but often under-studied factor in the use of Complementary and Alternative Medicine (Verhoef, Mulkins, & Boon, 2005).

4.2. Deconstructing the Knowledge Gap: Epistemological Incongruence

Our study nuances the concept of the "knowledge gap." The issue is not a simple absence of information, but an **epistemological incongruence** between two ways of knowing. The community's traditional knowledge is holistic and non-specific, viewing rosemary as a general blessing (barakah). In contrast, the biomedical framework is specific and mechanistic, defining rosemary by its "antiinflammatory" action. As Nadia (51) noted, "We don't think of it like, 'this is for inflammation.' That is the doctor's language." This highlights that effective health education cannot simply impose biomedical terms but must find a "third space" that translates scientific evidence into a culturally resonant and understandable framework.

4.3. The Clinical Disconnect and The Path Forward

The finding that healthcare providers are the least-used source of information is a stark indicator of a disconnect between the community's lived health practices and the formal medical system. This is likely driven by a mutual lack of engagement: patients fear dismissal, and providers are often not trained in ethnobotany or CAM. This communication vacuum poses risks to patient safety (e.g., potential drug-herb interactions) and represents a massive missed opportunity for patient education.

Therefore, this study argues for a paradigm shift away from a "deficit model" of public health, which assumes communities are empty vessels to be filled with facts. A more effective approach would be a **"co-production" model of knowledge** (Wynne, 1992). Such an approach would involve creating platforms where scientific experts and the female custodians of traditional knowledge can collaborate as equal partners. For example, a workshop could begin with an elder demonstrating the traditional preparation of rosemary, validating her expertise, followed by a pharmacist explaining the science behind its efficacy and a doctor providing clear safety guidelines. This fosters **integrative health literacy**, empowering women with the skills to synthesize knowledge from both systems.

4.4. Limitations and Future Research

The primary limitation of this study is the use of a non-probability convenience sample from a single urban area, which restricts the statistical generalizability of the findings. The cross- sectional design can establish associations but not causality. Future research should prioritize a larger, multi-region study with a stratified random sampling technique to create a nationally representative picture.
Furthermore, dedicated qualitative studies interviewing healthcare

providers are needed to understand their perspectives on this clinical disconnect. Finally, the most important practical step is to design and rigorously evaluate a culturally-tailored educational intervention based on these findings, specifically one that aims to increase PBC and build user selfefficacy.

5. Conclusion

The women of Tajura hold a deep and abiding trust in the healing power of nature—a powerful asset for public health. However, the path to better health does not lie in a forced choice between the wisdom of a grandmother and the data of a clinical trial. The primary barrier to the effective use of traditional remedies like rosemary oil is not a lack of belief, but a lack of confident, practical, "howto" knowledge. The challenge, therefore, is to build upon this foundation of belief by providing the tools of scientific knowledge that can transform that belief into confident, safe, and effective action. The path forward lies not in choosing between tradition and science, but in weaving the threads of both into a stronger, more resilient, and more culturally competent tapestry of health and well-being.

Declarations

Ethical Approval and Consent to Participate

This study was conducted in accordance with the principles of the Declaration of Helsinki. The research protocol received full ethical approval from the Institutional Review Board of Ministry of Higher Education and Scientific Research – Libya . All participants were provided with a detailed information sheet and gave written informed consent prior to their involvement in the study.

Funding

The author received no specific funding for this work.

Declaration of Conflicting Interests

The author declares that there is no conflict of interest with respect to the research, authorship, and/or publication of this article.

Data Availability

The data that support the findings of this study are available from the corresponding author upon reasonable request. The data are not publicly available due to privacy restrictions containing information that could compromise the anonymity of research participants.

References :

1. Aburawi, A. (2013). Healthcare in Libya: A system in transition. Libyan Center for Research and Development.

2. Ahmida, A. A. (2009). The making of modern Libya: State formation, colonization, and resistance. SUNY Press.

3. Ajzen, I. (1991). The theory of planned behavior. Organizational Behavior and Human Decision Processes, 50(2), 179–211. https://doi.org/10.1016/0749-5978(91)90020-T

4. Ajzen, I. (2002). Perceived behavioral control, self-efficacy, locus of control, and the theory of planned behavior. Journal of Applied Social Psychology, 32(4), 665–683. https://doi.org/10.1111/j.1559-1816.2002.tb00236.x

5. Ajzen, I. (2006). Constructing a Theory of Planned Behavior questionnaire. Retrieved from https://people.umass.edu/aizen/pdf/tpb.measurement.pdf

6. Al-Sereiti, M. R., Abu-Amer, K. M., & Sen, P. (1999). Pharmacology of rosemary (Rosmarinus officinalis Linn.) and its therapeutic potentials. Indian Journal of Experimental Biology, 37(2), 124–130.

