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The extent to which family physicians record their patients' exercise in medical records: a scoping review

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ABSTRACT

Objective Exercise is an effective modality for the prevention and treatment of chronic conditions and family physicians are the healthcare providers tasked to manage patients' chronic disease status. However, little is known about the exercise documentation in family-physician records. Therefore, a scoping review was conducted to describe family-physician-recorded exercise-related advice to patients in electronic medical records.

Design Scoping review.

Setting Primary care clinics.

Search strategy PubMed, Medline, SPORTDiscus, Google, Dissertations & Theses Global, OCLC PapersFirst (via First Search) and included references were searched between 1 January 1990 and 10 June 2018. Extracted information included year, geographic origin, data input structure, input frequency and content of exercise inputs in family physicians' electronic medical records. The primary outcomes are the structure, purpose and frequency of inputs.

Results Of a possible 1758 documents, 83 remained after a title and abstract scan and 22 after a full-text review. These documents included 32 findings of physical activity/exercise medical record documentation: counselling/advising patients (50.0%), status (12.5%), embedded questionnaires (12.5%), status as a risk factor (12.5%), health promotion documentation (6.3%), inactivity status (3.1%) and grading (3.1%). The frequency of exercise inputs in primary care records vary from as low as 0.4% of patients with documentation of physical activity health promotion inputs to as high as 87.8% of patients with exercise or physical activity status recorded. The majority of included documents (63.6%) were focused on patients with identified chronic conditions.

Conclusion The findings suggest that the structure and purpose of exercise documentation is often unclear or unspecified. Studies that present exercise information from family-physician medical records tend to focus on patients with specific chronic conditions and present little detail about the field from which information was extracted. The review found that the proportion of patients with physical activity or exercise information is often less than half.

BACKGROUND

Physical inactivity is the fourth leading risk factor of global mortality and is a known prominent risk factor for many chronic conditions.[1 2] It is well documented that exercise is effective in preventing and treating many chronic conditions and offers benefits comparable to pharmacologic interventions, yet, exercise is under prescribed in the clinical setting.[3] This may be due to clinicians' apprehension of physical activity counselling effectiveness[4] and/or renumeration structures in health systems.[5] Regardless, primary care providers are in a unique position to provide such counselling because of their ability to reach a large portion of the overall population and their role as trusted sources of health information as well as the ability to refer to a range of related health professionals available within many primary care clinics.[6]

Because of a historic lack of comprehensiveness,[7] initiatives have recently emerged that use electronic medical record (EMR) information inputted by primary care providers to assess the quality of care provided for representative patient population samples.[8] Given that primary care EMR databases were developed to support healthcare management and to include information about patient history

Strengths and limitations of this study

► Medical record systems continue to evolve and there is a subsequent need to understand what is documented in them to inform quality-improvement initiatives.
► This review is the first to identify the content of exercise recording in family-physician electronic medical records.
► This review included published studies to provide a comprehensive response to the identified research questions.
► This review describes the context and input structure of family physicians documenting exercise information in electronic medical records.
► Due to the variability in exercise and physical activity terminology across countries and settings, documents may have been missed.

and associated clinician notes, they are a rich population-level source of health information that can be collected and standardised for secondary analyses and surveillance purposes.[9] However, little research exists about the nature of EMR exercise inputs by family physicians and no review has examined the structure, content and frequency of these inputs. This is surprising since the WHO's Global Action Plan on Physical Activity 2018–2030 identified the importance of healthcare providers in promoting physical activity with the aid of digital innovations.[10]

Heeding this advice, we conducted a scoping review to determine the frequency and depth of related research. Based on studies that used EMR data for primary data collection, we posed the following three questions: What types of exercise information are family physicians recording in EMRs? Is there available literature describing the structure of such inputs? How often is this information inputted into EMRs?

Given the broad nature of these questions, we elected to use a scoping review as the most suitable approach for summarising acquired information. Specifically, a scoping review provides an appropriate methodology for identifying gaps in the literature and is deemed particularly relevant for addressing research topics with limited or emerging evidence.[11]

METHODS

PROSPERO does not currently accept registrations for scoping reviews, literature reviews, or mapping reviews, thus the protocol for this review was not registered. Instead, this review followed recommendations for scoping reviews,[11 12] and the Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR).[13] The completed PRIM-SA-ScR checklist is included as a supplementary document (online supplementary appendix A) and a copy of the review protocol is available on request from the corresponding author.

