Clinical Research

Quality of life in Indonesian conjunctival tumor patients

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ABSTRACT

BACKGROUND As quality of life (QoL) research continues to expand, there remains a study gap of less common malignancies such as conjunctival tumors. This study aimed to investigate the differences in QoL between Indonesian patients with benign and malignant conjunctival tumors.

METHODS This cross-sectional study was conducted from May–September 2024 and included 273 patients diagnosed with conjunctival tumors. The participants provided informed consent and completed the RAND SF-36 questionnaire to assess their QoL. A consecutive sampling method was employed to adequately represent benign and malignant tumor types. Data were analyzed using IBM SPSS version 26 to identify QoL differences among the patients.

RESULTS This study found that squamous cell carcinoma was the most frequently observed conjunctival tumor, accounting for 28.9% of the cases. Patients with benign tumors had significantly higher QoL scores (69.61) than those with malignant tumors (43.05). Key factors influencing QoL included tumor type ($p<0.001$), age ($p<0.001$), sex ($p = 0.039$), occupation ($p = 0.027$), residence ($p = 0.044$), income ($p = 0.010$), and comorbidities ($p = 0.045$).

CONCLUSIONS The results show significant disparities in QoL between patients with benign and malignant conjunctival tumors, emphasizing the impact of sociodemographic and tumor type on patient well-being. Focused healthcare plans are needed to help improve the QoL of patients with conjunctival tumors. Prioritizing early detection and providing complete support to enhance patient outcomes in Indonesia are crucial.

KEYWORDS benign, demography, malignant, quality of life, tumor

Conjunctival tumors represent a heterogeneous group of conditions, ranging from benign lesions to malignant neoplasms, and can significantly impact patients' quality of life (QoL).[1] These tumors primarily originate from epithelial and melanocytic cells.[2] Evaluating QoL in patients with cancer, particularly those with conjunctival tumors, is essential for evaluating treatment efficacy and overall patient health.[3] However, patients with conjunctival tumors are often overlooked in oncology research, and studies specifically examining QoL differences across tumor types are limited.

Due to their anatomic location, conjunctival tumors may impair visual acuity, interfere with daily functioning, and lead to visible disfigurement. These effects can contribute to social stigma, appearance-related anxiety, and psychological distress. Existing literature predominantly focuses on QoL in patients with systemic malignancies, such as brain, spinal cord, and colorectal cancers.[4] Understanding the

QoL implications of various tumor types is crucial for developing treatment plans tailored to the unique needs of different patient groups.[1] Healthcare providers can implement targeted interventions to improve patient outcomes by identifying the QoL challenges these patients encounter.[5]

Demographic variables, such as age, income, and sex, significantly influence health outcomes and overall QoL across various medical conditions.[6] Older populations are more susceptible to malignant tumors, with women experiencing heightened anxiety about recurrence.[7] Additionally, tumor detection and diagnosis timing significantly influence treatment outcomes and prognosis.[7] Comprehensive QoL data can guide the development of effective support systems that address both physical and psychological needs.[8] Therefore, this study aimed to evaluate the demographic characteristics and associated risk factors, while comparing the differences in QoL between patients with benign and malignant conjunctival tumors in Indonesia.

METHODS

This cross-sectional study design assessed the well-being of individuals diagnosed with conjunctival tumors. Previous studies were either focus on a singular tumor type or fail to differentiate among types.[9] Using a sample size calculation formula for comparing two means, approximately 64 participants per group were required to detect a 20% difference in QoL scores, assuming 80% power and a significance level of 5%.[10] The study received ethical approval from the Ethics Committee of Dr. Moewardi Hospital approved on May 8, 2024 (No: 1.157/V/HREC/2024), and adhered to ethical principles to protect participants' rights.

Data collection was conducted from May to September 2024. During this period, 273 participants provided informed consent and completed a 30-minute interviewer-administered questionnaire. Three trained interviewers conducted these interviews after their work shifts to minimize disruption to the participants' professional responsibilities and enhance response reliability. Inclusion criteria were as follows: participants aged 18 years or older at the time of enrollment; a confirmed diagnosis of conjunctival tumors based on histopathological results; and the presence of a tumor at any stage (from early to advanced), either benign (e.g., papilloma, nevus, pterygium, cysts, and hemangioma) or malignant (e.g., squamous cell carcinoma [SCC], basal cell carcinoma, melanoma, and non-Hodgkin's lymphoma). Exclusion criteria included the absence of a confirmed histopathological diagnosis of conjunctival tumors (benign or malignant); significant ocular comorbidities, including severe dry eye syndrome, glaucoma, or retinal disorders; cognitive impairments that could interfere with questionnaire completion; inability to provide informed consent due to mental or physical conditions; current pregnancy or lactation; and severe comorbidities likely to independently impact QoL, such as advanced systemic diseases or severe mental health disorders.

