

We thank the Reviewer for his/her comments.

Response to Reviewer #1

Comments: The abstract provides a clear overview of the study, including the methodology and key findings. However, it would be beneficial to emphasize the limitations of the study in the abstract to provide a more balanced representation of the research. The study's core tip effectively summarizes the main results and implications. It could be enhanced by including a brief statement about the study's limitations or potential future research directions.

In the revised version of the manuscript, we have added the following to the abstract: "...Limitations include the use of cross-sectional data, temporal misalignment, and reliance on ALN as a socioeconomic proxy...". Furthermore, we have added the following in the article's core tip: "...While correlations between ALN and economic factors are observed, a direct link of ALN to TC remains unconfirmed..."

Introduction: The introduction effectively establishes the background and significance of the study. However, it would be valuable to explicitly state the primary aim or hypothesis of the research.

In the revised version of the manuscript, we have added the following, at the end of the paper's Introduction: "... In this study we aimed to assess, worldwide, the potential impact of ALN on TC, using available satellite ALN data and reported TC epidemiological data..."

Materials/Methods: The section provides comprehensive details on the data sources and statistical analyses employed. However, it would be helpful to include a brief rationale for the selection of specific ALN exposure thresholds and their relevance to the research question.

In the revised version of the manuscript, we have added the following in the Materials & Methods section: "...These thresholds were chosen because the 87 $\mu\text{cd}/\text{m}^2$ level corresponds to 50% more night luminance compared to normal, whereas the 688

$\mu\text{cd}/\text{m}^2$ level denotes the total loss of the natural appearance of the night sky....". For this we cite the seminal article by Falchi et al (Sci Adv. 2: e1600377, 2016), which also used these thresholds.

Results: The results are well-presented, and the statistical analyses are clearly described. It may be beneficial to include a discussion of any unexpected or contradictory findings to provide a more nuanced interpretation of the results.

In the revised version of the manuscript we added the following, in the beginning of the Discussion section, based on our Results: "...Thus, financial indicators were associated with the incidence of TC, whereas ALN was not associated with its incidence." We further elaborate on this in the Discussion section [please see below].

Discussion/Conclusion: The discussion effectively contextualizes the findings within existing literature and addresses potential mechanisms underlying the observed associations. However, the limitations of the study should be emphasized to provide a balanced interpretation of the results.

In the revised version of the manuscript we have expanded on its limitations as follows: "..... However, the temporal misalignment of cross-sectional data from different years (2016 for ALN, 2019-2020 for TC incidence, and 2019-2020 for economic data) may have affected the accuracy of the associations studied, especially considering the latency period for TC. Another limitation of the study is that the accuracy of epidemiological data for cancer incidence may not be satisfactory in countries with low quality cancer registries or without cancer registries. This introduces potential bias, as the accuracy of TC data may vary widely between countries..." "...Thus, the relationship between ALN data and socioeconomic conditions may not be uniform across all countries; while we recognize this, we have to accept a consequent degree of uncertainty in the interpretation of results. According to our results, light pollution might be associated with a lifestyle leading to carcinogenesis, but we were not able to delve deeply into specific lifestyle factors....".

Overall, the study makes a valuable contribution to understanding the potential impact of ALN on thyroid cancer. However, emphasizing the study's limitations and areas for future research would strengthen the manuscript. Additionally, further clarification on the rationale behind certain methodological choices would enhance the overall quality of the research.

The study's limitations were amended in the revised version of the manuscript - please see our answer above.

Regarding future research, the following was added to the conclusion: "Exploring the underlying mechanisms linking light pollution, socioeconomic status, and lifestyle factors to TC risk is crucial for a more comprehensive understanding of these associations. Physicians should be aware of the potential impact of lifestyle, including exposure to ALN, on cancer risk. Further research seems imperative to elucidate the intricate relationship between ALN, lifestyle factors, and TC. Future investigations should delve into specific aspects of lifestyle, such as sleep hygiene and circadian rhythm disruptions, to identify modifiable risk factors. The broader implications for public health should not be overlooked: public health initiatives aimed at reducing light pollution, promoting healthy sleep habits, and raising awareness about the potential impacts of ALN on health may contribute to overall cancer prevention strategies."

Regarding methodological choices, we presume that the Reviewer refers to the choice of ALN exposure thresholds. Please see our answer above.

Response to Editors

We thank the Editor for his/her suggestions. Following the revision of our work, we have uploaded the requested material.