ABSTRACT

Background: Cone beam computed tomography (CBCT) is a marvelous three-dimensional (3D) dental and maxillofacial imaging method in recent years. It is based on a multi-surface resampling process that has distinct advantages such as condensed radiation area size, image resolution, fast scanning time, exclusive maxillofacial imaging patterns and reduced image errors.

Objectives: This study aimed to evaluate the knowledge and attitude of a sample of Yemeni dentists toward the use of CBCT.

Methods: A total of 98 selected dentists participated in this study. The self-administered questionnaires, consisting of two parts, were distributed: The first is related to the demographic characteristics and the second section is related to the knowledge and attitude of the dental practitioners towards CBCT. The study was conducted in Dhamar, Yemen.

Results: The majority of respondents were 86 general dental practitioners (87.8%), most of whom were working in private dental clinics. More than half of the participants (67.3%) used digital imaging techniques to take radiographs. The most frequent source of knowledge about respondents' digital imaging techniques was the Internet (39%). Awareness of CBCT was higher in dentists, dental specialists, and those who were in an academic position. Lower radiation dose (26%), followed by secure image processing (23%), and short scanning time (21%) were the most common advantages of CBCT reported by the respondents.

Conclusion: Study participant responses reflect the importance of CBCT in the dental field. Awareness about CBCT among dentists in Yemen is good and appears to be different among dentists with regard to gender, qualifications and type of work. The study requires that continuing learning courses be held in dental colleges in Yemen including appropriate hands-on CBCT training and integration with other clinical courses to improve the dentist’s basic knowledge and interpretation regarding this technology.

Keywords: Attitude, CBCT practitioners, knowledge, Yemen.
because of its high cost, access, and radiation dose considerations\(^3\). In the late 1990s, Arai \textit{et al.}, and Mozzo \textit{et al.}, independently introduced cone beam computed tomography (CBCT) scanners for the oral and maxillofacial (OMF) region as an alternative to conventional CT\(^2\). One benefit of CBCT technology, its ability to provide sub-millimeter (0.1mm or even less) resolution in terms of images\(^4\). The images provided are also high in diagnostic quality\(^1,2\). Moreover, CBCT has several advantages over conventional CT making it the first choice among dental professionals, including reduced cost and space requirements, a more rapid scanning time, limit the beam to the head and neck, reduction in the radiation doses, the ability to take different images from a certain structure and the possibility of reconstructing sagittal and coronal views\(^5,6\). However, CBCT gives increased radiation doses to patients compared with conventional dental radiographic techniques\(^8\). Other disadvantages of CBCT are the low resolution of its soft tissue and scattering beams from tooth tissue\(^1\).

Previous studies showed that the effective radiation dose of CBCT ranged between 0.035 and 0.10 µSv, which is equivalent to approximately a full mouth series of periapical or 3-10 standard dental panoramic tomography. The above dose is up to a 98% lower compared to conventional CT, being about 0.4 µSv\(^1,3\). In spite of the fact that the dose and the cancer risk from dental CBCT are almost negligible for an individual patient, extensive use of radiation covering large populations should not be allowed without proper justification, with a specific focus on children. The justification step is often the most efficient step for patient dose reduction. One of the important factors in CBCT optimization is the selection of an appropriate field of view (FOV) according to clinical indication\(^2,9\). Common indications for CBCT in dentistry are implantation, orthodontic treatments, assessment of temporo-mandibular joint, proximity of third mandibular molar with inferior alveolar nerve previous to extraction, planning orthognathic surgery and endodontic review\(^3,6,10\). Also, CBCT has been indicated in craniofacial clinical practice for diagnosing as well as pre-surgical planning of different types of acquired and congenital craniofacial malformations, like; cleft palate, facial trauma, root fractures, inflammatory bony changes and benign and malignant tumors\(^2\). In addition, CBCT imaging can assess airway shape and volume in patients with obstructive sleep apnea (OSA)\(^1\).

