INFOKES : Jurnal Ilmiah Rekam Medis dan Informatika Kesehatan E-ISSN : 2745 – 5629
Volume 16 Issue 1 2026 page : 105 - 114

A New Formative Assessment for Indonesian Medical Records Education: Validating DOPSAT-RSP

Untoro Dwi Raharjo[1]*, Rizky Yuspita Sari[1], Resia Perwirani[2], Jannatul Iza Ahmad Kamal[3]

[1]Medical Record and Health Information Department, Faculty of Health, Universitas Jenderal Achmad Yani Yogyakarta, Indonesia
[2]RSUP Hospital of Surakarta, Indonesia
[3]Faculty of Information Science, University Teknologi MARA (UiTM), Malaysia

Email: untorodr.unjaya@gmail.com*

Submitted : 15 December 2025 Accepted : 9 February 2026 Accepted : 14 February 2026

ABSTRACT

The assessment of practical skills among Associate Degree or Diploma 3 students of Medical Records and Health Information (MRHI) during field practice (PKL) lacks a standardized workplace-based assessment (WPBA) instrument, resulting in variations across institutions and potential subjectivity in evaluation. While Direct Observation of Procedural Skills (DOPS) is effective in clinical assessment but not fully suited to the non-clinical context of MRHI practice. This study aimed to modify DOPS into a formative assessment tool for MRHI field practice and to examine its validity and reliability. A research and development design was applied. The modified instrument, DOPSAT-RSP, underwent content validity testing by ten experts using the Content Validity Index (CVI) and Content Validity Ratio (CVR). Reliability testing included inter-rater reliability using Weighted Cohen's Kappa and internal consistency using Cronbach's alpha, involving two raters and 39 students. All items met content validity criteria (I-CVI ≥0.900; CVR ≥0.800; S-CVI =0.950). The Weighted Kappa value (0.774) indicated strong inter-rater agreement, while Cronbach's alpha (0.952) demonstrated excellent internal consistency. The DOPSAT-RSP instrument is valid and reliable for formative assessment of D-3 RMIK students' practical skills during PKL and shows potential for wider implementation with user training.

Keywords: Direct Observation of Procedural Skills; Educational Measurement; Workplace-based assessment, Health Records; Clinical Competence

INTRODUCTION

Quality education in Medical Records and Health Information (MRHI) serves as a foundation for the sustainability of the Medical Records and Health Information profession or PMIK in Indonesia. Education precedes professional practice in healthcare and should be designed in a structured and systematic manner to achieve optimal learning outcomes (1). Various standardized assessment methods have been developed to evaluate learning processes and outcomes, enabling objective measurement of students' expected competencies (2).

One assessment area of particular concern in Associate Degree or Diploma 3 of MRHI education is the evaluation of students' practical skills achievement during field practice. As a vocational program, field practice provides a learning environment in healthcare settings aimed at strengthening practical skills in medical records services among Associate Degree MRHI students (3–5). Although field practice has long been implemented, limited studies have evaluated its effectiveness in developing practical competencies of Associate Degree MRHI students. In Indonesia, research on educational aspects in the MRHI field remains scarce. This condition reflects the presence of underexplored areas that are valuable for advancing MRHI scientific development.

Assessment of field practice learning outcomes may be conducted through evaluation of both processes and results. Along with the advancement of health professions education, practical assessment in healthcare facilities has shifted from written examinations toward workplace-based assessment (WPBA), emphasizing real-performance evaluation through formative and summative assessment (6). This approach allows direct observation of student competence in authentic work contexts (7–9). Studies have reported that WPBA implementation contributes to improved practical skills, enhanced student confidence, and greater flexibility in clinical practice learning across health profession education. Additionally, it has been demonstrated that WPBA greatly enhanced the clinical core competencies of residents in Emergency General Surgery, including clinical

skill, patient management, communication and teamwork, professional ethics, and ongoing learning (42). According to a study by Sandika and Veena, the use of workplace-based assessment help to boost the relational competences evaluation, enhanced perioperative teaching and learning, and increased the feedback quality and efficacy in surgical training programs (43).