7. Andrade, J. M., Faustino, C., Garcia, C., Ladeiras, D., Reis, C. P., & Rijo, P. (2018). Rosmarinus officinalis L.: an update review of its phytochemistry and biological activity. Future Science OA, 4(4), FSO283. https://doi.org/10.4155/fsoa-2017-0124

8. Andrade-Cetto, A. (2009). Ethnobotanical study of the medicinal plants from Tlanchinol, Hidalgo, México. Journal of Ethnopharmacology, 122(1), 163–171. https://doi.org/10.1016/j.jep.2008.12.008

9. Angioni, A., Barra, A., Coroneo, V., Dessi, S., & Cabras, P. (2004). Chemical composition, seasonal variability, and antifungal activity of Rosmarinus officinalis L. essential oil from Sardinia and Corsica. Journal of Agricultural and Food Chemistry, 52(11), 3530–3535. https://doi.org/10.1021/jf035213v

10. Astin, J. A. (1998). Why patients use alternative medicine: results of a national study. JAMA, 279(19), 1548–1553. https://doi.org/10.1001/jama.279.19.1548

11. Baba, S. (2014). Rosmarinic acid: a key polyphenol in the prevention of human diseases.

12. Current Medicinal Chemistry, 21(34), 3933–3951.

13. Baricevic, D., Sosa, S., Della Loggia, R., Tubaro, A., Simonovska, B., Krasna, A., & Zupancic, A. (2001). Topical anti-inflammatory activity of Salvia officinalis L. leaves: the relevance of ursolic acid. Journal of Ethnopharmacology, 75(2-3), 125–132. https://doi.org/10.1016/s03788741(00)00395-2

14. Beaton, D. E., Bombardier, C., Guillemin, F., & Ferraz, M. B. (2000). Guidelines for the process of cross-cultural adaptation of self-report measures. Spine, 25(24), 3186–3191. https://doi.org/10.1097/00007632-200012150-00014

15. Bellakhdar, J. (1997). La pharmacopée marocaine traditionnelle: Médecine arabe ancienne et savoirs populaires. Ibis Press.

16. Birtić, S., Pichersky, E., & Gruissem, W. (2015). The role of carnosic acid and carnosol in the antioxidant and anti-inflammatory properties of rosemary. Phytochemistry, 115, 9–19. https://doi.org/10.1016/j.phytochem.2014.12.009

17. Bishop, F. L., Yardley, L., & Lewith, G. T. (2007). A systematic review of beliefs involved in the use of complementary and alternative medicine. Journal of Health Psychology, 12(6), 851–867. https://doi.org/10.1177/1359105307082447

18. Boon, H. (2004). The issue of 'evidence' in evidence-based complementary and alternative medicine. Journal of Alternative and Complementary Medicine, 10(4), 587–589. https://doi.org/10.1089/1075553041922379

19. Borges, R. S., Ortiz, B. L. S., Pereira, A. C. M., Keita, H., & Carvalho, J. C. T. (2019). Rosmarinus officinalis L.: a review of its phytochemistry, anti-inflammatory activity, and mechanisms of action involved. Journal of Ethnopharmacology, 229, 29–45. https://doi.org/10.1016/j.jep.2018.09.038

20. Brinkmann, S., & Kvale, S. (2015). InterViews: Learning the craft of qualitative research interviewing. Sage Publications.

21. Bryman, A. (2006). Integrating quantitative and qualitative research: how is it done?.
22. Qualitative Research, 6(1), 97–113. https://doi.org/10.1177/1468794106058877

23. Cole, P., & Cole, D. P. (2017). Libya: From colony to revolution. Routledge.

24. Conner, M., & Armitage, C. J. (1998). Extending the theory of planned behavior: A review and avenues for further research. Journal of Applied Social Psychology, 28(15), 1429–1464. https://doi.org/10.1111/j.1559-1816.1998.tb01685.x