It has been recommended that CBCT should be performed as an auxiliary imaging technique. However, due to a lack of strict guidelines and ignorance about the role of CBCT in dentistry, it has become a substitute for conventional radiography, including periapical, bitewing, and panoramic radiographs\(^2,3,11\). Some criteria have been laid down by the American Academy of Oral and Maxillofacial Radiology for the role of CBCT in implants, endodontics, and orthodontics\(^14\). The American Dental Association Council on Scientific Affairs Council has encouraged CBCT operators to contribute in continuing education courses in order to ensure that practitioners have a satisfactory understanding of radiation safety in the dental care setting. So, CBCT imaging should only be recommended by a clinician who has undergone appropriate training in CBCT radiology and exhibits an acceptable knowledge concerning the applications of CBCT, along with experience in the interpretation of CBCT images and an appreciation of the limitations of CBCT\(^2,15\). The aim of this survey was to assess awareness, knowledge and attitude among dentists in Yemen towards CBCT use.

**MATERIALS AND METHODS**

A total of 120 self-administered questionnaires were distributed to dental practitioners in, Dhamar city, Yemen. The questionnaires were printed and disseminated personally by the authors. The questionnaire was adopted from some previous studies\(^16,17\). Only completely filled-in questionnaires were included in the analyses. The questionnaire consisted of two main sections. The first is related to the demographic characteristics including: gender, qualification, year of graduation, and type of work. The second section is related to the main objective of the study (CBCT) including 2 parts relating to knowledge and attitude of the dental practitioners towards CBCT.

In the knowledge part dentists were asked the use or order of digital imaging, reason for not ordering digital imaging, and their awareness of CBCT in dental radiology. In the attitude part dentists were asked about attending courses related to CBCT, advising CBCT in their dental practice, and conducting continuous dental education (CDE) in CBCT. Data were presented in the terms of frequencies and percentages. The statistical package for social sciences (SPSS V25) was used for analyzing the data.

**Table 1: Characteristics of the study sample.**

| Gender       | Male | 52   | 53.1 |
|--------------|------|------|------|
| Female       | 46   | 46.9 |

| Qualification | Bachelor | 86   | 87.8 |
|--------------|----------|------|------|
| Specialist   | 12       | 12.2 |

| Place of work | Private | 51   | 52.0 |
|--------------|---------|------|------|
| Academic     | 12      | 12.2 |
| Governmental | 9       | 9.2  |
| Combined     | 17      | 17.3 |
| None         | 9       | 9.2  |

**RESULTS**

A total of 98 dentists (53.1% male and 46.9% female) participated in this study (response rate 82%). Among them, 86 (87.8%) were general dental practitioners and 12 (12.2%) were specialists. About half of respondents (52.0%) were working in private dental clinics, 12.2% in academic positions, 17.3% in more than one, and 9.2% in government or none, of an equal position (Table 1). More than half of the respondents (67.3%) used digital imaging techniques to obtain radiographs. The main reason why respondents did not request digital imaging is its high cost (59.4%) (Table 2), while...
the main reasons for requesting were a lower radiation dose (26%), followed by a short time (24%) (Figure 1).

Table 2: Knowledge of dental practitioners about CBCT.

| Use/Order digital imaging modalities | Yes | No |
|-------------------------------------|-----|----|
|                                     | 66  | 32 |

Table 3: Attitude of dental practitioners toward CBCT.

| Having CBCT in the dental institution | Yes | No |
|---------------------------------------|-----|----|
|                                       | 78  | 20 |

| Attended courses related to CBCT | Yes | No |
|---------------------------------|-----|----|
|                                 | 22  | 76 |

| Willing to attend courses related to CBCT | Yes | No |
|------------------------------------------|-----|----|
|                                          | 62  | 10 |

| Advised CBCT for diagnosis | Yes | No |
|---------------------------|-----|----|
|                           | 47  | 51 |

| Like to use CBCT in future | Yes | No |
|----------------------------|-----|----|
|                            | 69  | 1 |

| Adequate teaching given to undergraduate students | Yes | No |
|---------------------------------------------------|-----|----|
|                                                   | 37  | 61 |

| CDE/Workshops should be conducted | Yes | No |
|----------------------------------|-----|----|
|                                  | 45  | 5  |

More than 60% of respondents claimed that no adequate teaching relating to CBCT was given to undergraduate students and less than 50% believed that workshops should be conducted for it (Table 3).

The most frequently advantages of CBCT cited by respondents were lower radiation dose (26%), followed by easy image processing (23%), and short scanning time (21%) (Figure 3).

Implant dentistry and evaluation of cyst and tumors, equally (23%), followed by evaluation of impactions (19%) were the most cases for which dentists will use CBCT in future (Figure 4).

