

# BMJ Open Systematic review of personal finance training for physicians and a proposed curriculum

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## ABSTRACT

**Background** Many physicians complete medical school and graduate medical education (GME) burdened by high debt and financial illiteracy. This places them at increased risk for ill-informed financial decisions, which can result in increased stress and anxiety and a lower quality of life. Furthermore, financial concerns impact physicians' specialty selections and may partly explain the scarcity of primary care practitioners. In response, medical wellness programmes have increasingly sought to offer personal finance education, but there is little guidance on optimal curricula. Our objective is to systematically review the existing literature examining physician financial literacy curricula and to recommend a standardised personal finance curriculum.

**Methods** This review used the Preferred Reporting Items for Systematic Reviews and Meta-Analyses 2020 checklist to report the results of literature searches in PubMed, ERIC, MedEdPortal, EBSCO, JSTOR and Google Scholar. Three researchers used predetermined inclusion and exclusion criteria to select articles, including a focus on financial concepts applicable in the USA. Selected articles published between 2000 and 2022 were assessed using the BEME strength of findings tool, and further assessed using modified Côté-Turgeon and Kirkpatrick model qualitative analyses tools.

**Findings** 49 articles met all inclusion criteria. Ten specifically described personal finance literacy curricula for medical students or GME trainees, with varied criteria for selecting instructors, topics and outcomes. All studies reported that audiences were ill prepared for making financial decisions but strongly desired financial literacy education. Qualitative analysis revealed Strength of Findings summary scores ranging from 2 to 4, while applicable Kirkpatrick Model scores were all 3 or greater. Based on these findings, a 14-module personal finance curriculum is proposed by the researchers, along with learning objectives.

**Interpretation** Although medical students and GME trainees value financial literacy, few publications report the impact of actual curricula. These efforts vary in depth, breadth and measured impact. Future research should focus on development of valid testing instruments specifically for physicians, content standardisation, selection of credible instructors and delivery formats.

## INTRODUCTION

A lack of personal finance literacy makes financial decision-making difficult among

## STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ This systematic review is the first study that comprehensively assesses the literature on personal finance literacy.
- ⇒ This article uses three key frameworks to assess all relevant articles in an effort to ensure objectivity and reduce bias.
- ⇒ Few studies report on physician personal finance literacy curricula.
- ⇒ Most studies are based on small sample sizes and many of the surveys have not been validated.
- ⇒ Assessed articles are limited to publications in English that address physicians and medical students in the USA.

medical trainees and practitioners.<sup>1-14</sup> As a result, medical students, trainees and early career physicians may not make optimal choices regarding budgeting, saving, investing, insurance and other financial decisions, which are particularly important during a time when finances are especially constrained by high debt.<sup>4-7 10-13 15-22</sup> Therefore, these groups can experience increased stress and anxiety and a lower quality of life.<sup>10 14 18 20 21 23-25</sup> Furthermore, financial stress and medical student loans may influence medical student subspecialty choice and exacerbate subspecialty disparities among new residents.<sup>26</sup> Accordingly, the UME and graduate medical education (GME) communities have recommended financial literacy training to reduce debt-related anxiety,<sup>10 27 28</sup> decrease burnout,<sup>10 11 14 29-31</sup> and improve physician wellness.<sup>10 12 14 32 33</sup> In addition, medical students and trainees recognise the lack of personal finance knowledge and want a greater emphasis on the development of financial skills during their training.<sup>19 10 18 24 34-36</sup>

However, UME and GME institutions are not mandated by accrediting organisations (such as the Accreditation Council for GME or the Liaison Committee on Medical Education) to provide personal finance literacy



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training.<sup>9 12 37</sup> Few programmes offer structured courses in personal finance because some institutions have not accepted that the content is necessary. In addition, there is a lack of standardised curricula, qualified unbiased instructors and time and resources for teaching sessions.<sup>10 25 32 35</sup> Because of these limitations, many institutions invited or allowed credentialed financial industry professionals, such as financial advisors, brokers and insurance agents, to lead finance education trainings on campus.<sup>25 38</sup> Since many of these invitees also sell financial products and services to participants,<sup>14 23 32 38 39</sup> many medical students and trainees distrust these educational attempts.<sup>14 32 38 39</sup> In contrast, trainees prefer expert and unbiased sources to address their unmet financial training needs, resulting in a recent rise in the number of peer-reviewed publications addressing objective and impactful personal finance literacy.