25. Creswell, J. W. (2014). Research design: Qualitative, quantitative, and mixed methods approaches. Sage Publications.

26. da Silva, J. K. (2010). Biological activities of borneol. International Journal of Molecular Sciences, 11(12), 4979–4993. https://doi.org/10.3390/ijms11124979

27. Dinarello, C. A. (2000). Proinflammatory cytokines. Chest, 118(2), 503–508. https://doi.org/10.1378/chest.118.2.503

28. Đorđević, S., Stanojević, L., Cvetković, D., & Babić, M. (2019). Supercritical CO2 extraction of rosemary (Rosmarinus officinalis L.): A review. Journal of Essential Oil Research, 31(5), 347–360. https://doi.org/10.1080/10412905.2019.1627018

29. Eisenberg, D. M., Davis, R. B., Ettner, S. L., Appel, S., Wilkey, S., Van Rompay, M., & Kessler, R. C. (1998). Trends in alternative medicine use in the United States, 1990-1997: results of a follow-up national survey. JAMA, 280(18), 1569–1575. https://doi.org/10.1001/jama.280.18.1569

30. Fanon, F. (1963). The wretched of the Earth. Grove Press.

31. Faul, F., Erdfelder, E., Lang, A. G., & Buchner, A. (2007). G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. Behavior Research Methods, 39(2), 175–191. https://doi.org/10.3758/bf03193146

32. Field, A. (2013). Discovering statistics using IBM SPSS statistics. Sage.

33. Fishbein, M., & Ajzen, I. (1975). Belief, attitude, intention, and behavior: An introduction to theory and research. Addison-Wesley.
34. Foucault, M. (1973). The birth of the clinic: An archaeology of medical perception. Routledge.

35. Funk, C. D. (2001). Prostaglandins and leukotrienes: advances in eicosanoid biology.
36. Science, 294(5548), 1871–1875. https://doi.org/10.1126/science.294.5548.1871

37. Gilbert, B., & Alves, L. F. (2003). Synergy in plant medicines. Current Medicinal Chemistry, 10(1), 13–20.

38. Gobbo-Neto, L., & Lopes, N. P. (2007). Medicinal plants: factors of influence on the phytochemical composition and biological activity. Química Nova, 30(2), 374–381. https://doi.org/10.1590/S0100-40422007000200026

39. Gollwitzer, P. M. (1999). Implementation intentions: Strong effects of simple plans.
40. American Psychologist, 54(7), 493–503. https://doi.org/10.1037/0003-066X.54.7.493

41. Good, B. J. (1994). Medicine, rationality, and experience: An anthropological perspective. Cambridge University Press.

42. Grieve, M. (1931). A modern herbal. Harcourt, Brace & Company.

43. Habtemariam, S. (2016). The therapeutic potential of rosemary (Rosmarinus officinalis) diterpenes for Alzheimer's disease. Evidence-Based Complementary and Alternative Medicine, 2016, 2680409. https://doi.org/10.1155/2016/2680409

44. Hatt, H. (2008). The role of TRP channels in temperature sensing. Cell Calcium, 43(5), 415– 423.

45. Inhorn, M. C. (2003). Local babies, global science: Gender, religion, and in vitro fertilization in Egypt. Routledge.

46. Inoue, K., Takano, H., Shiga, A., Yoshikawa, T., & Kondo, K. (2002). Effects of rosmarinic acid on the inflammatory responses of neutrophils. Biological and Pharmaceutical Bulletin, 25(2), 253–257. https://doi.org/10.1248/bpb.25.253

47. Kapadia, G. J., Azuine, M. A., Tokuda, H., Hang, E., & Mukhtar, H. (2011). Chemoprevention of DMBA-induced UV-B promoted, Norwich skin carcinogenesis, and promotion by oleanolic acid. Cancer Research, 56(15), 3617–3621.

48. Kim, Y. S., Lee, H. J., Hwang, E., Jung, Y. R., Park, D., & Kim, Y. C. (2015). In vitro and in vivo antiinflammatory effects of α-pinene. Journal of Food Science, 80(7), M1522–M1529. https://doi.org/10.1111/1750-3841.12911

49. Kleinman, A. (1980). Patients and healers in the context of culture: An exploration of the borderland between anthropology, medicine, and psychiatry. University of California Press.

50. Kumar, V., Abbas, A. K., & Aster, J. C. (2017). Robbins basic pathology. Elsevier.

51. Last, M. (1992). The importance of knowing about not knowing: observations from Hausaland. Social Science & Medicine, 35(8), 1047–1056.
52. Lee, H. E., Lee, B. K., Kim, Y. O., Park, S. Y., Lee, J., Nam, D., ... & Kim, J. H. (2018).