Most respondents (79.6%) claimed that they have CBCT in their dental institution and about 77.6% did not attend courses related to CBCT while 63.3% were willing to attend such courses in future. Less than half of respondents (48.0%) advised CBCT for diagnosis while, 70.4% liked to use CBCT in future.
Table 4: Responses of dental practitioners to some questions related to CBCT.

|                   | Aware of CBCT in dental radiology | Adequate teaching given to undergraduate students | Attended courses related to CBCT | Use/Order digital imaging modalities |
|-------------------|-----------------------------------|--------------------------------------------------|---------------------------------|-------------------------------------|
|                   | Yes (%) | No (%) | Yes (%) | No (%) | Yes (%) | No (%) | Yes (%) | No (%) |
| Gender            |          |        |          |        |          |        |          |        |
| Male              | 40 (76.9) | 12 (23.1) | 17 (32.7) | 35 (67.3) | 16 (30.8) | 36 (69.2) | 38 (73.1) | 14 (26.9) |
| Female            | 26 (56.5) | 20 (43.5) | 20 (43.5) | 26 (56.5) | 6 (13.0) | 40 (87.0) | 28 (60.9) | 18 (39.1) |
| Qualification     |          |        |          |        |          |        |          |        |
| Bachelor          | 54 (62.8) | 32 (37.2) | 34 (39.5) | 52 (60.5) | 17 (19.8) | 69 (80.2) | 56 (65.1) | 30 (34.9) |
| Specialist        | 12 (100.0) | 0 (0.0) | 3 (25.0) | 9 (75.0) | 5 (41.7) | 7 (58.3) | 10 (83.3) | 2 (16.7) |
| Working status    |          |        |          |        |          |        |          |        |
| Private           | 38 (74.5) | 13 (25.5) | 18 (35.3) | 33 (64.7) | 12 (23.5) | 39 (76.5) | 34 (66.7) | 17 (33.3) |
| Academic          | 11 (91.7) | 1 (8.3) | 4 (33.3) | 8 (66.7) | 3 (25.0) | 9 (75.0) | 10 (83.3) | 2 (16.7) |
| Governmental      | 4 (44.4) | 5 (55.6) | 2 (22.2) | 7 (77.8) | 0 (0.0) | 9 (100.0) | 2 (22.2) | 7 (77.8) |
| Combined          | 9 (52.9) | 8 (47.1) | 7 (41.2) | 10 (58.8) | 5 (29.4) | 12 (70.6) | 14 (82.4) | 3 (17.6) |
| None              | 4 (44.4) | 5 (55.6) | 6 (66.7) | 3 (33.3) | 2 (22.2) | 7 (77.8) | 6 (66.7) | 3 (33.3) |

Table 5: Distribution of dentists’ opinions about the use of CBCT in dental practice according to gender, qualification, and work.

| Believe that CBCT will be used in routine dental practice | It will not be used | In all specialties of dentistry | Limited use | Selected dental applications only | No idea |
|---------------------------------------------------------|---------------------|--------------------------------|--------------|---------------------------------|---------|
| Gender                                                  |                     |                                |              |                                 |         |
| Male                                                    | 2 (5.0)             | 20 (50.0)                      | 7 (17.5)     | 7 (17.5)                        | 4 (10.0) |
| Female                                                  | 1 (3.8)             | 10 (38.5)                      | 5 (19.2)     | 9 (34.6)                        | 1 (3.8) |
| Qualification                                           |                     |                                |              |                                 |         |
| Bachelor                                                | 2 (3.7)             | 25 (46.3)                      | 9 (16.7)     | 13 (24.1)                       | 5 (9.3) |
| Specialist                                              | 1 (8.3)             | 5 (41.7)                       | 3 (25.0)     | 3 (25.0)                        | 0 (0.0) |
| Working status                                          |                     |                                |              |                                 |         |
| Private                                                 | 3 (7.9)             | 19 (50.0)                      | 6 (15.8)     | 8 (21.1)                        | 2 (5.3) |
| Academic                                                | 0 (0.0)             | 5 (45.5)                       | 2 (18.2)     | 4 (36.4)                        | 0 (0.0) |
| Governmental                                            | 0 (0.0)             | 0 (0.0)                        | 1 (25.0)     | 2 (50.0)                        | 1 (25.0) |
| Combined                                                | 0 (0.0)             | 5 (55.6)                       | 1 (11.1)     | 2 (22.2)                        | 1 (11.1) |
| None                                                    | 0 (0.0)             | 1 (25.0)                       | 2 (50.0)     | 0 (0.0)                         | 1 (25.0) |