Several WPBA instruments for procedural skills assessment have been widely developed and applied, including Direct Observation of Procedural Skills (DOPS) (2,10–12), Objective Structured Assessment of Technical Skills (OSATS) (13), and Clinical Examination and Procedural Skills (CEPS) (10), which have become standard instruments across various health disciplines.

Despite the implementation of skills assessment in the field practice, a standardized instrument specifically designed to assess students' procedural competence for Associate Degree MRHI programs is not yet available. Consequently, each institution independently develops its own assessment tools, resulting in substantial variations among higher education institutions (14). These differences occur not only in assessment components but also in scoring ranges, passing criteria, and competency thresholds. Such inconsistency may create difficulties for assessors or preceptor in interpreting evaluation indicators and increase the risk of inaccurate grading due to instruments lacking established validity and reliability. As emphasized by Vanteemar S, Sreeraj et al.(2019), clinical practice assessment planning should consider the principles of cost-effectiveness, acceptability, reliability, validity, and educational impact (CARVE) to ensure that instruments are simple, effective, and efficient (15).

Direct Observation of Procedural Skills (DOPS) is a WPBA instrument widely used in procedural skills assessment across healthcare disciplines (9–12,16–18). Several studies report that students assessed using DOPS demonstrate better skill improvement compared to control groups in clinical practice (10,19–21). Students also express higher satisfaction due to immediate feedback from clinical supervisors regarding performed procedures (10,22). This mechanism also assists educators in adapting their teaching strategies to the learning development of students by taking into account positive teaching factors. Practical assignments are guaranteed to stay in accordance with learning objectives and professional expectations due to this cyclical approach to feedback and evaluation (45). DOPS improves performance, practical skills, and confidence in learners when it is used consistently, involves students in the process, and gives them direct feedback. On the other hand, inconsistent use could make assessments in the workplace less effective (45, 46).

The development and implementation DOPS have been widely applied to assess students' clinical skills, particularly in anesthesiology and surgical practice, such as the DOPS instrument developed by the Australian and New Zealand College of Anaesthetists (ANZCA). Kalej et al. adapted DOPS to meet assessment needs in speech therapy procedures and reported satisfactory content validity index (CVI) and content validity ratio (CVR) results. Similarly, Chen specifically modified DOPS for splinting skills assessment in occupational therapy, demonstrating that DOPS adaptation can be tailored to highly specific procedural competencies. Moore, Vaughan, and Butterworth modified DOPS for podiatry practice and, despite being tested on a limited sample, reported positive educational impact (23).

However, to date, no studies have reported the modification or implementation of DOPS for assessing field practice in MRHI education, including in Indonesia. This research gap underscores the necessity of modifying and validating a DOPS-based instrument tailored to the RMIK field practice context. However, the original DOPS instrument cannot be directly applied to assess procedural skills of Associate Degree MRHI students during field practice, as its indicators are designed for clinical procedures. In Associate Degree MRHI field practice, assessed skills are non-clinical, involving management of health data and medical record information, both manual and electronic (24,25). These distinct practice characteristics necessitate adaptation of assessment indicators and components to ensure DOPS relevance for the Associate Degree MRHI field practice context and to enhance fulfilment of CARVE principles in its application.

A preliminary study conducted at the Associate Degree of MRHI Program of Universitas Jenderal Achmad Yani Yogyakarta revealed that procedural skills assessment instruments used in field practice have not fully adopted WPBA principles and tend to change over time. This situation creates challenges for preceptors and academic supervisors, who must continuously adjust to different instruments. Additionally, differing perceptions in assessment frequently occur, potentially leading to bias and subjectivity due to inconsistent components and scoring systems. Therefore, modification of the DOPS instrument is viewed as an innovative alternative to address these issues. In this study, the modified and tested DOPS instrument is named the Direct Observation Practical Skill Assessment Tools – Raharjo, Sari, and Perwirani version (DOPSAT-RSP), emphasizing its distinct evaluation domain from previously developed DOPS instruments for student practical skills assessment.

