Analyzing Article Processing Charges and Engagement Metrics in Orthopedic Scientific Literature

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INTRODUCTION: Peer-reviewed scientific journals utilize two publishing models: open (OA) or hybrid access (HA). OA publishes free articles, whereas HA allows authors to elect access type (restricted or open). With research cost increases, article processing charges (APCs) are also increasing. We sought to analyze any correlation between APC and engagement metrics (impact factor (IF) and H5-index) for both OA and HA models in orthopedic literature. We hypothesized that there would be no correlation between APC and engagement metrics, regardless of publication model.

METHODS: The Scimago Journal & Country Rank (SJR) database was queried, identifying 100 orthopedic and related journals. 36 journals were excluded for irrelevancy, non-native to United States, discontinued, or invitation only. The included 64 journals consisted of 19 OA and 45 HA journals. Data collected included APCs, IFs, and H5-indexes. Correlation between APC and engagement metrics was determined using linear regression to obtain a coefficient of determination (R^2). T-statistics were used to calculate variable significance. Statistical significance was determined at $P<.05$, and correlation was considered strong at $R^2 \geq 0.80$. Nonsignificant data were tested with post-hoc power analysis.

RESULTS: On average, the APC for OA was $2,094 compared to HA $3,179 (P<.0001) (Table 1). No significant differences between journal type and IF or H5-Index (37.1 and 43.7% power, respectively) were observed. R^2 for OA APC vs. IF and H5-index were 0.64 and 0.47, respectively (P<.001), whereas HA APC vs. IF and H5-Index were 0.42 and 0.39, respectively (P<.001). When comparing all included journals, the R^2 for APC vs. IF is 0.33 (Figure 1).

DISCUSSION AND CONCLUSION: OA requires smaller APCs compared to HA journals without significant differences in engagement metrics. Although no robust correlation was identified, engagement metrics do have a statistically significant effect on APCs. Thus, with increasing APCs, OA remains a viable option for cost-effective publishing without sacrificing engagement metrics in orthopedics.

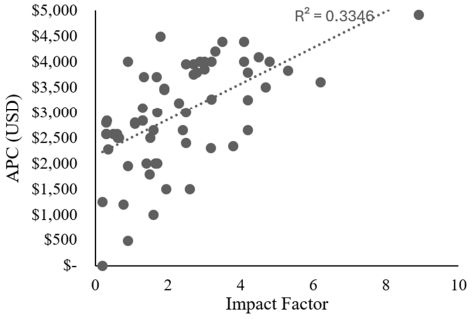

Figure 1. Linear regression of APC by impact factor for all included journals.

Table 1. Descriptive Statistics Between Open and Hybrid Access Journals.

Journal Characteristic	*OA (n=19)*	*HA (n=45)*	*P value*
APC (USD)	$1,976.95 ± 1044.88	$3,364.89 ± 666.70	**< .0001**
IF	2.2 ± 2.0	2.3 ± 1.5	.7617
H5-Index	26.0 ± 17.0	34.1 ± 20.1	.1253
Total Documents (2023)	156.1 ± 121.9	187.5 ± 147.8	.4181

Bold P values designate statistical significance.
Abbreviations: OA=open access, HA=hybrid access, USD=United States Dollar, IF=impact factor.