

Profile of evidence-based practice among respiratory therapists in Taiwan

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Running title: evidence-based practice of respiratory therapists

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Abstract

BACKGROUND: Evidence-based practice (EBP) has been proposed as a core competence to improve healthcare quality. The profile of EBP among respiratory therapists (RTs) has not been explored yet. **OBJECTIVE:** The current study was to investigate how RTs perceived the implementation of EBP. **METHODS:** A postal questionnaire survey was conducted for the RTs in Taiwan's regional hospitals during a four-month period in 2011. **RESULTS:** A majority of RTs were aware of EBP (88.0%). Although most RTs hold a favorable impression of EBP, their knowledge of and skill in EBP implementation were deficient. Only half of RTs have implemented EBP for clinical service. Insufficient convenient kits (59.1%), deficient designated personnel (50.0%), and lack of time (45.5%) were major barriers to implementing EBP. RTs rated MEDLINE as the most commonly used evidence-based retrieval database, followed by UpToDate, the Cochrane Library, MD Consult, ProQuest, CINAHL, DynaMed, and Micromedex. Multivariate regression analyses demonstrated sufficient skill in EBP and usage of online database as favorable factors for implementing EBP. In contrast, barriers of time constraint and insufficient knowledge were unfavorable factors for the implementation of EBP.

CONCLUSIONS: Our findings indicate that EBP is not widespread among RTs. We have identified important factors in relation to the implementation of EBP. The data

provide valuable evidence in plotting strategies for disseminating EBP
implementation.

Key Words: evidence-based practice, respiratory therapist, online database

Introduction

Evidence-based practice (EBP) is a clinical practice consistent with the current best evidence. It integrates clinical epidemiology, biostatistics, research methods, and informatics into health care.^{1,2} The process of EBP mainly involves four sequential steps: (1) framing a clear question based on a clinical problem, (2) searching relevant evidence from the literature, (3) critically appraising the validity of contemporary research, and (4) applying the findings to clinical decision-making.³

Respiratory care is increasingly utilized, with the associated respiratory therapists (RTs) playing an important role in supporting related clinical services.⁴⁻⁷ EBP has been proposed as a useful means to improve healthcare outcomes for RTs.⁸⁻¹¹ Therefore it's essential to assess how RTs implement EBP in clinical decision-making. A number of examples have illustrated that although a majority of medical, nursing, pharmacological, and allied health professions hold positive attitudes toward EBP, their knowledge and skill pertaining to its implementation are relatively insufficient.¹²⁻¹⁸ Whether RTs practice with evidence and, if so, how, has been unclear.¹⁹

RTs have to deal with a broad range of medical problems in clinical practice.²⁰ They play an important role in the prevention and management of respiratory diseases.²¹ Timely acquired relevant information is important for their clinical

practice. Access to evidence-based information can help facilitating an effective management. Therefore, how to obtain current evidence-based knowledge is a critical skill. Nevertheless, only few studies surveyed the behavior of RTs in searching for evidence-based information.

In the current questionnaire study, we systematically examined how RTs actually perceive EBP. This nationwide study allowed us an opportunity to understand various levels of awareness of, belief in, attitude toward, knowledge of, skill in, implementation of, and barriers to EBP. These data will shed some light on overcoming barriers to improving the effectiveness of EBP implementation.

Methods

Design

A structured questionnaire was developed by the National Health Research Institutes (NHRI) using questions based on our previously reported questionnaires.^{13,22} This study was conducted for the four-month period between January and April 2011.

Subjects

Targets were RTs working in Taiwan's regional hospitals. A regional hospital is defined as a secondary-care hospital, as appraised by Taiwan's Joint Commission of Hospital Accreditation. Cluster sampling was used to conduct the present study.

Briefly, the regional hospitals were divided into four clusters by location (northern, western, eastern and southern Taiwan) and a random sample of each cluster was selected. Since there were more hospitals in the northern and western Taiwan, we selected more hospitals in these areas. For the present study we randomly enrolled 11 of the 65 regional hospitals in Taiwan, including 3 located in northern Taiwan, 4 in western Taiwan, and 2 each in eastern and southern Taiwan. The postal questionnaires were distributed to all RTs at the enrolled hospitals.