Additionally, participants were required to report at least one conjunctival tumor-related symptom, such as visual impairment, pain, swelling, redness, tearing, difficulty performing daily activities, ocular discomfort, persistent foreign body sensation, or eyelid ptosis. None of the participants had received prior treatment for conjunctival tumors, including chemotherapy or radiotherapy.

A consecutive sampling method was employed to ensure that all eligible individuals could participate. This approach facilitated a representative distribution of benign and malignant tumor cases within the study sample, thereby enhancing the validity of the findings and supporting meaningful comparisons between groups. All participants were recruited from a single-center ophthalmology polyclinic at Dr. Moewardi Hospital in Indonesia.

Tumor classification was based on a thorough review of patients' medical records, with histopathological results used to categorize tumors as malignant or benign. This classification was essential for evaluating how tumor type influences QoL scores. The informed consent process included detailed oral and written information about the study's purpose, procedures, risks, and benefits, following ethical standards and autonomy in medical research.

QoL was assessed using the RAND SF-36 Health Survey (RAND SF-36), a widely validated tool for assessing health-related QoL across multiple domains, including physical functioning, emotional well-being, and mental health.[8,11] The Indonesian version of the RAND SF-36 incorporates culturally relevant modifications to ensure accurate and meaningful data collection.[12]

Participants completed the Indonesian version of the RAND SF-36, a validated and reliable tool designed to evaluate health status.[13] Trained interviewers meticulously reviewed all questionnaires before concluding each interview session to ensure data completeness. The 36 items assess eight health domains: physical limitations, bodily pain, physical functioning capability, emotional limitations, social functioning, emotional well-being or mental health, general health perceptions, and energy/fatigue.[14] Specifically, the questionnaire incorporates 10 items (items 3–12) for physical functioning capability, 4 items (13–16) for physical limitations in determining how physical health affects work and daily life. The role limitations due to the emotional problems domain were assessed through three items (items 17–19) to understand how emotional challenges influence daily functioning. For the vitality domain, we utilized four items (27–31) to capture participants' energy levels and fatigue. Emotional well-being was evaluated using five items (24–30), focusing on mood and psychological health. Social functioning was assessed through two items (items 20 and 32), highlighting how health impacts social interactions. The pain domain is addressed with two items (items 21 and 22), which examine pain intensity and its interference with daily activities. Furthermore, perceptions of general health were captured through five items (1, 33–36), providing insights into the overall health status of participants. Finally, we included one item (item 2) specifically aimed at assessing participants' perceived health changes over time. This structured approach thoroughly examines the participants' physical, emotional, and social well-being.[15] The questionnaire's score ranges from 0 to 100 with a lower score indicating a poorer QoL.[16] The SF-36 reliable questionnaire (Cronbach's α = 0.789) was used to obtain a QoL score.[13]

In addition to RAND SF-36, demographic and clinical variables were collected to enrich the study's findings. The data included sex, educational qualifications, age, occupation, length of marriage, marital status, place of residence, monthly income, length of illness, surgery and specific treatment, and the presence of comorbidities.

Data were collected through a combination of structured interviews, surveys, clinical observations, and documentation review. This comprehensive data collection approach enhanced the depth of participant profiling and contributed to a more meaningful interpretation of QoL outcomes. This sampling technique ensured the representation of both tumor types in the study sample, facilitating the comparison of QoL between the two patient groups. QoL scores were also compared to population data. The data analysis utilized SPSS software version 26 (IBM Corp., USA).