Although 'physical activity', 'activity' and 'exercise' are not synonymous, they are often used interchangeably in clinical settings.[14] Therefore, when describing the content of the EMR, the results will refer to the term as used in the original source document.

The search included a three-stage approach conducted by an expert librarian (AS), who developed the search strategy. First, MEDLINE (Ovid), SPORTDiscus and PubMed were accessed using terms from the research questions including: ("primary care physician*", "physician*", "exercise", "physical activity", "exercise therapy", "exercise movement techniques", "medical records" and "electronic health records". The search was completed on 10 June 2018. Second, "family physician AND exercise AND record" was searched in the Grey Literature Database (http://www.greylit.org), 10 December 2018. Third, Dissertations & Theses Global and OCLC Papers-First (via First Search) were used to identify dissertations, theses, and conference papers/abstracts and the first 100

Google searches were reviewed for: "+physician +exercise+record", "+doctor +exercise+record", "+general practitioner+exercise +record" with repeat replace with "+exercise" and "+physical activity". All searches were restricted to the date range of 1 January 1990 and 10 June 2018. The starting date of 1990 was chosen as it was unlikely that EMRs were used to document physical activity information prior to this date. The search strategy is included as online supplementary appendix B.

To be included for full-text review, titles and/or abstracts had to detail: (1) exercise or active or activity or physical activity; (2) primary care or primary care physician or primary healthcare physician or family doctor or doctor; (3) medical record or record or EMR or health record or medical health record. Documents that did not include all three criteria were excluded.

All document titles and abstracts were independently reviewed by two reviewers; CL reviewed all results and a combination of: ANQP, BW, AM and CGL each reviewed 25%. The reviewers recorded whether a document should be considered for full-text review. All discrepancies were reviewed in person, which provided the opportunity to discuss challenges and uncertainties that arose during the study selection.

Data extraction was conducted using a codebook developed by: CL, AM and JCS. It consisted of specific categories: characteristics of the document (ie, author, year of study, geographic location, publication type and study design); characteristics of the patient and provider sample (ie, age, sex, type of population, sample size, general population or specific chronic condition); whether information was documented in an EMR; content recorded (ie, advice, fitness levels, current behaviour and past behaviour); frequency of patients with recorded information in medical records; structure of exercise recording (ie, unstructured text, drop-down menu, e-template and unspecified); and author recommendations or statements regarding physical activity recording by family physicians. Two reviewers extracted data from the studies and subsequently met to compare the results and resolve discrepancies.

Data were coded and frequency counts were performed for each categorical variable. The main findings were recorded as text and subjected to content analysis.[15] Specifically, the primary meaning of the text was categorised according to the differing purposes stated (ie, advice, fitness levels, current behaviour, past behaviour or structure of input). All data relevant to the study are included in the article or uploaded as online supplementary information.

PATIENT AND PUBLIC INVOLVEMENT

There was no patient or public involvement in this review.
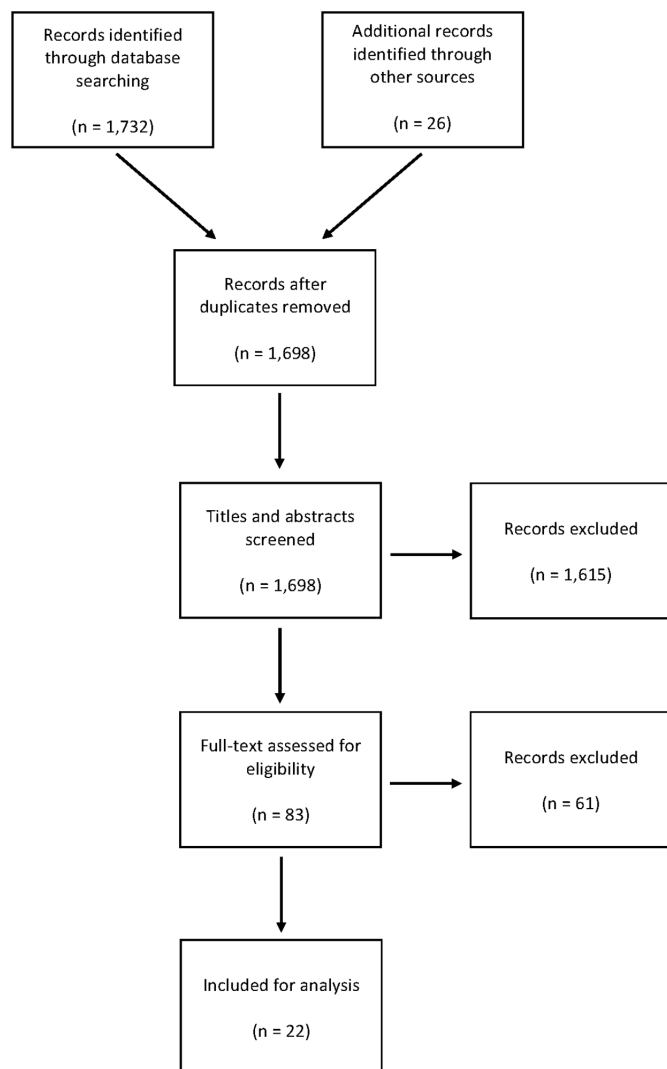
Figure 1 Selection of sources for scoping review.