METHODS

This study employed a Research and Development (R&D) design aimed at modifying the DOPS instrument to meet the assessment needs of students' practical skills during field practice of Associate Degree MRHI program. The modified instrument was named DOPSAT-RSP. Subsequently, the DOPSAT-RSP instrument was subjected

to content validity and reliability testing involving evaluations from expert panels. The finalized DOPSAT-RSP instrument will also be accompanied by a user manual describing its application in the assessment process. Data collection in this study was conducted through a cross-sectional questionnaire completed by experts. Through this approach, the collection of expert judgments can be obtained at a single point in time. It has also been shown that cost-effective data collection, simultaneous assessment of multiple variables, and identification of patterns within the expert group can also be achieved (44). Our research was under the process that explained in the flowchart below:

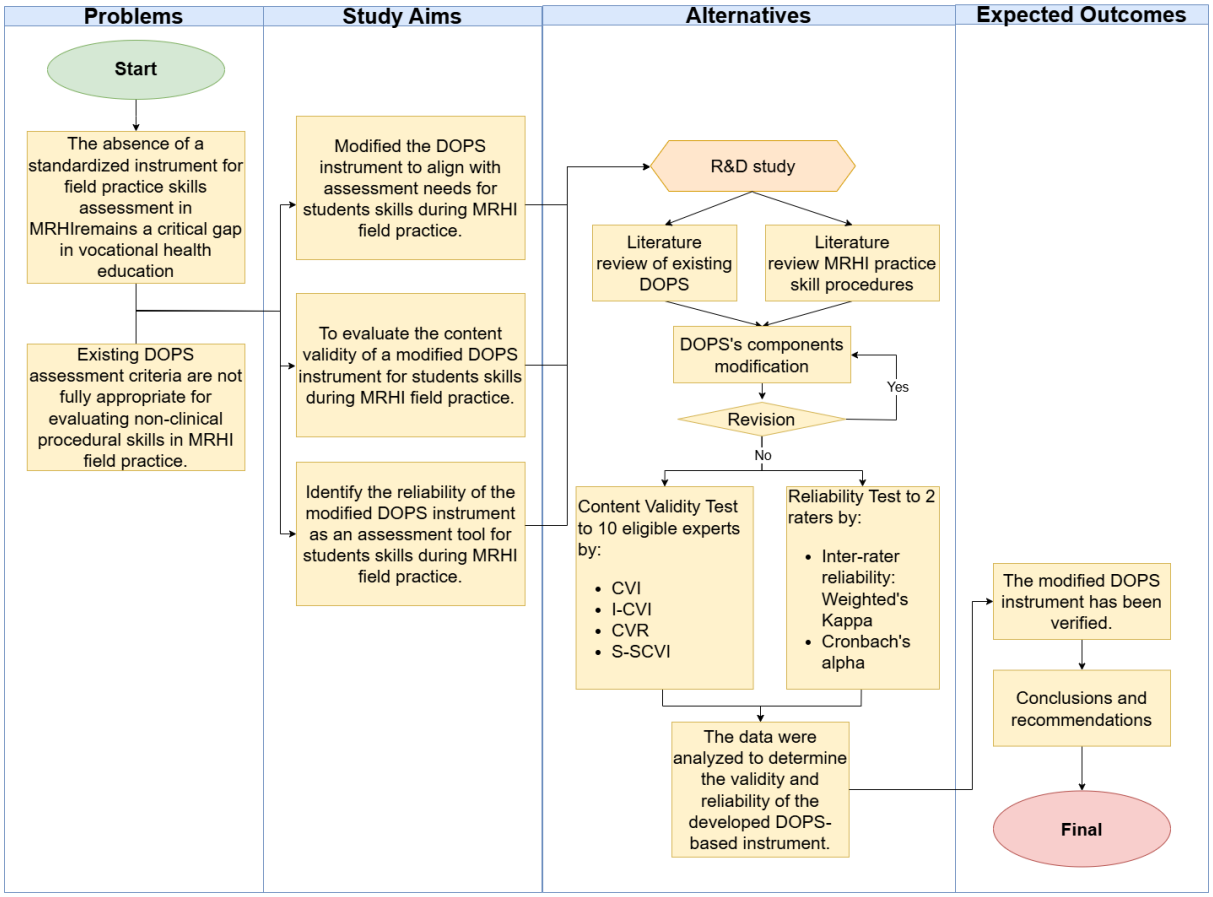

Figure 1. Research Stages Flowchart

Population and Sample
Content Validity Testing

Content validity of the DOPSAT-RSP instrument was evaluated by ten experts, following Lynn's recommendation (26). Experts were selected using purposive sampling from: the Association of Higher Education Institutions in Medical Records and Health Information Management in Indonesia (APTIRMIKI) (two experts), the Indonesian Professional Association of Medical Records and Health Information (PORMIKI) (two experts), the PMIK Collegium (two experts), experts in health professional education (two experts), and field preceptors from hospitals (two experts). The inclusion criteria for expert panellists were as follows:

1. At least five years of experience in medical records and health information education, health information management, or clinical practice in health professions education.
2. Minimum educational qualification of a Master's degree (S-2) and/or certification in preceptorship or clinical instruction.
3. At least five years of experience in supervising field practice or serving as clinical instructors.
4. Experience in developing learning strategies for field practice in Associate Degree of MRHI program.

Reliability Testing

Reliability testing was conducted through the application of the DOPSAT-RSP instrument by two raters to identify agreement in using the newly developed instrument. Raters were selected using purposive sampling. The inclusion criteria were:

1. At least five years of experience in medical records and health information education or health information management.
2. Minimum educational qualification of an Associate Degree of MRHI.
3. At least three years of experience in supervising field practice.

Assessment Subjects

The assessment subjects of the DOPSAT-RSP instrument consisted of 39 students who were observed using the DOPSAT-RSP during field practice, as recommended by Bujang and Baharum (27). Participants were selected through accidental sampling while undertaking field practice at RSUP Hospital of Surakarta. The inclusion criterion was enrolment as Associate Degree MRHI students participating in field practice activities.

Statistical Analysis

Based on Lynn (28), data for content validity testing were collected by distributing the instrument to expert panellists, who rated each item using a 4-point scale: 1 = not relevant, 2 = somewhat not relevant, 3 = relevant, and 4 = highly relevant. Ratings of 3 and 4 were interpreted as indicating valid items. Content validity of the DOPSAT-RSP instrument was determined using the Content Validity Index (CVI), Content Validity Ratio (CVR), Item-Level Content Validity Index (I-CVI), and Scale-Level Content Validity Index (S-CVI). Interpretation of content validity followed established criteria (29–31). As ten experts participated in the content validity assessment, the acceptance thresholds applied were I-CVI > 0.900 and CVR ≥ 0.800, based on the table below:

Table 1. Critical Value of Content Validity Index

Jumlah Penilai	Proporsi I-CVI	Nilai Kritis CVR
5	1	1
6	1	1
7	1	1
8	0,875	0,775
9	0,889	0,889
10	0,900	0,800

Reliability of the DOPSAT-RSP instrument was identified using the inter-rater reliability method involving two raters. The instrument was tested using Weighted Cohen's Kappa, based on the assumption that the assessment scale was ordinal and that two raters were involved. Interpretation of Kappa values followed the criteria proposed by Landis and Koch (32), as presented in Table 2.

Table 2. Inter Rater Reliability Weighted Cohen's Kappa Interpretation

Nilai *Kappa*	Tingkat Kesepakatan	% Data yang Reliabel
0 – 0,20	Not reliable	0-4%
0,21-0,39	Minimal	4-15%
0,40-0,59	Weak	15-35%
0,60-0,79	Moderate	35-63%
0,80-0,90	Strong	64-81%
>0,90	Almost perfect	82-100%

Internal Consistency Analysis

Internal consistency of the modified DOPSAT-RSP instrument was assessed using Cronbach's alpha to determine the instrument's internal reliability. Statistical analysis in this study was conducted using JASP software version 0.19.3.

Ethical Approval

This study received ethical approval from the Ethics Committee of RSUP Hospital of Surakarta under reference number BP.01.01/17/08/2025.

RESULTS

The draft instrument was developed collaboratively by the research team through both online and in-person discussions. The DOPSAT-RSP draft was constructed based on several key references:

1. Assessment aspects derived from existing DOPS instruments.
2. The Decree of the Minister of Health of the Republic of Indonesia No. HK.01.07/Menkes/1424/2022 concerning the National Competency Standards for Medical Records and Health Information.
3. The Decree of the Minister of Health of the Republic of Indonesia No. 312/2020 concerning the Professional Standards for Medical Records and Health Information.
4. The Health Information Manager (HIM) Professional Competency Standards Version 4.0 from HIMAA.
5. The 2018 AHIMA Health Information Management Curricula Competencies from AHIMA.