Questionnaire

The survey included items for measuring the profile of EBP — including the awareness of, belief in, attitude toward, knowledge of, skill in, barriers to, training for, and implementation of EBP. Questions regarding the belief, attitude, knowledge, skill, and barriers of participants were rated by Likert's 5-point scale (strongly agree, agree, neutral, disagree, and strongly disagree). The questions regarding the awareness, belief, attitude, knowledge, skill, and implementation of EBP were listed as follows:

1. Awareness: Have you heard of EBP (evidence-based practice) or related terms, such as EBM (evidence-based medicine), EBN (evidence-based nursing) or EBHC (evidence-based health care)?
2. Belief: Do you believe EBP is important for the improvement of patient care quality?

3. Attitude: Are you willing to support the promotion of EBP implementation?
4. Knowledge: Do you have sufficient knowledge to implement EBP principles?
5. Skill: Do you possess enough skill to implement EBP principles?
6. Implementation: Have you searched relevant evidence from the literature to solve your clinical question, and then applied the findings into clinical decision-making after critical appraisal in the past year?

Background characteristics — including gender, age, faculty position, administrative position, working experience, and academic degree — were also examined.

Eight resources of searching for professional information were measured: Web portals (e.g., Google, Yahoo), electronic textbooks, online databases, electronic journals, printed journals, colleague consultations, textbooks, and continuing education (such as conferences). The frequency was classified by Likert's 5-point scale (always, often, sometimes, seldom, and never).

In addition, the questionnaire explored the usage of access to 8 commonly used online databases, including the Cumulative Index to Nursing & Allied Health Literature (CINAHL), the Cochrane Library, MD Consult, MEDLINE, ProQuest, UpToDate, Micromedex, and DynaMed. These 8 databases were selected because of their popularity. MEDLINE is freely accessible, while the other databases require payment from individuals or their organizations. Since 2007 the National Health

Research Institutes has provided free access to the Cochrane Library for enrolled regional hospitals.

Validity and reliability

Content validity was examined by 10 experts with more than 15 years of clinical experience each. The internal consistency of all indexes was estimated by using Cronbach's coefficient alpha. In this survey, the content validity index of 0.96 and Cronbach's coefficient alpha of 0.88 indicated sufficient validity and reliability of the parameters in the questionnaire.

Ethical considerations

The Ethical Review Board of the National Health Research Institutes approved the study protocol. The questionnaire was accompanied by an introductory letter stating the purpose of this study and promising confidentiality. Return of the completed questionnaire was considered as consent for participation.

Statistical analyses

The Likert's 5-point scale was dichotomized for further analyses. A self-rating report of either "strongly agree" or "agree" was regarded as a favorable answer and the other three ("neutral," "disagree," and "strongly disagree") were viewed as unfavorable answers. Similarly, a self-rating report of either "always" or "often" was

regarded as a favorable answer and the other three (“sometimes,” “seldom,” and “never”) were viewed as unfavorable answers. The statistical analyses were conducted using SPSS 12.0 for Windows (SPSS Inc., Illinois, USA). Categorical variables were analyzed using the chi-square or Fisher’s exact test when appropriate. Significance was defined as $p < 0.05$.

Results

Demographic data

A total of 86 questionnaires were distributed to RTs, with 50 returns being valid for analysis (valid return rate: 58.1%). The demographic information of RTs is shown in Table 1. The average age and working period were $32.8 \text{ years} \pm 6.0 \text{ years}$ and $4.8 \text{ years} \pm 4.7 \text{ years}$, respectively. Three RTs had a master’s degree (6.0%), while 34 had a bachelor’s degree (68.0%), 10 had a junior college’s degree (20.0%), and the rest had a degree from a technical school (6.0%). Furthermore, 13 RTs were faculty members (26.0%) and 5 were directors (10.0%).

Awareness of, belief in, attitude toward, knowledge of, skill in, and training for

EBP of respondents

A total of 44 RTs (88.0%) were aware of EBP. Their belief in, attitude toward, knowledge of, and skill in EBP are shown in Figure 1. Thirty-eight RTs believed that

EBP is important for the improvement of patient-care quality (86.4%). In addition, 27 RTs stated that they were willing to support the implementation of EBP (61.4%). However, their knowledge of implementing EBP principles (29.5%) and skill in implementing EBP principles (15.9%) were relatively insufficient. Of the 44 RTs who were aware of EBP, 11 RTs (25.0%) had participated in a training course for EBP implementation.