Descriptive statistics were used to summarize participant demographics, characteristics, socioeconomic factors, and related risk variables. Categorical data are presented as percentages and frequencies, while continuous variables are described using means and medians for normally distributed data, and standard deviations for non-normally distributed data. These analyses provided an overview of the sample population and highlighted the key demographic patterns. The omnibus coefficient model test was employed to develop a model that effectively predicts variations in QoL among patients with conjunctival tumors, considering several influencing factors.[17]

To assess the normality of continuous variables, both the Kolmogorov–Smirnov test and skewness values were evaluated. A $p>0.05$ in the Kolmogorov–Smirnov test indicated a normal distribution.[18] For normally distributed data, the skewness values ranged between -2 and +2.[19] Based on their RAND SF-36 QoL scores, participants were categorized into two groups: high QoL (scores above the mean) and low QoL (scores below the mean). This classification enabled clearer comparisons across diverse patient categories.

Depending on data distribution, group differences in continuous variables were tested using either the unpaired t-test (for normally distributed data) or the Mann–Whitney *U* test (for non-normally distributed data). Chi-square or Fisher's exact tests were used to examine categorical variables. This multifaceted strategy allowed for a detailed examination of the disparities in QoL scores between patients with malignant and benign conjunctival tumors.

Logistic regression analysis was performed to identify determinants of QoL and to explore previously reported risk factors associated with conjunctival tumors. The multivariate logistic regression model included variables with a $p<0.25$ in bivariate analysis. The results were reported as odds ratios (OR) with 95% confidence intervals (CI), clearly understanding of the connections between various factors and QoL outcomes. A $p<0.05$ was considered statistically significant.

The proportion of benign and malignant conjunctival tumors, confirmed through histopathology, is reported as counts and percentages. Homogeneity of variance between groups was assessed using Levene's test, with a $p>0.05$ indicating homogeneity.[20] If both normal distribution and homogeneity assumptions were met, a parametric analysis using an unpaired t-test was conducted to compare QoL scores between groups.[21] This structured approach enabled a comprehensive assessment of participants' QoL based on their tumor type and facilitated meaningful comparisons, offering valuable insights into the impact of tumor characteristics on overall health outcomes.

RESULTS

A total of 273 patients were enrolled during the study period, comprising 145 patients with benign tumors and 128 with malignant tumors (Table 1). All enrolled patients successfully participated in the study, with no losses to follow-up, refusals, or exclusions after screening. Significant demographic differences were observed between the groups (Table 1). Participants had diverse educational backgrounds, including primary education (elementary school), secondary education (junior and senior high school), and higher education (diploma, bachelor's, master's, or doctoral degrees). Notably, patients with benign tumors were generally younger than those with malignant tumors. Residence and income levels were also notably different; patients in the malignant group were more likely to live in rural areas and had lower monthly incomes.

The study population consisted of patients aged 30 to 70, with a gender distribution of 47.62% male and 52.38% female. Preoperative patients with advanced-stage conjunctival tumors reported significantly lower QoL scores. The RAND SF-36 assessed multiple dimensions of health status. The bivariate selection process identified several variables with $p<0.25$, qualifying them for inclusion in the multivariate analysis. Table 2 shows several key findings from the logistic regression test, focusing on the relationship between QoL and various risk factors among patients with conjunctival tumors. Data analysis reveals several factors significantly impacting patients' QoL, including tumor type, age, occupation, surgery or specific treatment, monthly income, and comorbidities (p-value <0.05).

Tumor characteristics were further classified based on clinical stage and histological grade, revealing that patients with advanced-stage malignant tumors had significantly poorer QoL compared to those with early-stage benign tumors. Histological analysis further differentiated tumor types, including SCC and melanoma, each of which affected QoL differently.

Of the 273 conjunctival tumors diagnosed in this study, 145 (53.1%) subjects were benign and 128 (46.9%) malignant. The benign lesions were papilloma (42.8%), nevus (29.7%), cysts (17.2%), pterygium (9.0%), and hemangioma (1.4%). The malignant tumors were squamous cell carcinoma (61.7%), basal cell carcinoma (20.3%), melanoma (12.5%), and non-Hodgkin lymphoma (5.5%).

Analysis of the mean QoL values for benign and malignant conjunctival tumors revealed notable differences. A homogeneity test between these two groups yielded a p-value of 0.160, exceeding the threshold of 0.05. This indicated that the variances between the groups were statistically homogeneous. Statistical analysis showed a mean difference of 26.560 in QoL scores between the groups, with a CI of 23.918–29.202. The t-count value was 19.794, which exceeded the reference t-score of 1.968.

