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Health Information Use Among Healthcare Providers: A Systematic Review

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Abstract

Background: *Healthcare policy formulation, program planning, monitoring and evaluation, and healthcare service delivery as a whole are dependent on routinely generated health information in a healthcare setting. Having a reliable source for health information is vital to build a strong foundation of knowledge, especially with the current revolution of the internet and social media, which raises many concerns regarding harmful effects on the health of the public. However, there are no studies on how the Saudi Arabian population seeks health information. Details about the most used and trusted sources of health information among the public will help health authorities and public awareness accounts on social media to effectively disseminate health information.* ***Aim:*** *The main aim of this review was to combine the magnitude of routine health information use and its determinants among healthcare providers.* ***Methods:*** *Databases and repositories such as PubMed, Global Health, Scopus, Journal online, Advanced Google Search and Google Scholar were searched until August 2022.* ***Result:*** *A total of 890 articles were searched but only 23 articles were included. A total of 8662 (96.3%) participants were included in the studies. The pooled prevalence of routine health information use was found to be 53.7% with 95% CI (47.45% to 59.95%). Training (adjusted OR (AOR)=1.56, 95% CI (1.12 to 2.18)), competency related to data management (AOR=1.94, 95% CI (1.35 to 2.8)), availability of standard guideline (AOR=1.66, 95% CI (1.38 to 1.99)), supportive supervision (AOR=2.07, 95% CI (1.55 to 2.76)) and feedback (AOR=2.20, 95% CI (1.30 to 3.71)) were significantly associated with routine health information use among healthcare providers at p value≤[1]0.05 with 95% CI.* ***Conclusion:*** *The use of routinely generated health information for evidence-based decision-making remains one of the most difficult problems in the health information system. The study's reviewers suggested that the appropriate health authorities invest in enhancing the skills in using routinely generated health information.*

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Introduction

The current sources of health information are diverse, and they influence the perception of medical knowledge among the Saudi Arabian population. Having a reliable source of health information is critical for building a strong foundation of knowledge about health among the public, especially with the current revolution of the internet and social media. According to the latest statistics, more than 50% of the global population uses the internet. Moreover, more than 64% of the Saudi Arabian population uses the internet, and this number has been increasing every year [(1)]. Although social media, websites, and internet search engines are considered as easily accessible sources of medical information, these sources still contain ambiguities. There is increasing evidence that the instant exchange of news from random resources and the lack of verification and determination of the accuracy and credibility of the information being shared by nonprofessionals raise many concerns about the harmful effects on a person's health [(2)].

The health information gathered from sources at the facility and population level influences the quality of healthcare policy formulation, program planning, monitoring, and evaluation, and healthcare service delivery as a whole [(3)]. Alternatively, facility-level data sources can sometimes be referred to as 'routine health information data sources', whereas population-level data sources are known as 'non-routine health information sources' [(4)]. The administrative and operational processes that take place in routine health information sources produce data. Data about the morbidity and mortality of service users, the services delivered, the medications and goods provided, the availability and quality of services, case reporting, and resource, human, financial, and logistical data are just a few of the many categories of health service data. While non-routine (population) health information sources provide data on each individual within defined populations, including overall population counts (such as the census and civil registration) and data on representative populations or subpopulations (such as household and other population surveys) [(4)].

However, routine health information utilization is the main emphasis of this review. The term 'routine health information system' refers to the process of consistently recording, reporting, analyzing and presenting data from health facilities. Daily patient management, disease prioritization, health education, resource allocation and decision-making, as well as the planning, monitoring and evaluation of healthcare service activities, all depend on the use of routine health information [(5)]. A regularly operating health information system enables policy-makers, managers and service providers to make decisions based on evidence by getting the appropriate information into the right hands at the right time [(6)]. Arab countries have shown quite much growth and massive changes in the health sector especially in the Middle Eastern region including the Kingdom of Saudi Arabia (KSA) and United Arab Emirates (UAE) in particular. The population of the Arab world is demanding accountability and inclusion from their government at all levels [(7)].