RESULTS

In accordance with PRISMA-ScR guidelines, figure 1 presents a flow chart of the search and selection process. The initial search of databases (n=1732) and manual searches (n=26) resulted in 1758 potential includes. After removal of duplicates, 1698 documents were considered for title and abstracts screening; a further 1615 documents did not satisfy the inclusion criteria and were subsequently excluded. The remaining 83 documents were subjected to full-text review, which resulted in 22 documents and 32 discrete findings (ie, determined as inputs with discrete, independent purposes) being included in the final analysis (a complete document reference list is included as online supplementary appendix C). Detailed in table 1, with aggregated results provided in table 2, the majority of the documents originated from Europe (45.5%), were cross-sectional in design (52.3%) and focused on patients with chronic conditions (63.6%). Nearly half (45.5%) of the documents mentioned recording exercise or physical activity in EMR, 11 (50.0%) specified 'medical record' or 'record', which may or may not be electronic. For

example, Asnani states, 'Data were collected retrospectively from a total of 125 medical records'[16] (p. 178).

As table 3 outlines, 16 findings (50.0%) detailed counselling/advice on physical activity or exercise, 4 findings (12.5%) referred to exercise/physical activity status and 4 findings (12.5%) had physical activity or exercise documented as a risk factor. Two findings (6.3%) used the Exercise as a Vital Sign questionnaire and (6.3%) used the General Practice Physical Activity Questionnaire. Two findings (6.3%) discussed health promotion; one finding (3.1%) recorded exercise/physical activity grading and one finding (3.1%) noted inactivity status.

Most findings presented a proportion of patients with an entry. For example, Mattar indicated 'Physicians provided … exercise counselling for 40% of patients with documented obesity'[17] (p. 71). The range of patients with inputs varied greatly; the number of patients who received counselling/advice on physical activity or exercise ranged from 1% of patients to 78.8%. Table 3 presents the range of patients with inputs by content.

Table 4 outlines the structure of the medical record inputs. The majority (65.6%) did not specify the structure of input. For example, Lieshout explained that physical activity capacity and physical activity advice "could be collected by extraction from medical records"[18] (p. 3), which does not describe the fields from which physical activity data was extracted be it open-text fields, drop-down menus, templates embedded within EMRs or another structure. While 12.5% used a structured questionnaire embedded within the EMR, 9.4% were found in 'medical notes', 6.3% were documented in an unstructured open-text format, and 6.3% used an e-template embedded within the EMR.

DISCUSSION

We asked three questions to understand the type of information family physicians recorded in EMRs, the structure of those inputs, and how many individual EMRs had the information recorded. This is of particular relevance as EMRs are being implemented in family medicine clinics; for example, in 2013, 64% of Canadian primary care physicians use EMRs compared with 23% in 2006.[19 20] Because of the wide adoption of medical records in primary healthcare, the low frequency of documents detailing inputs regarding exercise or physical activity is surprising.

