ORIGINAL ARTICLE

# Cost-effectiveness of surgical excision versus Mohs micrographic surgery for nonmelanoma skin cancer: A retrospective cohort study

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**Background:** Nonmelanoma skin cancer rates are increasing worldwide. Mohs micrographic surgery and surgical excision (SE) are the two treatment methods for this type of cancer. The current paper aims at determining and comparing the cost-effectiveness of SE and Mohs micrographic surgery. **Materials and Methods:** The current study has a retrospective cohort design. A number of 630 patients suffering from nonmelanoma skin cancer who at some point of time during the years 2007–2014 referred to the Al-Zahra or Seyed Al-Shohada Hospitals in Isfahan. Patients were followed up for 4 years, and then the incremental cost-effectiveness ratio (ICER) of the two methods was calculated. **Results:** The average (minimum-maximum) cost of the SE and Mohs surgery methods in Iran was obtained as 18,550,170 (2335,800–260,898,262) and 12,236,890 (6488,340–41,161,700) Iranian Rial, respectively. Recurrence percentage was also reported as 7.9% and 8.7% for SE and Mohs micrographic surgery, respectively ($P > 0.05$). The ICER of SE in comparison with Mohs surgery was calculated as 7891,600 Iranian Rials per recurrence avoided. **Conclusion:** Mohs surgery is less expensive than SE, it seems like Mohs surgery is more affordable, however further studies in different populations of the country are needed.

**Key words:** Cost-effectiveness, Mohs micrographic surgery, nonmelanoma skin cancer, surgical excision

**How to cite this article:** Nassiripour L, Amirsadri M, Tabatabaeian M, Maracy MR. Cost-effectiveness of surgical excision versus Mohs micrographic surgery for nonmelanoma skin cancer: A retrospective cohort study. J Res Med Sci 2016;21:90.

## INTRODUCTION

Surgical excision (SE) is considered the most common way of treating basal cell carcinoma (BCC).[1] The micrographic surgery (Mohs) method is a specific technique in surgery and it is being used more often nowadays.[2] When a specific treatment is chosen for a patient, the costs, outcomes, and other factors such as the patient's age need to be considered.[3] Few studies on the cost-effectiveness of SE and Mohs surgery have been performed.

In a study by Seidler *et al.*, they showed that Mohs surgery was more cost-effective in eradicating nonmelanoma skin cancer.[4]

Access this article online

Quick Response Code:

Website: www.jmsjournal.net

DOI: 10.4103/1735-1995.192507

Since the results of the former studies are inconclusive about which method is more cost-effective and regarding the fact that no such study has been conducted in Iran, we aimed to determine the cost-effectiveness of Mohs surgery and SE methods. Based on the results of the study, we can determine which treatment method is more cost-effective.

## MATERIALS AND METHODS

The current study has a retrospective cohort design and was conducted in Isfahan over the years 2007–2014 to compare the cost-effectiveness of the Mohs surgery and the SE method in treating nonmelanoma skin cancer. Economic evaluation of costs was carried out using the data in the financial documents of the patients in the



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**Received:** 10-02-2016; **Revised:** 17-04-2016; **Accepted:** 23-06-2016

hospitals. Nonrecurrence of the tumor was considered as the outcome effect of both the methods.

The study population comprised patients who were admitted to the Seyed Al-Shohada and Al-Zahra Hospitals in Isfahan in the years 2007–2010 followed to 2014. A total of 630 patients who were suffering from primary nonmelanoma skin cancers whether BCC or squamous cell carcinoma (SCC) and who were pathologically diagnosed and had a tumor with a diameter of equal to or more than 1 cm were recruited in the study (including 276 and 354 patients who are undergoing Mohs and SE surgery, respectively). Patients who experienced the recurrence of the disease, patients who were deceased before they were diagnosed with recurrence, and patients who could not be followed up for any other reason were excluded from the study. As a result, 96 people were excluded from the study. Most patients with tumor size <2 cm who were referred to the Al-Zahra Hospital underwent Mohs surgery, and all patients who were admitted to the Seyed Al-Shohada Hospital underwent SE surgery.