DIRECT OBSERVATION OF PRACTICAL SKILL ASSESSMENT TOOL
RAHARJO. SARI & PERWIRANI VERSION
(DOPSAT-RSP)

Nama Mahasiswa : ..... **Nama Penguji** : .....
NIM/NPM : ..... **Unit Kerja** : .....
Semester : ..... **Tanggal** : .....
Nama Prosedur:

- ☐ Analisis Rekam Medis
- ☐ Registrasi Pasien
- ☐ Kodifikasi
- ☐ Statistik Fasyankes
- ☐ Lainnya

No	Komponen Penilaian	Sangat di bawah harapan (0-2)	Di bawah harapan (3-5)	Sesuai harapan (6-7)	Di atas harapan (8-9)
1	Persiapan awal sebelum kegiatan				
2	Kemampuan memanfaatkan data dan informasi kesehatan yang mendukung kegiatan				
3	Menunjukkan keterampilan teknis dalam kegiatan yang dilakukan				
4	Menerapkan alur dan prosedur dalam kegiatan yang dilakukan				
5	Kemampuan manajemen alat dan waktu dengan tepat dan efisien				
6	Kemampuan komunikasi efektif				
7	Menunjukkan sikap profesioalisme dan minat belajar				
8	Mengutamakan keselamatan pasien				
9	Kemampuan berpikir kritis dalam pengambilan keputusan				
10	Keseluruhan performa pada kegiatan yang dilakukan				

Lama waktu observasi: … menit
Lama waktu umpan balik : … menit
Kepuasan penggunaan DOPSAT-RPS

- Penguji (Rendah) 1 2 3 4 5 6 7 8 9 10 (Tinggi)
- Mahasiswa (Rendah) 1 2 3 4 5 6 7 8 9 10 (Tinggi)

Masukan bagi mahasiswa:

Tempat, dd/mm/yyyy
(ttd & nama penguji)

Tempat, dd/mm/yyyy
(ttd & mahasiswa)

Figure 2. Direct Observation of Practical Skill Assessment Tool versi Raharjo, Sari dan Perwirani (DOPSAT-RSP) Instrument

Content Validity Analysis

Content validity testing was conducted using Microsoft Excel. Content validity was assessed across three aspects: relevance, clarity, and necessity. The analysis included Content Validity Index (CVI), Content Validity Ratio (CVR), Item-Level Content Validity Index (I-CVI), and Scale-Level Content Validity Index (S-CVI). After obtaining expert ratings, the research team recoded the scores assigned by the experts. Ratings of 1 and 2 were recoded as 0, indicating disagreement with the proposed assessment components, while ratings of 3 and 4 were recoded as 1, indicating agreement with the proposed assessment components. The results of the DOPSAT-RSP instrument content validity analysis from expert evaluations are presented in Table 3.

Following calculation of the draft DOPSAT-RSP assessment, content validity indices were computed for the aspects of relevance, clarity, and necessity. All I-CVI values exceeded the minimum threshold of 0.900, and CVR

values for each item ranged from 0.800 to 1.000. Referring to the critical CVR value for ten experts (0.800), all instrument items were classified as essential and valid.

Table 3. Content Validity Results of Direct Observation Practical Skill Assessment Tool (DOPSAT-RSP)