As to the question on the structure of input, our review found little specificity in how exercise information was entered in the EMRs. It was often unclear if the input structure was documented in the EMR notes, an embedded template, a dedicated field, or if the record had a dedicated structured specified field such as a drop-down menu dedicated to physical activity status inputs. The type of information family physicians recorded in EMRs varied from completing embedded questionnaires (eg, General Practice Physical Activity Questionnaire) to providing advice, health promotion discussions, current status, grading (presumably a measure of fitness but this

Table 1 Characteristics of included documents (n=22)

#	Author; year; countries	Method	Patient population	Family physician (n; % male; years of practice M)	Patient (n; % male; age in years M)
1	Lieshout; 2012; Austria, Belgium, England, France, Germany, Netherlands, Slovenia and Switzerland	Cross-sectional research article	Patients with coronary heart disease	Unspecified; unspecified; unspecified	2960; 67%; 68.7
2	Asnani; 2005; Jamaica	Pre-post research article	Patients with hypertension	Unspecified; unspecified; unspecified	125; 33%; 57
3	Gulliford; 1996; Barbados, Trinidad and Tobago, and Tortola	Cross-sectional research article	Patients with diabetes	Unspecified; unspecified; unspecified	1661; 33.3%; unspecified
4	Sun; 1995; China	Cross-sectional research article	Patients with cardiovascular disease	Unspecified; unspecified; unspecified	4520; unspecified; unspecified
5	Jordan; 2017; England	Randomised control trial	Patients with osteoarthritis	113; unspecified; unspecified	1960; 40.1%; 66.2
6	Grant; 2013; USA	Pre-post research article	General population	1196; unspecified; unspecified	696267; 47.7%; 51.4
7	Allenby; 2016; Australia	Cross-sectional research article	Patients with cardiovascular disease	282; unspecified; unspecified	282; 86.8%; 69.7
8	Wilson; 1992; England	Intervention research article	General population	Unspecified; 81%; unspecified	Unspecified; unspecified; unspecified
9	Crossen; 2000; New Zealand	Cross-sectional research article	Patients with coronary heart disease	21; unspecified; unspecified	326; 59.8%; 68.6
10	Wilkinson; 2014; Australia	Mixed methods research article	Patients with diabetes	18; unspecified; unspecified	43; unspecified; unspecified
11	Krska; 2016; England	Observational research article	Patients with cardiovascular disease	62; unspecified; unspecified	2892; 78.3%; unspecified
12	Lange; 2007; Denmark	Pre-post research article	Patients with COPD	154; unspecified; unspecified	4943; 44.9%; 70.4
13	Pajak; 2010; Poland	Intervention research article	Patients with cardiovascular disease	Unspecified; unspecified; unspecified	4421; 45.8%; 44.7
14	Doubova; 2015; Mexico	Cross-sectional research article	Patients with osteoarthritis	Unspecified; unspecified; unspecified	8991; 31%; 60
15	Mattar; 2017; USA	Cross-sectional research article	Patients with obesity	29; unspecified; unspecified	3868; 40%; 48.6
16	AuYoung; 2016; USA	Review article	General population	Unspecified; unspecified; unspecified	Unspecified; unspecified; unspecified
17	Heron; 2014; Ireland	Mixed-method research article	General population	11; unspecified; unspecified	192; unspecified; unspecified
18	Coleman; 2012; USA	Intervention research article	General population	Unspecified; unspecified; unspecified	1793385; 43.3%; unspecified
19	Chatterjee; 2017; UK	Cross-sectional research article	General population	1013; unspecified; 22	Unspecified; 43%; unspecified

Continued

Table 1 Continued

#	Author; year; countries	Method	Patient population	Family physician (n; % male; years of practice M)	Patient (n; % male; age in years M)
20	Ludt; 2011; Austria, Belgium, Finland, France. Germany, Netherlans, Slovenia, Switzerland and UK	Cross-sectional research article	Patients with cardiovascular disease	268; unspecified; unspecified	3723; 70.5%; 66
21	Neighbor; 1991; USA	Cross-sectional research article	General population	120; 62%; unspecified	1528; 28%; 36
22	Baker; 2015; UK	Cross-sectional research article	General population	85; unspecified; unspecified	20973; 45.2%; unspecified

COPD, chronic obstructive pulmonary disease.

was not clear) and as a risk factor in combination with other patient risk factors (eg, BMI level and smoking status). This indicates that the plausible topics for input in the EMRs is quite varied. Thus, designated sections in EMRs are needed to easily record exercise-related information. For instance, the specifics on the physical activity advice provided to patients as well as their current physical activity status should be regularly recorded to support

family physicians in subsequent conversations promoting active lifestyles with patients. Further research is needed to determine whether or not the implementation of structured templates for exercise in EMRs influences physician's exercise documentation practices and what format or variables in such templates may be most effective.