Barriers to implementing EBP

The barriers to implementing EBP are illustrated in Figure 2. The most common barrier was insufficient convenient kits (such as personal digital assistants, software, sketches, diagrams, flysheets, manuals, guidebooks, molds, and brochures) (59.1%). The following common barriers included deficient capable designated personnel (50.0%), time constraints (45.5%), deficient skill in critical appraisal (40.9%), deficient skill in literature searching (40.9%), insufficient library resources (34.1%), difficulty in forming answerable questions (34.1%), deficient basic knowledge (34.1%), deficient space for use (31.8%), lack of incorporation with clinical practice (20.5%), lack of organizational climate (13.6%), and lack of support from superiors (9.1%).

Behavior of EBP

Implementation of EBP

Among the 44 RTs who were aware of EBP, 25 reported they had implemented EBP in the past year (56.8%), including 2 RTs who had implemented EBP daily (4.6%), 1 weekly (2.3%), 4 monthly (9.1%), 9 quarterly (20.5%), and 9 yearly (20.5%). The remaining 19 RTs had not implemented EBP for clinical decision-making in the past year (43.2%).

Search of evidence-based information

Fifty RTs' information-searching behavior is shown in Figure 3. Of the eight resources, RTs most often searched for professional information via Web portals (84.0%), followed by colleague consultations (72.0%), continuing education (66.0%), evidence-based retrieval databases (58.0%), textbooks (56.0%), electronic journals (46.0%), electronic books (28.0%), and printed journals (22.0%).

The frequency of access to 8 commonly used online evidence-based retrieval databases is given in Figure 4. The most commonly used database was MEDLINE, followed by UpToDate, the Cochrane Library, MD Consult, ProQuest, CINAHL, DynaMed, and Micromedex.

Among the 44 RTs who were aware of EBP, 29 had accessed online evidence-based retrieval databases. Their motivations for accessing such databases are shown in

Table 2. The most common motivation was self-learning (100%), followed by clinical practice (89.7%), class assignment (72.4%), positional promotion (62.1%), instruction preparation (48.3%), research (37.9%), medical accreditation (31.0%), and insurance issue (6.9%).

Factors associated with EBP implementation

Factors in relation to the implementation of EBP are shown in Table 3. Compared with RTs without EBP implementation in clinical practice, RTs with EBP implementation were more likely to have sufficient skill in EBP ($p < 0.05$) and more often have accessed relevant online evidence-based retrieval databases ($p < 0.05$). In addition, RTs who listed time constraint ($p < 0.05$) and lack of basic knowledge ($p < 0.05$) as barriers were less likely to implement EBP than those who did not perceive these barriers. The behavior of information searching and demographic characteristics – including gender, position, working experience, age, and academic degree – carried no significant difference.

Discussion

In this study, we depict the profile of EBP among RTs of regional hospitals in Taiwan.

Our results demonstrate that a majority of RTs have a favorable perception of EBP.

However, their knowledge of EBP and skill pertaining to implementing it in clinical

decision-making are relatively insufficient. The findings are in accordance with reports for physicians, nurses, and the other allied health professionals.¹²⁻¹⁸ To our knowledge, this study is the first to explore the EBP profile of registered RTs.

There have been numerous efforts to verify the barriers to implementing EBP.^{13,23} Our results indicate that RTs encounter a number of impedances. Overall, lack of convenient kits and insufficient numbers of capable designated personnel were the most common barriers. Unlike medical centers, most regional hospitals are understaffed because of budget restraints. Since EBP is to a large extent a working framework, RTs need to find help from designated staff to overcome obstacles. Like the other health professionals, RTs lack sufficient time to search information in a pile of textbooks or journals. Thus, they require useful information that they can acquire at their own convenience. With the help of application kits and capable designated personnel, they could save time and overcome the constraints of insufficient knowledge and skill. In addition, RTs rated insufficient knowledge and skill as significant barriers to the practice with evidence. Only a minority of RTs had received EBP-related training. These findings can provide information for policymakers to plot strategies to disseminate the implementation of EBP for RTs. For example, education to enhance RTs' knowledge of EBP and their skill in its implementation may be helpful.