The important indication of the progress in the public health service and the health care information systems is the transition in the mortality. This is true for the developed countries but not really for the developing countries. Developing countries used to lag behind in the transition in term of demographic situation. But Arab countries have tried to make this notion untrue through effectively managing the healthcare services and most of the countries of the Arab region have reduced the mortality rate [(8)]. In the current era of globalization, the use of information technology (IT) has been pervasive. Each country is trying to grab this asset for development because without up-to-date technologies and computerized devices it is almost impossible to grow and compete with the contemporary world. Hence, it is called information and communication technology (ICT) world, where it is necessary to share knowledge among different sectors of the economy [(9)].

Most of the countries like India, China, Germany, USA, Russia, etc. are utilizing their best efforts to maintain the information system and to develop their own knowledge exchange systems to achieve a competitive edge in the world. In developed countries especially European countries like Germany, France, UK, Norway, Sweden and others in the EU, these information systems are so strong in the field of medicine that most of the hospitals are linked with each other electronically [(10)]. While in the case of developing countries the advancement is not to that marked, the government is trying to give incentives to organizations and encourage them to use information systems [(11)].

Governments in these developing countries want their nation to achieve the competitive advantage by investing in the programs of information systems to help the citizens by offering them special and convenient services. This is also the case of Arab world where the government has a great interest in the ICT that it wants this development in all the aspects of life [(12)]. For an example, the government of the Saudi Arabia has tried to implement the information and technological setup and systems in the health care sectors. Therefore, to achieve these technological goals, most of the hospitals are using healthcare information systems to provide the patients with higher standards of healthcare [(13)]. By using these integrated information systems, hospitals in Saudi Arabia are determined to provide the best possible service and solutions for the medical and clinical problems. However, there are some hospitals in Saudi Arabia which are using these healthcare information systems for maintaining and developing the records of patient's history and the administration's dealing. Along with this computerized service of hospitals, some hospitals have integrated networks of information through which these hospitals can share information and medical history of the patients. Through these integrated networks it is now possible to diagnose and treat patients online and one can choose the doctors and instruments for the cure through information networks [(14)].

However, there are no studies on how the Saudi Arabian population seeks health information. Details about the most used and trusted sources of health information among the public will help health authorities and public awareness accounts on social media to effectively disseminate health information. Because of this, it would be challenging for managers, planners and health practitioners to decide which evidence to employ for making decisions. Thus, the primary goal of this review was to aggregate the findings of many studies to derive a single impact estimate.

Methods

The Preferred Reporting Items for Systematic Reviews 2020 checklist was used to develop the review protocol [(15)]. The primary research included in the review should focus on the routine health information use, with or without its associated factors. The papers may be published or unpublished but must be written in English. All of the papers reviewed should have been produced and published at any time prior to August 2022. However, publications without a full text and abstract as well as editorial reports, letters, reviews and commentaries were excluded from the study. A methodical search of the literature was conducted using electronic databases such as PubMed, Global Health, Scopus, EMBASE, Journal online, Advanced Google Search and Google Scholar.

Study selection and data extraction: The Mendeley software, author names, location and setting, participant counts, study dates and study duration were all used to remove duplicate papers found in various databases. The inclusion and exclusion criteria of the review were also used for the study selection process. To ensure the homogeneity of our search, each reviewer independently selected the appropriate papers for the review, which were then gathered. This method was in line with the Cochrane review handbook's fundamental guidelines for choosing studies and extracting data, which note that data may be presented

in a number of formats but are commonly translated into a format appropriate for analysis. Additionally, multiple reports of the same study need to be linked together, and data should be extracted from study reports by at least two people, independently [16]. So that, this review employed two individuals (MMT and TMY) for both study selection and data extraction.