53. Apigenin inhibits the NLRP3 inflammasome and protects from colitis in mice.

54. Pharmacological Research, 133, 116–126. https://doi.org/10.1016/j.phrs.2018.04.025

55. Manstead, A. S. (2000). The role of moral norm in the theory of planned behaviour. In D. J. Terry & M. A. Hogg (Eds.), Attitudes, behavior, and social context: The role of norms and group membership (pp. 11–30). Lawrence Erlbaum Associates Publishers.

56. Martin, E. (1987). The woman in the body: A cultural analysis of reproduction. Beacon Press.

57. Moss, M., & Oliver, L. (2012). Plasma 1,8-cineole correlates with cognitive performance following exposure to rosemary essential oil aroma. Therapeutic Advances in Psychopharmacology, 2(3), 103– 113. https://doi.org/10.1177/2045125312436573

58. Nigro, G., Cosenza, M., & Ciclitira, K. (2014). The theory of planned behaviour and the role of collectivism in the use of alternative medicine. Journal of Community & Applied Social Psychology, 24(5), 415–429. https://doi.org/10.1002/casp.2177

59. Ouellette, J. A., & Wood, W. (1998). Habit and intention in everyday life: The multiple processes by which past behavior predicts future behavior. Psychological Bulletin, 124(1), 54–74. https://doi.org/10.1037/0033-2909.124.1.54

60. Park, H. H., Lee, S., Son, H. Y., Park, S. B., Kim, M. S., Choi, E. J., ... & Lee, S. K. (2008).

61. Flavonoids inhibit histamine release and expression of proinflammatory cytokines in mast cells. Archives of Pharmacal Research, 31(10), 1303–1311. https://doi.org/10.1007/s12272- 001-2110-5

62. Polit, D. F., & Beck, C. T. (2010). Essentials of nursing research: Appraising evidence for nursing practice. Lippincott Williams & Wilkins.

63. Rufino, A. T., Ribeiro, M., Judas, F., Salgueiro, L., Cavaleiro, C., & Mendes, A. F. (2014). Antiinflammatory and chondroprotective activity of (+)-α-pinene: structural and enantiomeric selectivity. Journal of Natural Products, 77(1), 264–269. https://doi.org/10.1021/np400828x

64. Shamsi, M., & Bayat, F. (2013). Predictors of intention to use herbal remedies among patients with type 2 diabetes: an application of the theory of planned behavior. Journal of Diabetes & Metabolic Disorders, 12(1), 22. https://doi.org/10.1186/2251-6581-12-22

65. Siahpush, M. (1998). Postmodernism and the health of the public. Journal of Public Health, 20(3), 247–250. https://doi.org/10.1093/oxfordjournals.jpubhealth.a024765

66. Suh, N., Honda, T., Finlay, H. J., Barchowsky, A., Williams, C., Benoit, N. E., ... & Sporn,

67. M. B. (1998). Novel triterpenoids suppress inducible nitric oxide synthase (iNOS) and inducible cyclooxygenase (COX-2) in mouse macrophages. Cancer Research, 58(4), 717– 723.

68. Verhoef, M. J., Mulkins, A., & Boon, H. (2005). The theory of planned behavior and its application to CAM use. Journal of Alternative and Complementary Medicine, 11(S1), S- 117–S123. https://doi.org/10.1089/acm.2005.11.s-117
69. Voeks, R. A., & Leony, A. (2004). Forgetting the forest: assessing medicinal plant erosion in eastern

Brazil. Economic Botany, 58(1), S294–S306. https://doi.org/10.1663/0013-0001(2004)58[S294:FTFAMP]2.0.CO;2

70. World Health Organization. (2019). WHO global report on traditional and complementary medicine 2019. World Health Organization.

71. Wynne, B. (1992). Misunderstanding science? The public reconstruction of science and technology. In A. Irwin & B. Wynne (Eds.), Misunderstanding science? The public reconstruction of science and technology (pp. 41-68). Cambridge University Press.

72. Zaouali, Y., Bouzaine, T., & Boussaid, M. (2010). Essential oils composition in wild populations of rosemary (Rosmarinus officinalis L.) from Tunisia. Journal of Essential Oil Research, 22(4), 343–349. https://doi.org/10.1080/10412905.2010.9700342