Our study has verified several factors in relation to the implementation of EBP. First, self-efficacy in the skill of EBP is the primary influence on its implementation. The finding is similar to previous reports indicating that health professionals who often implemented EBP had more sufficient skill.²⁴⁻²⁷ Second, lacking knowledge and time serve as two negative predictors. Taken together, our data support the importance of providing training courses to facilitate the implementation of EBP. The data concur with other available studies showing that teaching program can change the behavior of EBP implementation.^{3,28}

RTs used a wide variety of approaches to look for professional information. We found that Web portals were the most popular resource, possibly because access to Web portals is instant. However, information found via Web portals is not always accurate. On the other hand, online databases can offer evidence-based and summarized recommendations for clinical services to facilitate the integration of evidence into practice.²⁹ Our results demonstrate that a great proportion of RTs used online databases for self-learning and clinical service. In our study, RTs accessed MEDLINE the most, which is not surprising because it provides more information than the other databases. Our study is the first to identify the patterns of RTs' preferences in informational searching. The data can help the refining of strategies to promote the accessing of evidence-based information.

When compared with physicians in Taiwan,¹³ the knowledge and skills of EBP among RTs are relatively lower. The likely explanation is that physicians have been persuaded to follow EBP longer than RTs have. In Taiwan, the professionalism of respiratory therapist is still in the developing stage. In the past, RTs relied mainly on clear direction from physicians rather than their own decision-making. The regulatory standards for clinical practice and the process for attaining credential are not well-formulated until recent years.

There are limitations to our study. First, this is a self-administered survey, not an audit of actual practice. The results may not reflect the realities of practice under routine clinical care. Second, the return rate of this questionnaire survey was only 58.1%, though the rate is similar to other RTs questionnaire survey in Taiwan for different subject.³⁰ In order to obtain a higher responding rate, our study used a cluster sampling. Our previous works have shown a cluster sampling could obtain a higher responding rate than random sampling.³¹ Third, our sample size was small. Nevertheless, our study is the pioneer to evaluate the EBP profile of RTs. In spite of these limitations, our survey presents several potentially useful findings. Our study differs from previous ones on information-searching patterns in that we examined the behaviors of EBP in the context of clinical decision-making.

In conclusion, this cross-sectional survey provides baseline data about the

perceptions of EBP among registered RTs of regional hospitals in Taiwan. Although RTs recognize the value of EBP, few have acquired the ability to implement its principles. Thus, RTs in Taiwan are not ready for EBP because of insufficient knowledge and skills. The findings have important implication for educational and clinical issues to disseminate the EBP implementation into RTs. . We suggest RTs in the regional hospitals of Taiwan require more EBP-related training courses to improve their knowledge and skills.

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Author disclosures

The authors have no conflicts of interest to declare.

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Figure legends

Figure 1. Belief in, attitude toward, knowledge of, and skill in EBP among 44 RTs in the regional hospitals of Taiwan.

Figure 2. Perceived barriers to the implementation of EBP.

Figure 3. Behavior of searching for professional information.

Figure 4. Frequency of access to 8 commonly used online evidence-based retrieval databases.

Table 1. Demographic data of 50 respiratory therapists.

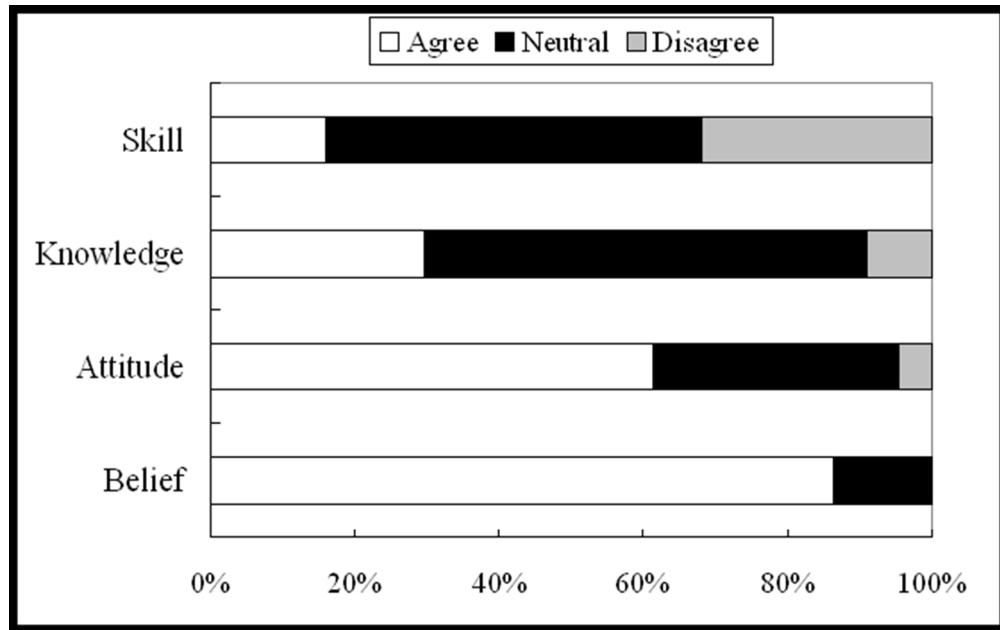
Characteristic	Number	%
Gender		
male	5	10
female	45	90
Age (y)		
20–30	16	32
31–40	28	56
41–50	6	12
Working experience (y)		
<5	31	62
5–10	15	30
>10	4	8
Academic degree		
technical school	3	6
junior college	10	20
bachelor's	34	68
master's	3	6
Faculty (%)		
yes	13	26
no	37	74
Director (%)		
yes	5	10
no	45	90