Both experts received a set of agreed-upon inclusion and exclusion criteria (MMT is the lead researcher and TMY volunteered). Each of them evaluated the articles and decided which ones to include or leave out of the analysis. In light of this, MMT rated 23 articles to be included but rated to exclude 867 articles out of the total articles accessed (890), while TMY rated 20 items to include but rated 870 articles to omit. However, both raters agreed to combine their exclusion of 865 items and inclusion of 18 articles. It was discovered that the computed kappa statistics was 0.80. According to the interpretation of Cohen's kappa [17], there was a high level of agreement between raters because the kappa value was 0.80, which was between 0.80 and 0.90 and meant that 64% to 81% of the data were considered credible. Because both raters used dialogue to resolve their differences, a third rater was not required. Data about study region, study setting, study year, publication status, study design, sample size, sampling technique and response rate was collected using a checklist.

Outcome measurement and quality assessment

Data extraction was made after a careful review of outcome measurement. The outcome of interest for this review was routine health information use which was defined as the use of routine health data to track daily health service activities, create weekly plans, improve service delivery, display updated data, purchase drugs, mobilize resources, assist community mobilization, identify the root of a health issue in the community, predict outbreaks and priorities diseases [18]. In order to reduce garbage in, garbage out problem of analysis and Newcastle-Ottawa Quality Assessment Scale (adapted for cross-sectional studies) [19] was used as indicated in table (1). MMT graded the articles' quality using an evaluation tool that has three parts: selection (five stars), comparability (two stars) and outcome (three stars).

Data synthesis and statistical analysis

A Microsoft Excel spreadsheet was used to extract the data, which was then imported into STATA V.14 for analysis. Tables, figures and forest plots were used to describe and summarize the major investigations. A random effects model with a 95% CI was used to pool the magnitude of routine health information use among healthcare providers. The OR with 95% CI was used to quantify the measure of association for factors that affect routine health information use among healthcare providers. Cochran's Q and I^2 statistics have been used to evaluate the heterogeneity between studies. The percentages of about 25% (I^2=25), 50% (I^2=50) and 75% (I^2=75) would, respectively, indicate moderate, medium and high heterogeneity [20]. In order to identify the apples and oranges' problem of a meta-analysis, subgroup analysis, meta-regression and the Galbraith plot test were conducted. Egger's regression tests and visual assessment of funnel plot asymmetry were used to determine 'the file drawer' problem of analysis (publication bias).

Results

A total of 890 articles were included for this particular study. From these articles, 345 removed due to duplication and 508 were removed after reviewing its title and abstract for its relevance to the topic. Finally, 23 articles were included for the review (figure 1).

Characteristics of included studies

A total of 20 (97%) primary studies we found were published between 2006 and 2022; the

other 3 (13%) primary studies included in the review were not published yet.

Routine health information use

The summary effect is an estimation of the common effect size in a fixed-effect model, which implies that the true effect size is the same across all studies (sampling error is the only reason for variability). According to a random effects model which also assumes that the true effect size varies from study to study, the studies included in the analysis constitute a random sampling of effect sizes that could have been observed in each study. Our estimation of the mean of these effects is the summary effect (variability of the effect sizes is due to systematic error) [(16)].

As can be seen from the forest plot, the existence of high heterogeneity between included studies which could be explained by I^2=97.4% (interpreted as 97.4% of the variation in effect sizes is due to between-study heterogeneity not caused by sampling error) at $p<0.001$. Therefore, a random effects model has a mechanism to handle this variability so that this review employed a random effects model to combine the extent of routine health information use. The prevalence of routine health information use in primary studies ranged from 22.5%12 to 78.5% [(21)]. The pooled prevalence of routine health information use was found to be 53.7% with 95% CI (47.45% to 59.95%) (Figure, 2).