By looking through the hospital files of the patients, their demographic information (age, sex, work place, and residence), type of nonmelanoma cancer, and the location and the size of the tumor were collected. Our work place variable was categorized into four groups of indoor workers, outdoor workers, retired, and jobless. The location of the tumor was divided into three subgroups. The first one was trunk such as arms and shanks. The second subgroup included scalp, neck, hands, legs, and genital organs and the third subgroup included face, ears, eyelids, nose, and lips. The size of the tumor was grouped into diameter of <2 cm and diameter of equal to or higher than 2 cm.[5]

The financial data regarding the medical services which the patients received were collected from the start of their treatment until their discharge during the 4 years, and the direct cost of any service was multiplied by the Health Ministry tariffs. Units of cost include type and number of pathologic tests, physicians' visit costs, drugs, instrument and equipment consumed in the operation room and wards, treatment and repair surgery methods, anesthesia costs, operating room costs, nonsurgical services, examinations, electrocardiography, hospital services, and visits and drugs after being discharged from the hospital. To the applicability of this research, all the cost tariffs were calculated based on the book document of "relative value of services"[5] and governmental tariffs of 2015. Moreover, only the governmental tariff of the SE and Mohs surgery was calculated since the two methods of surgery were done in the governmental hospitals such as the Al-Zahra and Seyed Al-Shohada hospitals.

In this study, to increase the number of patients, all patients were followed up for 4 years after the initial diagnosis during 2007–2010. Demographics and clinical information and the costs associated with their treatment were collected through the hospital files of the patients. According to physicians' opinions, cases in which the tumor had recurrence in 3 months after the surgery were viewed as cases of recurrence and other cases in which the tumor had shown itself again in <3 months were not regarded as recurrence.

In the current research, it was speculated that in cases of recurrence, the patient would refer back to the hospital where the initial surgery was undertaken, and if they did not refer back, it meant that the patient had recovered and the tumor had nonrecurrence.

Economic evaluation was undertaken from the payer's perspective. The costs and effect (percentage of nonrecurrence) of the Mohs and SE methods were calculated for a 4-year period. To change the cost units from Rials to Dollars, the exchange rate was taken from the Islamic Republic of Iran's Central Bank,[6] which meant that every American Dollar was taken as equal to 29,980 Rials.

### Statistical analysis

In the current research, three different scenarios were taken in the computation of the incremental cost-effectiveness ratio (ICER) by considering the discount rates of costs and effect. In the first scenario, both the discount rate of cost and effect were taken as 0, in the second scenario, they were taken as 3% based on the World Health Organization,[7] and in the third scenario, which was based on a research conducted in Iran, the interest rate of cost was taken as 7.2%[8] and 3% for effect.

Univariate sensitivity analysis was carried out by changing the costs and effect. The costs included in the sensitivity analysis were surgery and hospitalization costs, examination and para clinical test costs, and after surgery costs. These costs were analyzed with a 20% change, based on expert's views. Regarding to be 3% difference between upper and lower levels of confidence interval, the effect size was considered in the same change for the computational process.

Data were analyzed by the statistical package for SPSS version 18.0 (SPSS Inc., Chicago, IL, USA) software. $P < 0.05$ was considered as a significant level. Chi-square test, Mann–Whitney U-test, *t*-test, and logistic regression model were used.

## RESULTS

A total of 630 patients diagnosed with nonmelanoma cancer were included in the study. Four hundred and thirty-six (69.2%) were male. In the Mohs surgery group,

the average age (standard deviation [SD]) of the patients was 64.4 (13.2) and in the SE group, the average age (SD) was reported as 67.4 (12.6). On the whole, the average age (SD) of the participants in this study was 66 (13.2). The location of the nonmelanoma tumor was divided into three subgroups of face, ears, eye lids, nose, and lips (60.8%); head, neck, hands, legs, and genital organs (38.1%); and trunk, arms, and shank (1.1%). The male to female ratio in patients receiving Mohs surgery and SE treatments was 1.93 and 2.54, respectively [Table 1].

The average cost of SE and Mohs surgery for the patients was 18,550,170 ($618.7) and 12,236,890 ($408.1) Rials, respectively. These results show that the SE method is more expensive