Table 2. Motivation of access to the evidence-based retrieval database.

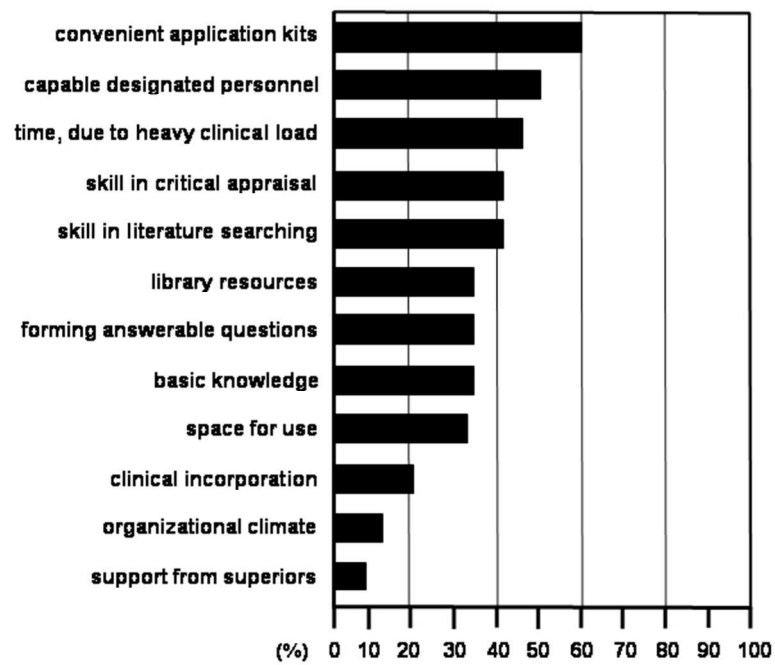
rank	motivation	n	%
1	self-learning	29	100
2	clinical practice	26	89.7
3	class assignment	21	72.4
4	positional promotion	18	62.1
5	instruction preparation	14	48.3
6	research	11	37.9
7	medical accreditation	9	31.0
8	insurance issue	2	6.9

Table 3. Factors associated with the implementation of EBP.