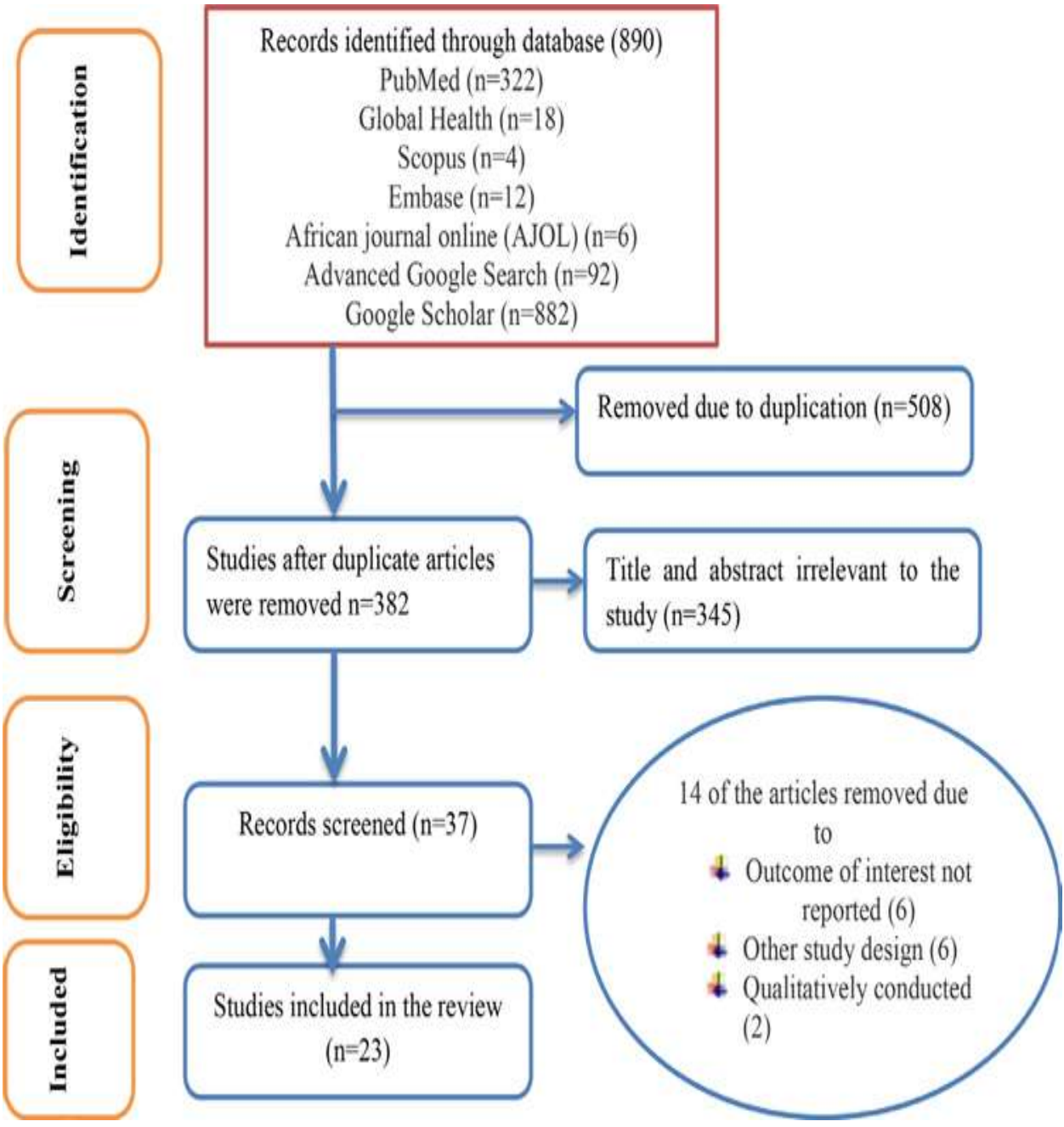

Figure 1 Flow chart of the study selection for systematic review of utilization of routine health information and associated factors among health workers.