**Table 1: Characteristics distribution, cost, and effect of the surgery methods for nonmelanoma skin cancer patients in Isfahan, Iran (2007-2010)**

| Demographic and clinical characteristics | Mohs surgery (*n*=276) | Surgical excision (*n*=354) | *P* |
|---|---|---|---|
| Age (year), mean±SD | 64.4±13.2 | 67.4±12.6 | 0.004 |
| Sex, *n* (%) | | | |
| Male | 182 (65.9) | 254 (71.8) | 0.117 |
| Female | 94 (34.1) | 100 (28.2) | |
| Residence, *n* (%) | | | |
| Urban | 234 (87.3) | 281 (81.2) | 0.042 |
| Rural | 34 (12.7) | 65 (18.8) | |
| Workplace, *n* (%) | | | |
| Indoor worker | 131 (51.4) | 91 (51.7) | 0.022 |
| Outdoor worker | 75 (29.4) | 34 (19.3) | |
| Jobless | 13 (5.1) | 9 (5.1) | |
| Retired | 36 (14.1) | 42 (23.9) | |
| Tumor sizes (cm), *n* (%) | | | |
| <2 | 222 (90.2) | 49 (18.7) | <0.001 |
| □2 | 24 (9.8) | 213 (81.3) | |
| Tumor location*, *n* (%) | | | |
| 1 | 1 (0.4) | 6 (1.7) | <0.001 |
| 2 | 83 (30.4) | 155 (44.0) | |
| 3 | 189 (69.2) | 191 (54.3) | |
| Outcome, *n* (%) | | | |
| Recurrence | 24 (8.7) | 28 (7.9) | 0.722[‡] |
| Nonrecurrence | 252 (91.3) | 326 (92.1) | |
| Cost (surgery, repair, drugs, and other hospital services*) | | | |
| Rial | | | |
| Mean (SD) | 8,194,086 (3,904,051) | 17,132,746 (28,068,159) | 0.165[Ł] |
| Median (range) | 7,866,830 (0-27,675,075) | 8,897,641 (0-259,074,262) | |
| Dollar | | | |
| Mean (SD) | 273.31 (130.2) | 571.47 (936.2) | |
| Median (range) | 262.4 (0-923.1) | 296.8 (0-8641.5) | |
| Cost (visits and drugs after discharge) | | | |
| Rial | | | |
| Mean (SD) | 4,042,804 (1,705,967) | 1,417,424 (889,104) | <0.001[Ł] |
| Median (range) | 3,685,325 (0-13,486,625) | 1,800,000 (0-5,124,000) | |
| Dollar | | | |
| Mean (SD) | 134.8 (56.9) | 47.3 (29.6) | |
| Median (range) | 122.9 (0-449.8) | 60 (0-170.9) | |
| Cost (total) | | | |
| Rial | | | |
| Mean (SD) | 12,236,890 (5,409,020) | 18,550,170 (28,498,761) | |
| Median (range) | 11,654,910 (0-41,161,700) | 10,697,641 (0-260,898,262) | 0.155[Ł] |
| Dollar | | | |
| Mean (SD) | 408.1 (180.4) | 618.7 (950.6) | |
| Median (range) | 388.7 (0-1373) | 356.8 (0-8702.4) | |

*Other hospital services: Visit before surgery, laboratory tests, ward instruments, operation room equipment and hoteling; ‡Chi-square test; ŁMann–Whitney U-test. SE = Surgical excision; Mohs = Mohs micrographic surgery; SD = Standard deviation

than the Mohs. The Mann–Whitney U-test showed no significant difference between the two groups [Table 1].

After a 48-month follow-up procedure, patients who underwent SE and Mohs surgery had 92.1% and 91.3% nonrecurrence, respectively. The effect (percentage of nonrecurrence) of the SE method was higher than the Mohs surgery, but the difference was not significant using Chi-square test.

Table 2 shows the ICER of the SE method and the Mohs surgery by considering the discount rate on costs and effect in three scenarios. The base cost and effect discount rate was taken as 0%. The ICER of the SE method was then compared with the Mohs surgical method and the calculated value was 7891600 Rials ($263.2) more for every case of prevented recurrence.

To analyze different scenarios, the ICER of different subgroups of the location of tumor, size of tumor, age, sex, work place, and residence was assessed and the results were shown in Table 3 without undergoing discounting.

Since the difference between the effect of the two methods in location 1 and 3 of tumor is 0, the ICER could not be calculated. In addition, regarding the variables of tumor smaller than 2 cm, age <50, and outdoor workplace, the ratio becomes negative, and so the ICER is not calculable.

Table 4 demonstrates that the SE method compared with the Mohs surgery for patients who work indoors has a 610,258 Rials ($20.3) recurrence prevention value compared to all other variables and the lowest ICER. The highest ICER was 10,211,051 Rials ($340.6) per recurrence avoided in the group of males suffering from nonmelanoma skin cancer.

