Needs Assessment of Pathologists Using Telepathology Systems

Sadrieh Hajesmaeel Gohari¹,
and Kambiz Bahaadinbeigy²

¹Medical Informatics Research Center,
Institute for Futures Studies in
Health, Kerman University of Medical
Sciences, Kerman, Iran

²Research Center for Modelling in
Health, Institute for Futures Studies in
Health, Kerman University of Medical
Sciences, Kerman, Iran

Corresponding author: Kambiz
Bahaadinbeigy. Modeling in Health Research
Center, Institute for Futures Studies in
Health, Kerman University of Medical
Sciences, Kerman, Iran. ORCID : <http://orcid.org/0000-0002-5430-3758>. Phone:
00989134416109. Email : Kbahaadini@kmu.ac.ir; Kambizb321@gmail.com

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Kambiz Bahaadinbeigy

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ABSTRACT

Background: This project sought to identify the most common telepathology consultation needs of pathologists based on the anatomic section of tissue to improve quality of consultations. **Methods:** This cross-sectional study used a questionnaire with four questions to assess pathologists' consultation needs. The questionnaire was distributed to the 16 pathologists recruited for this study. All 16 of the pathologists work in Kerman province, the largest province of Iran, which is situated 1,000 kilometers from Tehran, Iran's capital city. **Results:** On average, the pathologists expressed a need to consult with their colleagues in 7.5% of cases. They believed that articular and bone tissue, soft tissue and the lymphoid system (respectively in descending order) to be the three anatomical parts that require the greatest amount of consultation. As such, consultant pathologists should ensure they have particular expertise in articular and bone tissue, soft tissue and the lymphoid system. **Conclusion:** This study demonstrated that pathologists most need advice from consultants when working with samples of articular and bone tissue, soft tissue and the lymphoid system. These results can be used to ensure successful implementation of telepathology systems, which are helpful for consultation from rural and remote areas.

Key words: telepathology, consultation, pathologist, needs assessment.

1. BACKGROUND

Telepathology is a subspecialty of telemedicine that uses telecommunication technology to store, retrieve and transmit digital images to remote areas for different purposes such as teleeducation, teliagnosis and teleconsultation (1). A problem pathologists face is that the difficulty of diagnosing pathology slides differs between anatomic sections. That is, pathologists may read and diagnose slides taken from some organs more easily than they might diagnose slides taken from other organs. This study proposes that in the case of a remote pathologist needing to consult with another pathologist to diagnose a pathology problem through a telepathology system, the need for assistance with some anatomical parts will be greater.

When implementing a telepathology system, it is very important to assess and predict the nature of the telepathology consultations that will be conducted (i.e., which organs and anatomical parts will require greater consultation). This

issue is of far greater importance for pathologists working in rural and remote areas because the transfer of pathology slides to outside pathology clinics to obtain a second opinion can be very expensive and time consuming (2).

To the researchers' knowledge, no study has been conducted to assess pathologists' needs concerning the anatomical sections for which they require and seek most advice. Understanding pathologists' needs for obtaining advice can identify priorities when implementing telepathology systems.

2. METHODS

This cross-sectional study was designed to obtain pathologists' opinions about their areas of greatest need and priority when consulting with specialist pathologists to diagnose particular anatomical parts. We used a questionnaire that was approved by a specialist in telemedicine, two pathologists who are faculty members and two experts on medical informatics. The validity of the questionnaire was ap-

proved. The questionnaire was distributed to the 16 pathologists who participated in the study. All 16 of these pathologists work in Kerman city and the questionnaire was completed on site. Kerman city is the capital city of Kerman province, the largest province in Iran, and is a remote area located near the Afghanistan border (1,000 kilometers from Tehran). The questionnaire contained the four following questions:

- Is it happened for you that when read pathology slides of a tissue you feel need to consult with your colleagues in city, out of province or out of country?
- In how many per cent of cases this need is felt?
- Is this need different for various anatomical parts? If the answer is positive for which anatomical part you need more advice?
- If you want to get advice from expert pathologist out of province or out of country for diagnosing pathology slides, you prefer that in what area the pathologist has expertise?

The pathologists were allowed to select more than one anatomical part that requires pathology diagnosis. Descriptive statistics were used to analyze the results.

3. RESULTS

Need to consult with other pathologists

All 16 pathologists stated that they need to consult with their colleagues.

Percentage of cases for which consultation is required

When identifying the percentage of cases in which they feel they needed to consult with other pathologists, 10 stated from 1 to 5% of cases, three stated from 5 to 10% of cases, one stated from 10 to 15% and two stated from 15 to 20%. The mean is 7.5%.