Code	Component	Relevance	Clarity	Necessity	I-CVI	CVR	S-CVI
I1	Persiapan awal sebelum kegiatan	0.900	0.900	0.900	0.900	0.800	0.950
I2	Kemampuan memanfaatkan data dan informasi kesehatan yang mendukung kegiatan	0.900	0.800	1.000	0.900	0.800	
I3	Menunjukkan keterampilan teknis dalam kegiatan yang dilakukan	1.000	1.000	1.000	1.000	1.000	
I4	Menerapkan alur dan prosedur dalam kegiatan yang dilakukan	1.000	0.900	1.000	0.967	0.933	
I5	Kemampuan manajemen alat dan waktu dengan tepat dan efisien	0.900	0.900	1.000	0.933	0.867	
I6	Kemampuan komunikasi efektif	1.000	0.900	1.000	0.967	0.933	
I7	Menunjukkan sikap profesioalisme dan minat belajar	0.900	0.900	1.000	0.933	0.867	
I8	Mengutamakan keselamatan pasien	0.900	1.000	1.000	0.967	0.933	
I9	Kemampuan berpikir kritis dalam pengambilan keputusan	1.000	0.900	1.000	0.967	0.933	
I10	Keseluruhan performa pada kegiatan yang dilakukan	1.000	0.900	1.000	0.967	0.933	

Furthermore, the obtained S-CVI value was 0.950, indicating a very high level of agreement among experts regarding the overall content validity of the instrument. Considering the number of experts involved, an I-CVI value of 0.900 indicates that 9 out of 10 experts rated the item as valid and relevant, while I-CVI values of 0.967 and 1.000 indicate that all 10 experts rated the items as relevant. Similarly, a CVR value of 0.800 indicates that 9 out of 10 experts considered the item essential, whereas CVR values of 0.933 and 1.000 indicate that all experts (10 experts) judged the items as essential. Therefore, it can be concluded that all items in this instrument demonstrate excellent content validity.

Reliability Analysis

Data collection for inter-rater reliability testing was conducted at RSUP Surakarta and involved two raters who independently assessed students using the DOPSAT-RSP instrument. The assessment process included 39 students from the D-3 Medical Records and Health Information study program who were undertaking field practice. These students served as the observed subjects whose practical skills were evaluated using the instrument.

Table 4. Characteristic of participants (n=34)

Variables	Frequency (n)	Percentage (%)
Sex		
Female	32	82.05
Male	7	17.95

Variables	Frequency (n)	Percentage (%)
Semester		
2	6	15.38
4	24	61.54
6	9	23.08
Assessed Skills		
Filing	13	33.33
Entry claim	1	2.56
Inpatient discharge procedure	2	5.13
Assembling	2	5.13
Medical record documentation review	3	7.69
Statistics	3	7.69
Disease coding	10	25.64
Patient registration	5	12.82

Table 5. Responses of Rater and Students during DOPSAT-RSP Trial

Variables	Mean (SD)
Average activity duration	6.74 ± 3.68
Average feedback time	5.26 ± 3.08
Average rater satisfaction with DOPSAT-RSP	8.00 ± 0.00
Average student satisfaction with DOPSAT-RSP	8.08 ± 0.27

The majority of research participants were female (82.05%) and were in the fourth semester (61.54%). The most frequently assessed skills were Filing (33.33%) and Disease Coding (25.64%). These findings indicate that administrative and medical record processing activities constituted the main focus of formative assessment during field practice. The average duration of each assessment session was 6.74 minutes, while feedback provision averaged 5.26 minutes. The level of satisfaction with the use of the DOPSAT-RSP instrument was high, as reported by both raters (mean score 8.00) and students (mean score 8.08). indicating good acceptability of the instrument.

Reliability analysis was conducted using JASP version 0.95.2. Inter-rater reliability was examined using the Weighted Cohen's Kappa test. while internal consistency was assessed using Cronbach's alpha to determine the internal reliability of the DOPSAT-RSP instrument. The results of the statistical analyses are presented as follows:

Table 6. Reliability Test Results of DOPSAT-RSP

Statistical Tests	Results	SE	CI 95%		Interpretation
			Lower	Upper	
Weighted Kappa	0.774	0.124	0.532	1.000	Substantial (Strong)
Cronbach's alpha	0.952	0.010	0.932	0.972	Very High

The analysis showed a Weighted Cohen's Kappa value of 0.774 (SE = 0.124) with a 95% confidence interval of 0.532–1.000. According to the criteria of Landis and Koch, this value falls into the category of substantial agreement. indicating strong and consistent inter-rater agreement in the use of the DOPSAT-RSP instrument. Cronbach's alpha was calculated to assess the internal reliability of the instrument. The results showed an alpha value of 0.952 (SE = 0.010) with a 95% confidence interval of 0.932–0.972. This value indicates very high internal consistency, suggesting that the items within the instrument consistently measure the same construct of procedural skills.