The logistic regression model proved that the relationship between age ($P$ = 0.794), sex ($P$ = 0.998), the size of the tumor ($P$ = 0.998), work place ($P$ = 0.763), location of the tumor ($P$ = 0.840), residence ($P$ = 0.716), and the recurrence of the tumor after SE was not statistically significant. The relation between age ($P$ = 0.780), size of tumor ($P$ = 0.472), workplace ($P$ = 0.113), and the residence ($P$ = 0.404) and the recurrence of the tumor after Mohs surgery was not statistically significant. However, the relationship between location of the tumor and the recurrence of the tumor after Mohs was significant (odds ratio [OR] =4.47, 95% CI: [1.4–13.9]). Hence, tumors which were located in the face, ears, eyelids, nose, and lips had a 4.47 time higher chance of recurrence than tumors in other parts of the body. The relation between sex and recurrence of the tumor was also proven to be significant in patients who were treated with the Mohs surgery method (OR = 4.6, 95% CI: [1.2–17.9]). This means that males were at a 4.6 time

**Table 2: Results of incremental cost-effectiveness ratio based on three scenarios discounting for nonmelanoma skin cancer patients in Isfahan, Iran (2007-2010)**

| Discount rate | Surgery cost mean Rials (Dollars) | | Incremental cost of two methods | Surgery percentage effect | | Incremental effect of two methods | ICER |
|---|---|---|---|---|---|---|---|
| | SE | Mohs | | SE | Mohs | | |
| Cost and effect 0% | 18,550,170 ($618.7) | 12,236,890 ($408.1) | 6,313,280 ($210.6) | 92.1 | 91.3 | 0.8 | 7,891,600 ($263.2) |
| Cost and effect 3% | 18,507,981 ($617.3) | 12,208,384 ($407.2) | 6,299,597 ($210.1) | 93.53 | 93.52 | 0.01 | 629,959,700 ($21012.6) |
| Cost 7.2%, effect 3% | 18,453,983 ($615.5) | 12,172,762 ($406) | 6,281,221 ($209.5) | 93.53 | 93.52 | 0.01 | 628,122,100 ($20951.3) |

SE = Surgical excision; Mohs = Mohs Micrographic surgery; ICER = Incremental cost-effectiveness ratio

**Table 3: Univariate sensitivity analysis for cost and effect of surgical excision and micrographic surgery for nonmelanoma skin cancer patients in Isfahan, Iran (2007-2010)**

| Variable | Surgery rial (Dollar) | | Incremental of two methods | Incremental |
|---|---|---|---|---|
| | SE | Mohs | | |
| Surgical and hospitalization cost (%) | | | | |
| Maximum (+20) | 17,234,708 ($574.8) | 8,715,686 ($290.7) | 8,519,022 ($284.1) | 2,839,674 ($97.7) |
| Minimum (−20) | 11,489,805 ($383.4) | 5,810,457 ($193.8) | 5,679,348 ($189.4) | |
| Examination and para clinical test cost (%) | | | | |
| Maximum (+20) | 1,463,673 ($48.8) | 1,117,217 ($37.2) | 346,455 ($11.5) | 115,485 ($3.8) |
| Minimum (−20) | 975,782 ($32.5) | 744,812 ($24.8) | 230,970 ($7.7) | |
| After surgery cost (%) | | | | |
| Maximum (+20) | 1,700,908 ($56.7) | 4,851,365 ($161.8) | −3,150,456 ($−105) | −1,050,152 ($−35) |
| Minimum (−20) | 1,133,939 ($37.8) | 3,234,243 ($107.9) | −2,100,304 ($−70) | |
| Effect (%) | | | | |
| Maximum (+3) | 94.86 | 94.03 | 0.824 | 0.048 |
| Minimum (−3) | 89.33 | 88.56 | 0.776 | |

