

Reported emissions of waterpipe tobacco products

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Introduction

Waterpipe — also known as shisha, hookah, or nargile — is a traditional method of tobacco smoking, historically popular in the Middle East and Arabic countries. During use, smoke is drawn through water before inhalation. In recent years, waterpipe use has expanded globally, with increasing prevalence in **North America and Western countries**, particularly among **adolescents** and **young adults** [1]. Despite its popularity, waterpipe smoke contains **numerous toxic chemicals and carcinogenic compounds, as is the case on all tobacco products** [2-4]. Understanding these emissions is critical to assess exposure and health risks [1]. A **bibliometric analysis** helps identify research trends, knowledge gaps, and scientific interest in this field [5-7]. This study presents a bibliometric analysis and the first results of the bibliometric synthesis of the research indexed in the Scopus database, focusing on the **chemical emissions** of waterpipe tobacco products.

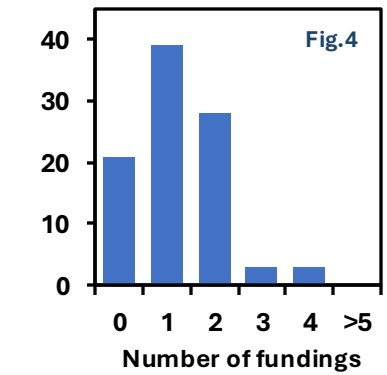
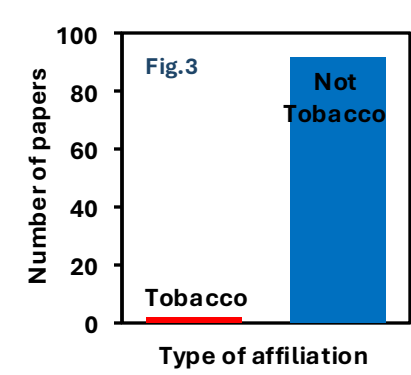
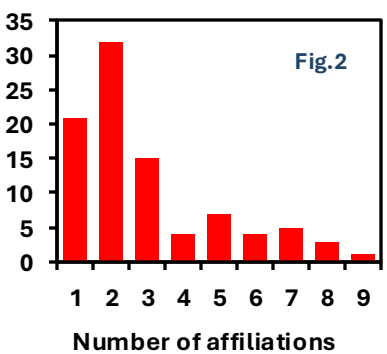
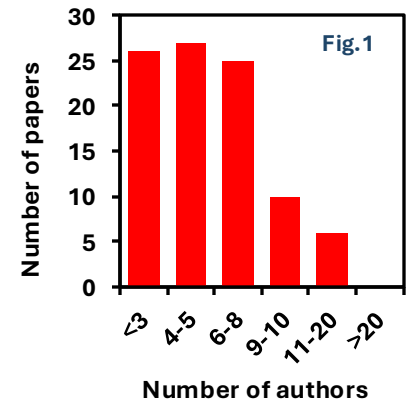
Methodology

- **Database:** Scopus
- **Time range:** All studies published until the end of **2024**
- **Language:** English only
- **Search strategy:** Keywords included variations of *waterpipe* terminology to capture regional differences:
("water-pipe" OR waterpipe OR "water pipe" OR shisha OR hookah OR nargile OR narghile OR arghile OR goza OR "hubble bubble hooka" OR hukka)
AND (nicotine OR tobacco OR smoking)
AND (emission* OR smoke OR aerosol OR VOC OR pollutant* OR particle* OR "particulate matter" OR PM OR carbonyl*)
- **Regional terminology examples:** "shisha" (Egypt, Saudi Arabia), "narghile" (Israel, Lebanon, Syria, Jordan), and "hookah" (Africa, India) [8].
- **The inclusion of the term "water pipe" ensures exclusion of unrelated hydraulic studies.**
- **Data extracted:**
 - Number of authors, affiliations and funding
 - Type of affiliations
 - Types of emissions reported (gaseous, metallic, particulate)

Results

- ❑ Initial Scopus search (1943–2024): 1,034 records → **94 final articles**
- ❑ Reported for each emission: The measured **concentrations** for each compound, the **collection method** and the **analytical method**.

Category	No of different compounds	Most used analysis technique
Gasses	227 (nicotine, CO, VOCs, PAHs)	GC-MS, HPLC-MS
Metals	66 (including the different isotopes of some metals)	ICP-MS
PM	23 (number, mass, etc.)	dust monitors, gravimetrically



Conclusions

- The reviewed publications report both **mainstream emissions** (directly inhaled smoke) and **sidestream emissions** (released into indoor environments during use).
- The synthesis reveals a **broad range of harmful compounds** demonstrating that waterpipe smoke contributes significantly to **indoor air pollution** and **user exposure**.
- Overall, the bibliometric analysis highlights the **need for standardized emission measurement methods** and increased **public health awareness** about the risks associated with waterpipe tobacco use.

References

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