DISCUSSION

The study provides critical insights into the QoL of patients with conjunctival tumors in Indonesia, addressing a notable gap in existing research. Furthermore, the use of RAND SF-36 enabled a multidimensional assessment of QoL, including physical functioning, social functioning, emotional well-being, and general health perceptions. This multifaceted approach is consistent with previous studies that emphasized the importance of holistic assessments in capturing the complexities of patient experiences.[22]

Among the various domains assessed, physical functioning emerged as a key determinant of QoL. Previous studies have demonstrated that declines in physical activity and performance can lead to social isolation, which is associated with poorer health outcomes.[23] The survey also assessed role limitations due to physical health, and also sheds light on how such a condition may hinder daily activities and emotional well-being, thereby impacting daily functioning. Previous studies had identified a correlation between physical discomfort and functional limitations due

Table 1. Characteristics of patients with benign and malignant conjunctival tumors

	Benign, n (%) (N = 145)	Malignant, n (%) (N = 128)	*p*
Age (years), mean (SD)	44 (14)	59 (12)	**<0.001**
<50	104 (71.7)	21 (16.4)	
≥50	41 (28.3)	107 (83.6)	
Gender			0.053
Male	77 (53.1)	53 (41.4)	
Female	68 (46.9)	75 (58.6)	
Educational qualifications			**0.001**
Primary	53 (36.6)	41 (32.0)	
Secondary	69 (47.6)	61 (47.7)	
Higher education	23 (15.9)	26 (20.3)	
Occupation			**0.031**
Fully retired	23 (15.9)	13 (10.2)	
Paid work	29 (20)	10 (7.8)	
Self-employment	31 (21.4)	11 (8.6)	
Unpaid work	62 (42.8)	94 (73.4)	
Median length of illness in months (IQR)	8 (1–21)	6 (1–19)	0.576
Marital status			0.633
Married or living with a partner	124 (85.5)	112 (87.5)	
Unmarried or no partner	21 (14.5)	16 (12.5)	
Length of marriage, mean (SD)	22.53 (15.760)	26.20 (16.120)	0.059
Place of residence			**<0.001**
Rural	62 (42.8)	95 (74.2)	
Urban	83 (57.2)	33 (25.8)	
Monthly income (IDR)			**<0.001**
<1.5 million	44 (30.3)	89 (69.5)	
≥1.5 million	101 (69.7)	39 (30.5)	
Comorbidity			**<0.001**
Hypertension	35 (24.1)	57 (44.5)	
Diabetes mellitus	10 (6.9)	24 (18.8)	
Cardiovascular diseases	7 (4.8)	15 (11.7)	
Absent	93 (64.1)	32 (25)	
QoL score, mean (SD)	**70 (11)**	43 (11)	**<0.001**
High QoL	118 (81.4)	14 (10.9)	
Low QoL	27 (18.6)	114 (89)	

IDR=Indonesian Rupiah; IQR=interquartile range; QoL=quality of life; SD=standard deviation

to physical health conditions.[24] These findings were particularly relevant for patients with conjunctival tumors, as the physical manifestations of the disease can lead to social withdrawal and a diminished sense of community.

Critical factors, such as age, occupation, place of residence, monthly income, comorbidities, surgery or specific treatments, and QoL, can significantly influence patient experiences and outcomes (Table 1). Our study revealed significant age disparities between the two groups. This result is consistent with the existing literature, which emphasizes an age-related increase in malignancy risk, particularly in conjunctival melanoma.[25] Age also emerged as a significant determinant, with older patients being at a significantly higher risk of experiencing reduced QoL, supporting the evidence that aging exacerbates health challenges and diminishes overall QoL.[26] Similarly,

Table 2. Logistic regression analysis of QoL determinants in patients with benign and malignant conjunctival tumors

Risk variable	OR (95% CI)	*p*
Tumor type	43.235 (13.582–137.742)	<0.001
Age	10.390 (2.931–36.832)	<0.001
Gender	0.298 (0.094–0.942)	0.039
Occupation	3.572 (1.155–11.048)	0.027
Place of residence	0.251 (0.065–0.964)	0.044
Monthly income	4.269 (1.406–12.961)	0.010
Comorbid	2.909 (1.024–8.262)	0.045

CI=confidence interval; OR=odds ratio
Income threshold: <IDR 1,500,000; Cox & Snell R^2: 0.603; Nagelkerke R^2: 0.804; Hosmer–Lemeshow (chi-square test: 10.586, p = 0.158)

this study highlights that advancing age is associated with decreases in general health perception, mental health, and physical functioning. The decline in physical functioning is especially significant, as it directly affects older adults' independence and capacity to perform daily activities. These findings underscore the importance of prioritizing the psychological well-being of older individuals.[22] Males generally reported better outcomes than females. Factors such as depression and healthcare dissatisfaction have been identified as independent predictors of poorer QoL among females.[27] For instance, a study by Motlagh et al[28] reported that older women with mild cognition had a mean QoL score of 60.58, with individual scores ranging from 32.61 to 84.09, emphasizing the influence of underlying health conditions on overall QoL.