Table 6: Distribution of dentists’ opinions and attitude toward the use of CBCT.

|                  | CDE/Workshops should be conducted | Like to use CBCT in future | Advised CBCT for diagnosis |
|-------------------|----------------------------------|----------------------------|-----------------------------|
|                   | Yes (%) | No (%) | Maybe (%) | Yes (%) | No (%) | Maybe (%) | Yes (%) | No (%) |
| Gender            |          |        |          |        |        |          |        |        |
| Male              | 24 (46.2) | 21 (41.7) | 3 (5.8) | 34 (66.8) | 12 (23.5) | 16 (30.8) | 36 (69.2) | 28 (55.1) |
| Female            | 21 (45.7) | 1 (2.2) | 24 (52.2) | 37 (71.2) | 0 (0.0) | 11 (21.2) | 4 (7.7) | 30 (57.7) |
| Qualification     |          |        |          |        |        |          |        |        |
| Bachelor          | 35 (40.7) | 0 (0.0) | 1 (3.3) | 59 (68.6) | 1 (2.2) | 22 (25.6) | 4 (4.7) | 40 (65.8) |
| Specialist        | 10 (83.3) | 1 (8.3) | 10 (83.4) | 0 (0.0) | 1 (8.3) | 1 (8.3) | 7 (58.3) | 5 (41.7) |
| Working status    |          |        |          |        |        |          |        |        |
| Private           | 19 (37.3) | 7 (58.3) | 0 (0.0) | 34 (68.6) | 1 (2.2) | 13 (25.5) | 3 (6.2) | 23 (45.1) |
| Academic          | 6 (66.7) | 7 (58.3) | 0 (0.0) | 5 (55.6) | 0 (0.0) | 4 (44.4) | 5 (55.6) | 4 (44.4) |
| Governmental      | 11 (64.7) | 1 (5.9) | 5 (29.4) | 14 (82.4) | 0 (0.0) | 3 (17.6) | 0 (0.0) | 11 (64.7) |
| Combined          | 2 (22.2) | 0 (0.0) | 7 (77.8) | 7 (77.8) | 0 (0.0) | 1 (11.1) | 4 (44.4) | 5 (55.6) |

DISCUSSION

Responses to the question related to the teaching given to undergraduate students, almost all dentists respond negatively that the teaching of CBCT was not enough. Regarding dentists’ opinions about the future use of CBCT in dental practice, the majority of responses were toward the use of CBCT in all specialties of dentistry (Table 5). Male dentists, dental specialists, and dentists in academic, governmental, and combined positions agreed that CBCT workshops should be conducted while, majority of responses by gender, qualification, and type of work were toward the use of CBCT in future. However, in response to the question related to the advice of CBCT for diagnosis, female dentists, general dental practitioners, and dentists in private, academic, and governmental positions did not advise CBCT for diagnosis in their dental practice (Table 6).

Studies assessing awareness, knowledge and attitude of CBCT among dentists and specialists are rare. This study used a questionnaire to assess the level of knowledge regarding CBCT among a sample of Yemeni dentists and specialists. Correct diagnosis and treatment planning of patients seeking various dental procedures sometimes need several radiographic imaging techniques. Among those radiographic techniques, CBCT has been shown to have a wide application in dentistry. This study showed that more than half of respondents (67.3%) were aware of CBCT. In contrast, a higher percentage was published by Rai et al., in their study among Indian dentists and a lower percentage were obtained by Aditya et al., who reported that low awareness regarding applications of CBCT among practitioners causes widely less use of CBCT in clinical practice. They reported that the majority of their participants did not advise CBCT at all or advice in less than one-fourth of their cases. This could be due to low availability of the technique.
high cost or inability of case selection for CBCT imaging by the dentists\textsuperscript{23}. The current study revealed that, the main reasons for ordering CBCT were less radiation dose (26\%) followed by short time (24\%). This was in agreement with the findings published by Rai \textit{et al.}\textsuperscript{20}, and also Chau and Fung\textsuperscript{22} who mentioned that CBCT causes the lowest radiation dose to the organs. A higher value was recorded by Balabaskaran and Srinivasan in which 80.48\% of participants revealed that the most advantage of CBCT over CT was the lower radiation. About 87.8\% revealed that CBCT offers enhanced diagnosis at a lower dose than CT\textsuperscript{23}. 