implementation of EBP	Yes N=25	No N=19	p
Belief	22 (88.0)	16 (84.2)	1.000
Attitude	17 (68.0)	10 (52.6)	0.300
Knowledge	8 (32.0)	5 (26.3)	0.682
Skill	7 (28.0)	0 (0.0)	0.014
Training	9 (36.0)	2 (10.5)	0.081
Barrier — difficulty in			
convenient application kits	16 (64.0)	10 (52.6)	0.447
capable designated personnel	13 (52.0)	9 (47.4)	0.761
time, due to heavy clinical load	8 (32.0)	12 (63.2)	0.040
skill in critical appraisal	8 (32.0)	10 (52.6)	0.168
skill in literature searching	8 (32.0)	10 (52.6)	0.168
library resources	7 (28.0)	8 (42.1)	0.328
forming answerable Questions	6 (24.0)	9 (47.4)	0.105
basic knowledge	5 (20.0)	10 (52.6)	0.024
space for use	8 (32.0)	6 (31.6)	0.976
clinical incorporation	3 (12.0)	6 (31.6)	0.144
organizational climate	5 (20.0)	1 (5.3)	0.213
support from superiors	3 (12.0)	1 (5.3)	0.622
Information searching			
skill in literature searching	22 (88.0)	10 (52.6)	0.009
resource of information			
Web portals	22 (88.0)	15 (78.9)	0.443
colleague consultations	18 (72.0)	13 (68.4)	0.797
continuing education	19 (76.0)	11 (57.9)	0.202
online databases	18 (72.0)	8 (42.1)	0.046
textbooks	12 (48.0)	11 (57.9)	0.515
electronic journals	13 (52.0)	7 (36.8)	0.317
electronic books	6 (24.0)	6 (31.6)	0.576
printed journals	4 (16.0)	5 (26.3)	0.467
Demographic characteristics			
female	24 (96.0)	17 (89.5)	0.570
director	4 (16.0)	4 (5.3)	0.370
faculty	8 (32.0)	5 (26.3)	0.682
working experience (y)			0.975
<5	14 (56.0)	11 (57.9)	
5–10	9 (36.0)	6 (31.6)	
>10	2 (8.0)	2 (10.5)	
age (y)			0.397
20–30	6 (24.0)	8 (42.1)	
31–40	17 (68.0)	9 (47.4)	
41–50	2 (8.0)	2 (10.5)	
academic degree			0.666
technical school	2 (8.0)	1 (5.3)	
junior college	3 (12.0)	5 (26.2)	
bachelor's	18 (72.0)	12 (63.2)	
master's	2 (8.0)	1 (5.3)	

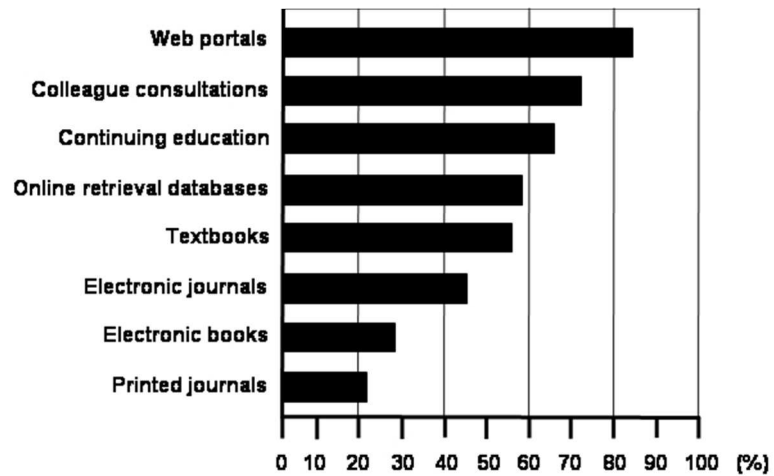


197x124mm (85 x 85 DPI)

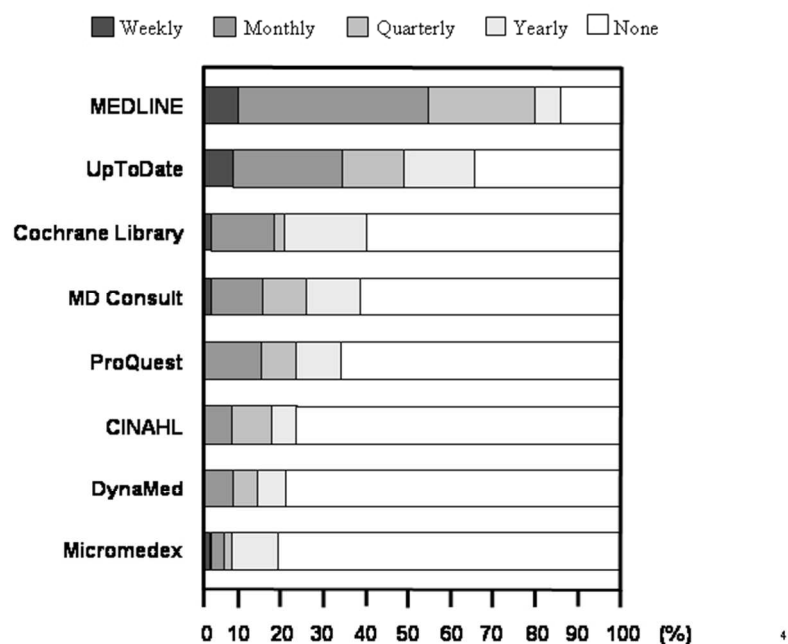


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275x190mm (72 x 72 DPI)



275x190mm (72 x 72 DPI)



275x190mm (72 x 72 DPI)