The frequency of exercise and/or physical activity documentation varied greatly across studies. The largest variation was for counselling/advice on physical activity, which ranged from 1% of patients with an input in medical record to 78.8%. Of the findings that presented a frequency or proportion of exercise or physical activity, 10 (33.3%) reported more than 50% of the sample had any record (see online supplementary appendix D). Although variation exists across contexts and patient population samples, more than half of patients do not appear to have any documentation of exercise or physical activity in EMRs. A potential explanation for the low

Table 2 Aggregated description of included documents

Geographic location (n=22)	N	%
Europe	10	45.5
North America	8	36.4
Australia	3	13.6
Asia	1	4.5
Publication status (n=22)		
Published	22	100.0
Unpublished	0	0.0
Publication type (n=22)		
Research article	21	95.5
Review article	1	4.5
Research article design (n=21)		
Cross-sectional	11	52.3
Intervention	3	14.3
Pre–post	3	14.3
Mixed-method	2	9.5
Observational	1	4.8
Randomised control trial	1	4.8
Patient population (n=22)		
Patients who have a specific chronic condition	14	63.6
General public	8	36.4
Medical record format (n=22)		
Electronic	10	45.5
Unclear	11	50.0
Electronic and paper	1	4.5

Table 3 Content recorded in medical records and the range of patients with inputs ($n_{findings}$=32)

Content record	Frequency of findings (n; %)	Range of patients with inputs (%)
Counselling/advice on physical activity/ exercise	16; 50.0	1.0–78.8
Exercise/ physical activity status	4; 12.5	12.4–87.8
Physical activity/exercise documented as risk factor	4; 12.5	25.0–55.9
EVS Questionnaire	2; 6.3	21.0–86.0
Exercise documentation/ health promotion	2; 6.3	0.4–25.0
GPPAQ Questionnaire	2; 6.3	10–78
Exercise/ physical activity grading	1; 3.1	8.0
Inactivity status	1; 3.1	30.0–47.0

EVS, Exercise as a Vital Sign; GPPAQ, General Practice Physical Activity Questionnaire.

Table 4 Structure of medical record input ($n_{findings}$=32)

Structure of input (n=34)	Frequency	%
Unspecified	21	65.6
Structured questionnaire embedded within EMR	4	12.5
Medical record notes	3	9.4
Unstructured open-text	2	6.3
E-template embedded within EMR	2	6.3

EMR, electronic medical record.

proportion of exercise inputs may be due to payment structures that incentivize inputs. A fee-for-service model encourages a one problem per visit approach to care while sessional contracts may provide flexibility for managing complex time-consuming patient care.[21] Future reviews should consider physician renumeration in relation to EMR input frequencies.[22]

Patients with diagnosed chronic diseases (eg, cardiovascular disease and obesity) are more likely than otherwise healthy patients to receive exercise counselling from physicians.[17 23] For instance, Mattar *et al*, found that physicians were more likely to provide exercise counselling for patients with documented obesity (40%) compared to patients with undocumented obesity (29%).[17] Thus, exercise is recorded more frequently once patients have diagnosed chronic conditions rather than as a treatment to prevent the onset of a chronic condition. This could be considered a more reactive approach to healthcare when in fact a more proactive, preventative approach may reduce chronic disease occurrence, such as increasing physical activity levels in patients who were deemed inactive.[24]

This review has some limitations that should be acknowledged. First, the information that family physicians recorded in EMRs and subsequently presented in published documents was scant. As Leishout *et al* found, 'Advice on physical activity had low scores… it remains uncertain whether such advice had been provided but not recorded.'[20] Thus, more research is required to better understand how exercise is recorded in EMRs and whether entries are located in notes or a structured field designed to support family physicians as they provide care for patients. Although EMR systems often capture data for a substantial portion of the general population,[25] the proportion of undocumented physical activity and exercise discussions are not known. Second, 21 of the 22 (95.5%) included documents are from the western developed world. Therefore, the relevance of our findings for non-developed countries is questionable.

In summary, the available research suggests that the structure and purpose of exercise documentation in EMRs is often unclear or unspecified. Studies that present exercise information from family physician medical records tend to focus on patients with specific chronic conditions,

present little detail about the field from which information was extracted, and indicate that the proportion of patients with physical activity or exercise information is often less than half. Ultimately, more audits of EMR exercise recording practices are needed that outline disparities across systems and capabilities.

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