\textbf{CONCLUSION}

Study participant responses reflect the importance of CBCT in the dental field. Awareness about CBCT among dentists in Yemen is good and appears to be different among dentists with regard to gender, qualifications and type of work. The study requires that continuing learning courses be held in dental colleges in Yemen including appropriate hands-on CBCT training and integration with other clinical courses to improve the dentist’s basic knowledge and interpretation regarding this technology.

\textbf{CONFLICT OF INTEREST}

The authors declare that they have no conflict of interest.
AUTHOR'S CONTRIBUTION

Mohammed M. AlKhawlani participated in conceptual framework, designing, and writing of the manuscript. Tariq A. Ziad and Ammar A. Daer participated in data analysis, and writing the manuscript. Ammar A. Daer, Najla A. Alwashali, Bushra M. Abdulaziz, and Abeer A Al-Sosowa participated in writing the manuscript. All authors read and approved the final manuscript.

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REFERENCES

1. Macleod I, Heath N. Cone-beam computed tomography (CBCT) in dental practice. Dent Update 2008; 35:590-592, 594-598. https://doi.org/10.12968/denu.2008.35.9.590

2. Kiljunen T, Kaasalainen T, Suomalainen A, et al. Dental cone beam CT: A review. Phys Med 2015; 31:844-860. https://doi.org/10.1016/j.ejmp.2015.09.004

3. Kalender WA: Computed tomography: fundamentals, system technology, image quality, applications. John Wiley & Sons, 2011.

4. Scarfe WC, Farman AG, Sukovic P. Clinical applications of cone-beam computed tomography in dental practice. J Can Dent Assoc 2006; 72:75-80. https://doi.org/10.14219/jada.archive.2010.0359

5. De Vos W, Casettman J, Swennen GR. Cone-beam computerized tomography (CBCT) imaging of the oral and maxillofacial region: a systematic review of the literature. Int J Oral Maxillofac Surg 2009; 38:609-625. https://doi.org/10.1016/j.ioms.2009.02.028

6. Hatcher DC. Operational principles for cone-beam computed tomography. The J American Dent Assoc 2010; 141:35-68. https://doi.org/10.14219/jada.archive.2010.0359

7. Baheerati M, Don K. Applications of cone-beam computerized tomography in dental practice: A brief review. Drug Inv Today 2019; 11.

8. Horner K, Islam M, Flygare L, et al. Basic principles for use of dental cone beam computed tomography: consensus guidelines of the European Academy of Dental and Maxillofacial Radiology. Dentomaxillofac Radiol 2009; 38:187-195. https://doi.org/10.1259/dmfr/74941012

9. Vandenbergh B, Jacobs R, Yang J. Diagnostic validity (or acuity) of 2D CCD versus 3D CBCT-images for assessing periodontal breakdown. Oral Surg Oral Med Oral Pathol Oral Radiol Endod 2007; 104:395-401. https://doi.org/10.1016/j.tripleo.2007.03.012

10. Paarwels R, Cockmartin L, Ivanauskaité D, et al. Estimating cancer risk from dental cone-beam CT exposures based on skin dosimetry. Phys Med Biol 2014; 59:3877-3891. https://doi.org/10.1088/0031-9155/59/14/3877

11. Kapila S, Conley RS, Harrell WE, Jr. The current status of cone beam computed tomography imaging in orthodontics. Dentomaxillofac Radiol 2011; 40:24-34. https://doi.org/10.1259/dmfr/12615645

12. Anderson PJ, Yong R, Surman TL, et al. Application of three-dimensional computed tomography in craniofacial clinical practice and research. Aust Dent J 2014; 59 Suppl 1:174-185. https://doi.org/10.1111/adj.12154

13. Gahlot M. A CBCT Study to Assess the Volumetric Analysis of Airway, Craniofacial Morphology and Cervical Vertebral Fusion Anomalies in North Indian Patients with Obstructive Sleep Apnea. EC Dental Science 2019; 18:303-320.