Table (1): Determining the quality of the original studies that were used in the analysis of routine health information use among healthcare workers

Study	Selection (maximum of five stars)	Comparability (maximum two stars)	Outcome assessment (maximum of three stars)	Overall quality
Andargie and	***	*	**	6

Study	Selection (maximum of five stars)	Comparability (maximum two stars)	Outcome assessment (maximum of three stars)	Overall quality
Addisse[12]				
Abajebel et al [22]	***	–	***	6
Mengistu et al [23]	*****	*	***	9
Asemahagn and Lee [24]	****	*	***	8
Kondoro et al [25]	****	*	***	8
Adane et al [26]	****	*	***	8
Shiferaw et al [27]	*****	*	***	9
Chanyalew et al [28]	*****	*	***	9
Seid et al [29]	*****	*	***	9
Teklegiorgis et al [30]	****	*	**	7
Emiru et al [31]	****	*	**	7
Kanfe et al [32]	****	*	**	7
Mekuria et al [33]	*****	*	**	8
Yarinbab and Assefa [34]	****	*	**	7
Ngusie et al [35]	*****	*	***	9
Wude et al [26]	*****	*	***	9
Abdisa et al [36]	*****	*	**	8
Tadesse et al [37]	****	*	**	9
Belay et al [38]	*****	*	***	9
Sako et al [39]	*****	*	**	8
Dagnew et al [21]	*****	*	***	9
Abera et al [40]	****	*	***	8
Tulu et al [41]	*****	*	***	9

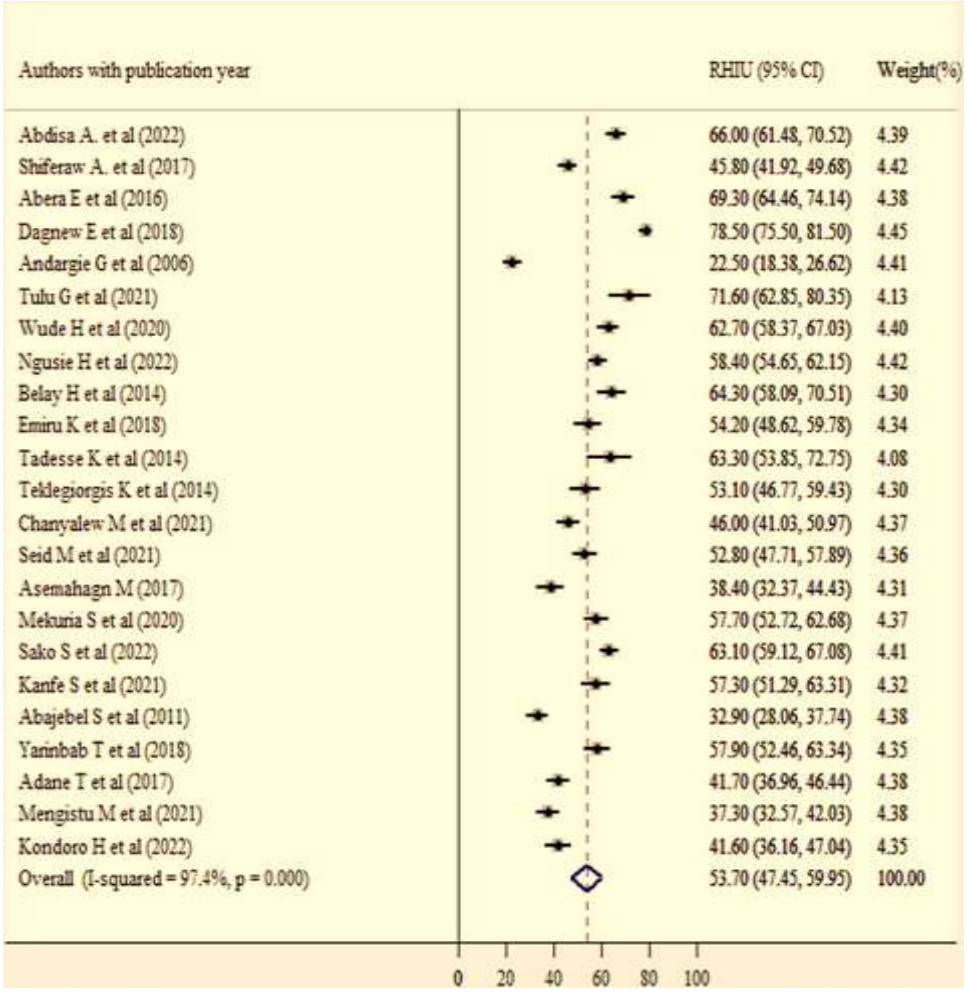

Figure (2): Forest plot showing the pooled level of good routine health information use (Good RHIU) among healthcare providers.