This article systematically reviews the published literature examining physician financial literacy curricula and proposes a personal finance curriculum that can be adopted or modified to address the personal finance needs of medical trainees and practitioners. Both the proposed curriculum and the systematic review focus on studies that detail the needs of trainees, the execution of a personal finance curriculum and the impact of these curricula.

## METHODS

We used the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 Checklist to guide the reporting of this qualitative systematic review, which assessed and collected all the literature on physician personal financial literacy programmes for medical students or physician trainees in the USA. All articles meeting our inclusion criteria were subjected to qualitative analysis, and the subset of articles that reported the implementation of financial literacy curricula were analysed further using a BEME-guided Strength of Findings approach,<sup>40 41</sup> a modified Côté-Turgeon tool,<sup>42</sup> and the Kirkpatrick Model for curricular assessment.<sup>43</sup>

### PRISMA guided publication selection

We identified all published literature on personal financial literacy training programmes for physicians and trainees in the USA from 2000 to 2022. We generated a list of keywords associated with medical students, trainees, medical personnel, financial literacy and education (online supplemental table A1). Our detailed search strategy is outlined in the accompanying online supplemental file 2 titled ‘Search Strategy.’ Search terms included: “curriculum,” “debt,” “doctor,” “financial decision,” “financial literacy,” “financial management,” “financial planning,” “undergraduate medical education”, “graduate medical education,” “medical personnel,” “medical staff,” “personal finance,” and “physician.” We applied available Medical Subject Headings terms corresponding to these search terms, and initiated article

searches using Boolean operators. We searched multiple databases including PubMed, ERIC, MedEdPortal, EBSCO, JSTOR, EMBASE and Cochrane Central. For all articles, we found using the above search strategy, we used a snowball approach to identify more relevant articles in each article’s reference section by reviewing every reference in each article for additional articles that fit our inclusion criteria, until saturation was achieved. This search spanned all UME and GME training programmes with available publications.

All included article information was compiled in a Microsoft Excel (Microsoft Corporation, Redmond, Washington, USA) spreadsheet. Article acquisition was performed by all three coauthors with the help of an informationist, and full text analysis was performed independently by all authors.

### Inclusion and exclusion criteria

The included articles satisfied the following requirements:

- ▶ English language articles.
- ▶ Published between 1 January 2000 and 8 March 2022.
- ▶ Described curriculum or curricula.
- ▶ Targeted UME or GME participants.

Since the included articles used a variety of words to describe financial literacy topics, we categorised them using more general terms. For example, ‘financial planning’ referred to general financial literacy content; ‘retirement accounts’ was included in the ‘retirement planning’ topic; ‘education debt,’ ‘credit cards,’ ‘home purchase,’ and ‘home mortgages’ were all categorised into the ‘debt’ topic; and ‘salary and benefits’ was included in ‘contract negotiation.’

Articles that were excluded did not fit our inclusion criteria or displayed the following characteristics:

- ▶ Articles authored by financial industry professionals, such as financial advisors, insurance agents, brokers or financial consultants, all of whom could have an inherent financial interest in encouraging the sale of financial instruments and thus harbour potential conflicts of interest.
- ▶ Articles whose authors appear to receive significant compensation from the financial services industry, which we determined through review of author disclosures and personal websites.
- ▶ Articles that addressed retired physicians.
- ▶ Articles that focused primarily on debt, a topic which has been well discussed in other articles.<sup>17 20 44–53</sup>