14. Jaju PP, Jaju SP. Cone-beam computed tomography: Time to move from ALARA to ALADA. Imaging Sci Dent 2015; 45:263-265. https://doi.org/10.1016/j.isom.2015.04.263

15. Bhata S, Kohli S. Cone-beam computed tomography usage: An alert to the field of dentistry. Imaging Sci Dent 2016; 46:145-146. https://doi.org/10.5624/sid.2016.46.2.145

16. Ezoddini Ardakani F, Sarayesh V. Knowledge of Correct Prescription of Radiographs among Dentists in Yazd, Iran. J Dent Res Dent Clin Dent Prospects 2008; 2:95-98. https://doi.org/10.5681/jdr.2008.004

17. Shetty SR, Castelino RL, Babu SG, et al. Knowledge and attitude of dentists towards cone beam computed tomography in Mangalore–a questionnaire survey. Austin J Radiol 2015; 2:1016. https://doi.org/10.18502/jfar.v1i6.2292

18. Hatcher DC, Dial C, Mayorga C. Cone beam CT for pre-surgical assessment of implant sites. J Calif Dent Assoc 2003; 31:825-833. PMID: 12245882

19. Kobayashi K, Shimoda S, Nakagawa Y, et al. Accuracy in measurement of distance using limited cone-beam computerized tomography. Int J Oral Maxillofac Implants 2004; 19:228-231. PMID: 15101594

20. Rai S, Misra D, Dhanaw A, et al. Knowledge, awareness, and attitude of general dentists toward dental radiology and CBCT: A questionnaire study. J Indian Acad Oral Med Radiol 2018; 30:110. https://doi.org/10.4103/ijamr.ijamr_115_17

21. Aditya A, Lele S, Aditya P. Current status of knowledge, attitude, and perspective of dental practitioners toward cone beam computed tomography: A survey. J Oral Maxillofacial Pathol 2015; 3:54. https://doi.org/10.4103/2321-3841.157524

22. Chau AC, Fung K. Comparison of radiation dose for implant imaging using conventional spiral tomography, computed tomography, and cone-beam computed tomography. Oral Surg Oral Med Oral Pathol Oral Radiol Endod 2009; 107:559-565. https://doi.org/10.1016/j.tripleo.2008.11.009

23. Balabaskaran K, Srinivasan A. Awareness and attitude among dental professional towards CBCT. IOSR J Dent Med Sci 2013; 10:35-59.

24. Kamburoglu K, Kursun S, Akarslan ZZ. Dental students’ knowledge and attitudes towards cone beam computed tomography in Turkey. Dentomaxillofac Radiol 2011; 40:439-443. https://doi.org/10.1259/dmfr/21915689

25. Zain-Alabdeeh EH, El Khateeb SM. Comparison of knowledge and perspectives toward cone-beam computed tomography among dentists in three Middle East regions: A cross-sectional study. Saudi J Oral Sci 2018; 53. https://doi.org/10.4103/1021-0452.230989

26. Bhagat B, Nagrik A, Yemle S. Dental Practitioners’ Knowledge and perspectives toward cone beam computed tomography in India. J Oral Maxillofac Surg Oral Med Oral Pathol Oral Radiol Endod 2015; 83:212-216. https://doi.org/10.1016/j.ijd.2012.10.003

27. Reddy RS, Kiran CS, Ramesh T, et al. Knowledge and attitude of dental fraternity towards cone beam computed tomography in south India–A questionnaire study. Indian J Dent 2013; 4:88-94. https://doi.org/10.1111/adj.12154

28. Riley JL 3rd, Gordan VV, Rouisse KM, McClellan J, Gilbert GH; Dental Practice-Based Research Network Collaborative Group. Differences in male and female dentists’ practice patterns regarding diagnosis and treatment of dental caries: findings from the Dental Practice-Based Research Network. J Am Dent Assoc. 2011; 142(4):429-440. https://doi.org/10.14219/jada.archive.2011.0199

29. Strindberg JE, Hol C, Torgersen G, et al. Comparison of Swedish and Norwegian use of cone-beam computed tomography: A questionnaire study. J Oral Maxillofac Res 2015; 6:62. https://doi.org/10.5037/jomr.2015.0602