Patients residing in rural communities showed improved well-being compared to those living in urban settings. This finding indicated that the QoL of women in rural regions improved more favorably than those in urban areas.[29] Patients with malignant tumors were more likely to be unemployed and come from rural, lower-income backgrounds, with higher unemployment rates (p<0.001). This is consistent with Blinder's findings,[30] which emphasized how the burden of illness can severely impact employment opportunities. Lower income levels were associated with poorer QoL, reinforcing the connection between socioeconomic status and overall well-being.[31]

Tumor type exhibited the most significant relationship, with an OR exceeding 43 for specific tumor types (Table 2), underscoring the significant implications of tumor aggressiveness. This disparity is consistent with the existing literature that links aggressive tumor types to higher morbidity rates and poorer health-related QoL outcomes.[32] Our study also confirmed that benign conjunctival tumors, such as papilloma and pterygium, account for a significant portion of conjunctival masses (Table 3). This outcome is consistent with the study conducted by Erdogan et al,[33] who reported that most conjunctival masses in their sample were benign. Malignant tumors, including SCC, basal cell carcinoma, non-Hodgkin's lyphoma, and melanoma, accounted for 46.9% of the participants. These conditions necessitate more intensive treatment and are associated with greater functional and psychological burden.[34]

The differences in QoL scores between patients with benign and malignant tumors were substantial, with the benign tumor group reporting significantly higher QoL (p<0.001) (Table 3). These findings highlight a substantial gap in QoL, underscoring the need for early detection and treatment of malignant conjunctival tumors. This finding underscored the importance of distinguishing tumor types when assessing QoL, a factor often underexplored in previous studies. Overall, the findings confirm a significant difference in QoL between individuals with malignant and benign conjunctival tumors, as the QoL reflects the extent to which life conditions are perceived as good or bad.[35] The questions from the RAND SF-36 domain of emotional well-being, specifically items 24, 25, 26, 28, and 30, directly influenced the QoL of preoperative patients with conjunctival tumors. Patients with malignant tumors exhibited a higher frequency of comorbidities, a trend corroborated by studies associating additional health issues with poorer QoL.[22]

Tumor extent was associated with lower mental health scores, reflecting a substantial psychological burden.[4] This observation is consistent with the findings of Chan et al,[36] who noted that anxiety levels are frequently elevated in patients with severe health conditions. Chadha and Sagoo[37] found that structured counseling and support groups can alleviate the emotional burdens of those facing malignant conditions. Proactive monitoring, combined with enhanced support systems, including education and counseling, can empower patients to make informed treatment decisions. Integrating educational initiatives into standard care practices can enhance patients' understanding of their illnesses and promote a more active role in their treatment, ultimately leading to improved outcomes.[38] Our findings revealed significant

differences in QoL, with malignant tumors correlating with poor outcomes. Similar to previous studies, this study highlights that individuals who are younger, female, married, and without chronic conditions show greater QoL improvements through multidisciplinary care.[22]

Important limitation was the reliance on self-reported information, which can introduce biases such as memory inaccuracies.[4] Patients' emotional states and health perceptions may influence self-reported QoL measures. This potential for bias highlights the need to incorporate objective QoL measures in future studies to validate and enhance the findings of this study. Additionally, although our sample size was substantial, it may not fully represent all sociodemographic groups in Indonesia, potentially limiting the generalizability of our findings.

Tumor type, age, comorbidities, and socioeconomic factors were significant predictors of QoL in patients with conjunctival tumors. Malignant tumors are associated with substantially lower QoL. Future studies can provide deeper insights into the complex interplay between tumor characteristics, treatment modalities, and patient-reported outcomes.

Conflict of Interest

The authors affirm no conflict of interest in this study.

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