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EDITORIAL

Using "History" of Toxicology as Educational Materials in Medicine, and for Popularizing the Science

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Health and medical students as well as health professionals including policymakers, health educators, medical professors and researchers need to be regularly updated on toxicology issues to keep up with rapidly evolving toxicology information and emerging health risks (1). As the bulk of information in this field is massive, remaining up to date on this extensive information is becoming increasingly difficult.

We recognised pragmatically the disadvantages that toxicologists are dealing with in low and middle income countries including the lack of adequate resources which curtails the empowerment of Medical Toxicology in the Asia Pacific region (2). In addition, limited capabilities and infrastructures to enforce regulatory toxicology recommendations has widened the inequalities between high and low income countries (3), bringing "environmental toxicology now a priority in the region" up in front in the region.

We have already explored and implemented a series of educational methods to improve the efficiency of our training endeavor. However, in the past four years, we have shifted our focus to the "history of toxicology" teaching model to attract more audiences and to increase the life span of the educational materials among trainees and public.

Professional Education

Our team has previously suggested and implemented concepts for the incorporation of medical research and education (4) including conducting action research in education (5, 6), promoting social accountability in medical education (7) and becoming *Socially Responsive Toxicologists* (8). We have worked on transforming educational strategies (9), developing up to date curriculum (10), providing effective training (11), using E-learning systems (12), evaluating pitfalls in knowledge and attitudes among health network staff (13), and delivering workshop training (14), all of which have borne fruits (15). We have also tried to broaden the horizon of medical toxicology in the Asia Pacific region (16, 17) by establishing the Asia Pacific Journal of Medical Toxicology (http://apjmt.mums.ac.ir/), which is provided free-of-charge for both authors and readers. Our aim was to enable primarily non-English speaking authors who commonly face barriers to publication in high-impact journals to have a platform for scientific visibility. We assist authors with their methodologies, and provide them with editorial assistance to publish their work in English. No part of our collaboration solicits payment from contributing authors. Nor do we add our names to the list of authors or include our assistance in the acknowledgment section. --- I take this opportunity to thank the honorable work of our colleagues.

Toxicology health literacy

Another important consideration for toxicologists is "popularizing" the science of toxicology among the public, and developing effective teaching materials. How to achieve this is a million dollar question! In this editorial, I summarise a series of experiences from medical and environmental toxicology which have used the "history of toxicology" as a teaching model. This approach intends to create a long-lasting "life" outside of the health system for our curricula. Through the strategic use of inspiring and mesmerizing ideas, stories and fairy tales, toxicologists are better able to communicate and embed information into the memory of their reader, and maintain reader engagement for a longer period of time (18, 19). Statistics have shown that the positive gradient of growth in the production and dissemination of research on the science of toxicology from the Asia Pacific region has increased, and the gap in the publication of research with high income countries is declining (20, 21). --- I believe that we have in part contributed to this success!

The use of historical figures and events

I started working on applying the history of toxicology model to the creation of inspiring educational materials by focusing on historical figures from Iran. A few articles including "Ferdowsi" (22) and "Scholarship of Teaching" (23), and a book entitled "Education and Health in Shahnameh (National Epic of Iran, Ferdowsi, 940 - 1020 CE)" have been published (24). Later we I focused on another historical poet and physician from the 11th century and authored "Health Literacy in History: A Medical Glance at the Masterpieces of the Poet Physician of Ancient Persia; Khaghani-Shervani (1121-1190 CE)" (25, 26). The expanded book is in the process of publication. In these two books, Ferdowsi's and Khaghani's

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references to poisons, poisonings and treatments were systematically extracted and classified to be compatible with 21st century literature.

Following publication, I received many positive and encouraging messages from professionals in health, medicine and toxicology, as well as from academics in the field of linguistics and literature, and members of the public. These inspiring responses led me to continue and expand this line of work. I have authored articles including:

- ✓ Mithridatium (Universal Antidote) (27),
- ✓ Emperor Qin Shi Huang and mercury poisoning (28),
- ✓ Use of Chemical Warfare Agents in Ancient History (29),
- ✓ Gustav III's risk assessment on coffee consumption (30),
- ✓ The voice and Execution of Socrates (31),
- ✓ Andrée expedition to the North Pole and his crews' mysterious death (32),
- ✓ The chronicle of lead poisoning (33),
- ✓ Arsenic poisoning (34), and
- ✓ Datura toxicities in 19th Century (35).

Readers are in love with the symbolism in the potential poisoning of Santa Claus (36) and Hamlet (37), the assassination of an ex-spy (38), the toxicology aspects related to the adventures of Ben Franklin (39) and a new toxicology explanation for the fall of the Easter Island civilization related to toxic prion exposures (40).

After working in this field for the past few years, and reading the feedback that I have received, I can say with a high level of confidence that historic symbolism is an effective educational strategy in medical and environmental toxicology! --- Just give it a try!

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