Anatomical parts with the greatest need for consultation

All 16 pathologists stated that the need for consultation with another pathologist is different for various anatomical parts. The pathologists identified several anatomical parts for which they seek consultation to diagnose. The thirty-seven answers for this question are presented in Table 1.

Specialty area of consultant pathologists

Anatomical parts	Number and percentage (%) of replies
Lung	2 (5.4)
Articular and bone	9 (24.3)
Nerve tissue	1 (2.7)
Soft tissue	7 (18.9)
Lymphoid system	7 (18.9)
Brain	4 (10.8)
Skin	2 (5.4)
Glands	1 (2.7)
Breast	2 (5.4)
Different tumours	2 (5.4)

Table 1. Anatomical parts requiring greatest pathology consultation

Sixteen pathologists stated 29 specialty areas in which they would prefer consultant pathologists to have expertise. The results of this question are presented in Table 2.

4. DISCUSSION

This study demonstrated that pathologists need to consult in 7.5% of cases. The three anatomical parts requiring the greatest need for consultation are articular and bone tissue,

Specialty area	Number and percentage (%) of replies
Lung	1 (3.4)
Articular and bone	6 (20.6)
Soft tissue	7 (24.1)
Lymphoid system	4 (13.7)
Brain	2 (6.8)
Skin	1 (3.4)
Breast	1 (3.4)
Immunohistochemistry	1 (3.4)
General	2 (6.8)
Depends on the type of tumour and tissue	4 (13.7)

Table 2. Preferred specialty areas for consultant pathologists

soft tissue and the lymphoid system. These areas represent the highest three specialty areas in which consultant pathologists should be expert.

The average of a 7.5% need for consultation found in this study demonstrates that there may be many thousands of difficult pathology diagnoses every year. Given that misdiagnosis in pathology may change the treatment the patient receives and therefore be dangerous for the patient, not obtaining advice from other pathologists could endanger the lives of many thousands of patients. Prior research has found an even higher percentage of cases (10–20%) in which pathologists need to consult (3).

Articular and bone tissue, soft tissue and the lymphoid system are the anatomical parts that require the most consultation (4–6). One of the reasons that may create this need is that in a pathology diagnosis of articular and bone tissue, the correct diagnosis is achieved when there is coordination between the diagnoses of radiology, pathology and the physician. This tissue may also be difficult to diagnose because there are reactive lesions in the bone and soft tissue that may mean such tissue is confused as malignant when it is benign and vice versa, for example, distinguishing between chondrosarcoma and chondroma is very difficult.

Further, given that anatomical parts such as articular and bone tissue, soft tissue, and the lungs and brain are operated on in specialty centers and samples of these parts are sent to pathologists of these centers, other pathologists do not have a great deal of experience in these fields and need to consult with expert pathologist in these areas. The other reason is that lymphoid-system samples often need immunohistochemistry to diagnose.

5. CONCLUSION

This study has demonstrated that pathologists require a greater amount of advice for samples of articular and bone tissue, soft tissue and the lymphoid system. These results can be used to inform successful implementation of telepathology systems, which are important for consultation in rural and remote areas.

- **Conflict of interest:** The authors declare that there is no conflict of interest in this study.
- **Author's contribution:** All authors contributed to the conception and design of the study, acquisition and interpretation of data, and drafting the article. All authors read and approved the final version of the article to be submitted.
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The International Medical Informatics Association (IMIA) Announces the Winners and Finalists of the MedInfo2015 Best Papers Awards

02 September 2015 (São Paulo – SP, Brazil) – The International Medical Informatics Association (IMIA) is pleased to announce that the winners of the MedInfo2015's Best Paper Awards. The Winners of the MedInfo2015 Best Papers Awards were announced and recognized at the closing ceremonies of the congress on August 23rd, 2015 in São Paulo, Brazil.

The highest scoring papers from the Scientific Review Committee, the quality of the paper and the quality of the presentation and answering questions from the audience was the criteria used for the selection of candidates for the awards. The Best Paper Review Committee consisted of three volunteers, Dr. Suzanne Bakken, Columbia University from the U.S.A., Dr. Christian Nohr, Aalborg University from Denmark, and Dr. Umberto Tachinardi, University of Wisconsin from the U.S.A.

The Gold Award was presented to Ferdinand Dhombres for his paper "Extending the Coverage of Phenotypes in SNOMED CT through Post-coordination" with co-authors being Rainer Winnenburger, James T. Case, and Olivier Bodenreider.

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