SE = Surgical excision; Mohs = Mohs Micrographic surgery

**Table 4: Incremental cost-effectiveness ratio based on characteristics for nonmelanoma skin cancer patients in Isfahan, Iran (2007-2010)**

| Variable | Cost mean rial (dollar) | | Incremental cost | Nonrecurrence percentage | | Incremental effect | ICER |
|---|---|---|---|---|---|---|---|
| | SE | Mohs | | SE | Mohs | | |
| Tumor location* | | | | | | | |
| 1 | 6,352,172 ($211.9) | 11,411,540 ($380.6) | −5,059,368 ($−168.7) | 100 | 100 | 0 | - |
| 2 | 21,825,713 ($728) | 12,521,735 ($417.6) | 9,303,978 ($310.3) | 89.7 | 85.5 | 4.2 | 2,215,233 ($73.9) |
| 3 | 16,416,725 ($547.6) | 12,137,835 ($404.8) | 4,278,890 ($142.7 | 93.7 | 93.7 | 0 | - |
| Tumor sizes (cm) | | | | | | | |
| <2 | 8,443,845 ($281.6) | 12,033,303 ($401.4) | −3,589,458 ($−119.7) | 100 | 93.7 | 6.3 | - |
| □2 | 16,120,678 ($537.7) | 13,679,395 ($456.3) | 2,441,283 ($81.4) | 91.1 | 87.5 | 3.6 | 6,78,134 ($22.6) |
| Age (year) | | | | | | | |
| <50 | 43,821,472 ($1461.7) | 12,999,718 ($433.6) | 30,821,754 ($1028) | 73.7 | 88.5 | −14.8 | - |
| □50 | 17,430,342 ($581.4) | 12,157,556 ($405.5) | 5,272,786 ($175.9) | 92.8 | 91.6 | 1.2 | 4,393,988 ($146.5) |
| Sex | | | | | | | |
| Male | 17,309,989 ($577.4) | 12,204,464 ($407) | 5,105,526 ($170.3) | 91.7 | 91.2 | 0.5 | 10,211,052 ($340.6) |
| Female | 21,700,228 ($723.8) | 12,299,674 ($410.2) | 9,400,555 ($313.5) | 93 | 91.5 | 1.5 | 6,267,037 ($209) |
| Workplace | | | | | | | |
| Indoor worker | 16,622,916 ($554.4) | 12,534,189 ($418.0) | 4,088,727 ($136.4) | 94.5 | 87.8 | 6.7 | 6,102,58 ($ 20.3) |
| Outdoor worker | 20,253,017 ($675.5) | 12,342,550 ($411.7) | 7,910,468 ($263.8) | 85.3 | 93.3 | −8 | - |
| Jobless | 15,463,134 ($515.8) | 10,599,214 ($353.5) | 4,863,920 ($162.2) | 100 | 92.3 | 7.7 | 631,678 ($21) |
| Retired | 9,431,734 ($314.6) | 11,811,945 ($394) | −2,380,211 ($−79.4) | 95.2 | 97.2 | −2 | 1,190,106 ($39.7) |
| Residence | | | | | | | |
| Urban | 18,959,801 ($632.4) | 12,206,482 ($407.1) | 6,753,319 ($225.2) | 91.8 | 91.0 | 0.8 | 8,441,649 ($281.6) |
| Rural | 18,183,653 ($606.5) | 12,377,891 ($412.9) | 5,805,761 ($193.6) | 92.3 | 91.2 | 1.1 | 5,277,965 ($176) |
| Total | 18,550,170 ($618.7) | 12,236,890 ($408.1) | 6,313,280 ($210.6) | 92.1 | 91.3 | 0.8 | 7,891,600 ($263.2) |

*Tumor location = (1) Trunk, arms, shanks (2) scalp, neck, hands, legs, genital organs (3) face, ears, eyelids, nose, lips. SE = Surgical excision; Mohs = Mohs Micrographic surgery; ICER = Incremental cost-effectiveness ratio

higher risk of recurrence than females in the Mohs surgery treatment group.

Table 3 shows the univariate sensitivity analysis results. The highest sensitivity levels were reported for the changes in surgery and hospitalization costs and the lowest sensitivity levels were related to the changes in para clinical tests and examinations costs.

## DISCUSSION

The results indicate the SE method to be more cost-effective; however, no significant difference existed between the probabilities of recurrence between the two methods.

Mosterd *et al*., van Loo *et al*., and Essers *et al*. in their studies indicated that the recurrence rate in patients who received the Mohs surgery treatment was lower than those who were treated with SE.[3,9,10] These three studies were based on a randomized clinical trial in Maastricht. The length of follow-up periods varied across the three studies.

The effectiveness of the current work is in contradiction with the results of the mentioned studies. The interpretation for the reduction of recurrence after surgical resection in the present study is that for cases where the SE was defected, the surgical process was repeated and cases that were subjected to the recurrence of the tumor after 3 months of the initial surgery were considered as recurrence cases.