Overall, the reliability findings demonstrate that the DOPSAT-RSP instrument has excellent reliability, both in terms of inter-rater agreement and internal consistency of its assessment components. Therefore, DOPSAT-RSP is appropriate for use as a formative assessment instrument for evaluating the procedural skills of Associate Degree MRHI students during field practice.

DISCUSSION

This study represents the first development of a workplace-based practical skills assessment instrument in the field of Associate Degree MRHI in Indonesia. The assessment instrument was adapted from DOPS, which has been widely applied for clinical skills assessment among medical. nursing. and other health professional students (9,18,20,33,34). Content validity testing involved ten experts in clinical practice and MRHI to achieve consensus on content validity. consistent with established recommendations for expert-based validation (35). The content validity results demonstrated high I-CVI. CVR. and S-CVI values, indicating that the assessment components of

DOPSAT-RSP are appropriate and relevant for evaluating students' practical skills according to expert judgment. Although DOPSAT-RSP is designed as a formative assessment for non-clinical skills. its assessment framework was developed by adopting the core observational phases of conventional DOPS, namely preparation, procedural implementation, closure, and overall performance assessment (36). This approach aligns with previous studies on DOPS modification. in which assessment components were structured from initial preparation to final performance evaluation to ensure comprehensive appraisal of learner competence (23,37). This structure enables evaluators to assess students' ability to identify required tools and resources, apply technical and non-technical skills. and perform procedural tasks systematically (38).

In this study, although DOPSAT-RSP does not assess clinical procedures, it achieved high validity and reliability because its assessment components were derived from national regulations and standard operating procedures governing professional practice in MRHI services. Consequently, the characteristics of DOPSAT-RSP differ from conventional DOPS instruments, as they reflect non-clinical service activities specific to medical records and health information management. The selection of assessment items was guided by three key criteria: relevance. clarity. and necessity. which were explicitly evaluated by expert reviewers (35,39). The high CVI and CVR values across these criteria confirm excellent content validity of the instrument for assessing students' competence during field practice.

Reliability testing further demonstrated that DOPSAT-RSP possesses strong psychometric properties. The Weighted Cohen's Kappa indicated substantial inter-rater agreement. while Cronbach's alpha showed very high internal consistency. These findings confirm that DOPSAT-RSP can be consistently applied by different raters and that its assessment items coherently measure the intended construct of procedural competence. Moreover, raters observed students across eight different MRHI service activities. Despite variations in the observed tasks, the instrument maintained strong reliability, suggesting its applicability across diverse practical service contexts. This finding is consistent with previous research indicating that high reliability supports broader implementation of an assessment instrument (40,41).

As an initial development study, further research is still required. The present study did not evaluate the effectiveness of DOPSAT-RSP implementation in field learning processes, including ease of use. assessor and student satisfaction. and the impact of formative feedback on students' skill development. Additionally, further evaluation of the assessment components under varied field conditions and across a wider range of practical competencies is necessary. Finally, capacity building for field preceptors in using DOPSAT-RSP is essential to ensure consistent understanding and optimal application of the instrument as a formative assessment tool for Associate Degree MRHI students.

CONCLUSION

The DOPSAT-RSP instrument is the first assessment tool specifically developed to observe and evaluate the practical skills of MRHI students during field practice. The instrument demonstrated high content validity and reliability indicating that DOPSAT-RSP is suitable for use as a formative assessment tool in field practice for MRHI students. Prior to implementation, training or socialization sessions are recommended to ensure that both preceptors and students can apply the DOPSAT-RSP instrument appropriately and consistently. Due to the nature of workplace-based assessments being non-standardised and evaluated by different preceptors, a strategically structured assessment instrument is crucial to help promote greater consistency in grading practical performance. The presence of an appropriate mechanism helps ensure fair and balanced evaluations of students' overall practical competency. Further refinement and in-depth evaluation are necessary to determine the effectiveness of DOPSAT-RSP as a formative assessment in the Associate Degree in MRHI field practice and to support continuous improvement of practical skills assessment instruments in MRHI education.

ACKNOWLEDGMENTS

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