Discussion

Most often, healthcare administrators and practitioners fall short of exploiting the everyday data generated in their organizations. Planning, monitoring and evaluation of the services offered are compromised when health information generated daily in facilities is not used. Additionally, it lowers preventative and promotion health services as well as the standard of care provided to patients [42]. This review's main objective was to combine the extent of routinely used health information after examining conflicting results from several individual research studies.

The pooled prevalence of routine health information use was found to be 53.7%. In fact, the findings of individual articles across the country significantly vary from region to region and study to study. However, this is less than a systematic review and analysis finding which was 57.42% [18] and other individual research findings from Kenya 66% [43] [34], Tanzania's of 58% [44] and 60% [45]. Compared with other earlier review [18], this review included a lot more articles in its analysis, most of which were published recently. Moreover, the results of individual articles [43-45] might have been slightly inflated because systematic reviews are more reliable than individual research findings.

The pooled estimate of the reviewed literature showed that healthcare professionals who had received training on how to use routine health information were 1.56 times more likely to use routine health information than those who had not. This was consistent with

the individual research findings from Kenya [43], Tanzania [44] and a systematic review and analysis finding [18]. Moreover, a capacity building and mentorship program (which included training as part of its intervention) was found to be beneficial at boosting study participants' ability to use the routine HIS for decision-making [28] where all of the literature described existence of a positive association between routine health information use and training.

Healthcare professionals' data management skills were combined, and those with good data management skills used routine health information 1.94 times more often than those with poor data management skills. This was in line with researches [18, 28, 46], where data management expertise was found to be favorably linked with routine use of health information by healthcare professionals. Having high proficiency in data management from generation to utilization is a means to meet that demand. Knowing how crucial it is to base decisions on the correct information is often a requirement for information demand. As a result, the routine use of health information may rise, which may benefit healthcare practitioners with strong abilities in health data management.

The pooled estimate of the analysis also revealed that healthcare professionals were 1.66 times more likely to use routinely generated health information when working in institutions with standardized health information guidelines than when working in institutions without such guidelines. The health information system specifically mentions guidelines such as the Revised HMIS indicators definition guide and the HMIS recording and reporting processes handbook that are intended to be used as a reference by all experts in the industry. The instructions' guidance and clarity may encourage healthcare workers to employ commonly produced health information in the facilities. Healthcare providers getting supportive supervision were using routinely generated health information two times as high as those healthcare providers who did not get supportive supervision.

In healthcare settings, supportive supervision is generally practiced, and competency gaps are found using a standardized checklist. In light of the findings, the supervisors are obligated to provide on-the-job training to people who were unable to use the routinely produced health information on their own. Therefore, supportive supervision's on-the-job training could raise the likelihood that healthcare providers will use routinely generated health information for evidence-based decision-making. The provision of feedback to healthcare providers' right after supportive supervision was found to increase 2.2 times routine health information use. Every constructive observation in the healthcare system should be followed by written feedback so that the healthcare professionals being supervised could learn from their mistakes and improve their use of routinely generated health data in their area of responsibility.

CONCLUSION

Ministry of Health and its partners are doing their best to make sure that data generated at all levels of the health system should be transformed into information and the transformed information should be used as evidence to make decisions. However, this review found that only around half of the information generated routinely in healthcare facilities was used by the healthcare professionals. Routine use of health information was positively correlated with training, competency related to health data management (data generation to use) and working in facilities having standardized guidelines. The study's reviewers suggested that the ministry of health and the appropriate regional health authorities invest in enhancing the skills of using routinely generated health information among healthcare practitioners through training, encouraging supportive supervision with feedback and the provision of standardized guidelines. Also, the authors of this review would like to recommend to health authorities that they make use of the research's conclusions when making plans to enhance

how routinely healthcare professionals use health information.

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