Based on the result of the current research, cost of the SE method was estimated higher than the Mohs surgery method. The results are consistent with the results of Seidler *et al*.[4] and Ravitskiy *et al*.[11] In this study, similar to Seidler's[4] study, it was assumed that during the process of SE, all the deep margins of the tumor were removed. The nursing costs of the treatments were not included in this study and are assumed to be similar for both treatments. The costs of recovery were also added to the initial costs of surgery.

One possible explanation for the higher cost of SE compared to the Mohs surgery method in the current study can be the fact that since the Mohs surgery has an outpatient procedure, the costs of anesthetics, the operating room, the para clinical tests, and the medical advices before the surgery were not considered. In Seidler's study, the Mohs surgery was performed in the clinic and no facility costs were included. However, in SE facility, costs were included.

Some studies have even shown Mohs costs to be higher than SE.[10,12] On the contrary, in the current study, the costs of

the SE method are shown to be less than the Mohs method. Because of the difference between the various details of costs in different studies, comparing them seems to be a difficult job.

This difference between the costs of the Mohs and SE group can be because of the difference between physicians' visits of the two groups. The patients of the Mohs surgery group were visited by a fellowship physician, and the patient visits of the SE group were performed by a specialist physician. Now because the fellowship visit costs are more expensive than the specialist visit costs, the rounds of the doctors examining the Mohs group were much higher. Another reason which can be mentioned for the difference between the costs of the two groups is the medication used by the patients after their discharge. The medication given to patients treated by Mohs surgery is prescribed by a dermatologist, and these medications include drugs used for the recovery of the skin and may be much more expensive than drugs prescribed by a general surgeon, which undertakes the SE method. Because in the SE the surgeon is only specialized in general surgery, after discharge, these drugs may not be prescribed for the patient.

In a study by Mosterd *et al*., the ICER of Mohs surgery and SE in the treatment of primary BCC was calculated, and the result was €23,454 per recurrence avoided, and therefore, viewed the SE method as the adequate method of treatment.[3] In a study by Essers *et al*., the result showed the ICER to be €29,232 per recurrence avoided. Based on the results, the probability of the Mohs surgery being more cost-effective than SE does not even reach 50%, and this method is indicated to be no more cost-effective than the SE method for the treatment of primary BCC when viewed in larger scales.[10] In the study by Seidler *et al*., the Mohs surgery treatment method was $292 less expensive than SE, and with a 0.056 higher quality-adjusted life year, it was understood to be the most effective method in the eradication of nonmelanoma skin cancer.[4]

The results of this study show the ICER of SE compared to Mohs surgery to be 7891,600 Rials ($263.22) more for every prevented recurrence case. The effectiveness of the two methods was approximately the same, and by considering the discount rate, the ICER would also increase, therefore cost analysis can be performed.

Many researchers have studied the ICER of the two mentioned surgical methods only on a specific type of nonmelanoma skin cancer or only on a specific part of the body.[4,10,12] In the current study, however, both BCC and SCC were considered and all locations on the skin were also included. Moreover, all medical outcomes and costs were collected directly from the medical files of the patients.

All patients who referred to the Seyed Al-Shohada and Al-Zahra Hospitals were included in this study. However, information of patients who had referred to private hospitals was not included in the study, and so it is probable that the results of this study are not completely generalizable for the nonmelanoma skin cancer population of Isfahan.

Since SE surgery only has been performed in the Seyed Al-Shohada Hospital, there is no choice for patients admitted to this hospital to allocate either SE or Mohs surgery. Then, possible selection bias could be generated by specialists.

## CONCLUSIONS

Therefore, based on the results of this study, the Mohs treatment method is advisable to patients and health officials as the most appropriate method in the treatment of nonmelanoma skin cancer.

### Acknowledgments

The authors thank the student research center, School of Health, Isfahan University of Medical Sciences, for approved project number 394337.

### Financial support and sponsorship

Nil.

### Conflicts of interest

There are no conflicts of interest.

## AUTHORS' CONTRIBUTION

- MRM contributed in the conception of the work,conducting the study, revising the draft,approval of the final version of the manuscript, and agreedfor all aspects of the work.
- LN contributed in the conception of the work, conducting the study, revising the draft, approval of the final version of the manuscript, and agreed for all aspects of the work.
- MA contributed in the conception of the work, revising the draft, approval of the final version of the manuscript, and agreed for all aspects of the work.
- MT contributed in the conception of the work,revising the draft,approval of the final version of the manuscript, and agreed for all aspects of the work.

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