### BEME findings, Modified Côté-Turgeon Tool and Kirkpatrick Model

Descriptive statistics were employed for all included articles. Studies that implemented financial literacy curricula were assessed qualitatively using a BEME-guided Strength of Findings approach per BEME Guides 10 and 13<sup>40 41</sup> and graded from 1 to 5, with 1 indicating the lowest score with the least significant findings and 5 indicating the highest score with the most significant findings.<sup>40</sup> The subset of articles that covered personal finance literacy curricula

were further assessed using the Kirkpatrick Model, which examined the reactions, learning, behaviour and results for each curriculum<sup>43</sup>; and a modified Côté-Turgeon tool, which critically assessed multiple characteristics for each qualitative medical education article using 12 items on an evaluative grid.<sup>42</sup>

The Kirkpatrick Model assessed each of four levels of curriculum impact (reaction, learning, behaviour and results) on a 1–5 point scale, with 1 representing the least favourable outcome and 5 indicating the most favourable impact: level 1 reaction—measured participant reaction to personal finance training (eg, satisfaction). Level 2 learning—measured participant understanding of personal finance training (eg, change in attitude, increase in knowledge or skills). Level 3 behaviour—measured whether participants used what they learnt (eg, change in behaviours). Level 4 results—measured whether the personal finance training material had a positive impact on participants' work and personal environments/organisations, for example, a hospital, private practice or household.

Modifications to the Côté-Turgeon tool involved splitting item 7, 'Data analysis is credible,' into three fields: triangulation, referring to whether researchers used multiple methods or data sources to support findings<sup>54</sup>; internal validity and external validity. Additional fields assessed the depth and breadth of curricula. Breadth considered the number of financial literacy topics covered while depth reflected the total time allocated for the number of addressed topics.

All 12 items and three subdivisions of item 7 in the modified Côté-Turgeon tool were independently ranked by each author on a scale of 1–5, with one being 'poor,' three being 'neutral,' and five being 'excellent.' Strength of Findings scores were determined, with grade 1 indicating non-significant findings and grade 5 signifying unequivocal results. For all assessment scores, inter-rater reliability was maintained by standardising tool assessments prior to use. Reconciliation was performed if authors deviated by more than one point on any rating by discussions and score revisions. For each criterion, scores were averaged following reconciliation. Of note, one of the papers was authored by two of the authors (YDB-O and SZ).<sup>38</sup> This study was reviewed last, to help the authors anchor scores based on similar criteria as the other studies. To avoid conformity bias, the independent author (JI) provided rankings results first for all papers assessed.

### Patient and public involvement

Not applicable. No patients and no members of the public were involved in the study.

## RESULTS

As shown in [figure 1](#), the initial search yielded 207 publications and of these, 158 were excluded. Articles were excluded because they focused on private practice

management or business finance,<sup>49</sup> had a primary focus on student debt,<sup>17</sup> focused on nurses, pharmacists, chiropractors or non-US physicians,<sup>30</sup> were authored or coauthored by financial advisors, bankers or others with potential conflicts of interest,<sup>12</sup> primarily addressed moonlighting,<sup>8</sup> referred only tangentially to finance but focused on medical curricula,<sup>8</sup> were only abstracts or posters,<sup>4</sup> or addressed the needs of retired physicians.<sup>2</sup> The remaining 49 articles included 10 peer-reviewed reports of financial literacy curricula ([table 1](#)), 21 reports of cross-sectional surveys and 18 opinion pieces (online supplemental table A2).

### Grading key

Strength of Findings determined per BEME guides 10 and 13.<sup>40 41</sup>

Grade 1: No clear conclusions can be drawn. Not significant.

Grade 2: Results ambiguous, but there appears to be a trend.

Grade 3: Conclusions can probably be based on the results.

Grade 4: Results are clear and very likely to be true.

Grade 5: Results are unequivocal.

Kirkpatrick Model categories were assessed on a 1–5 point scale, with 1 representing the least favourable outcome and five the most favourable impact. Dash indicates inability to assess.

Level 1 reaction: participant reaction to the training (eg, satisfaction).

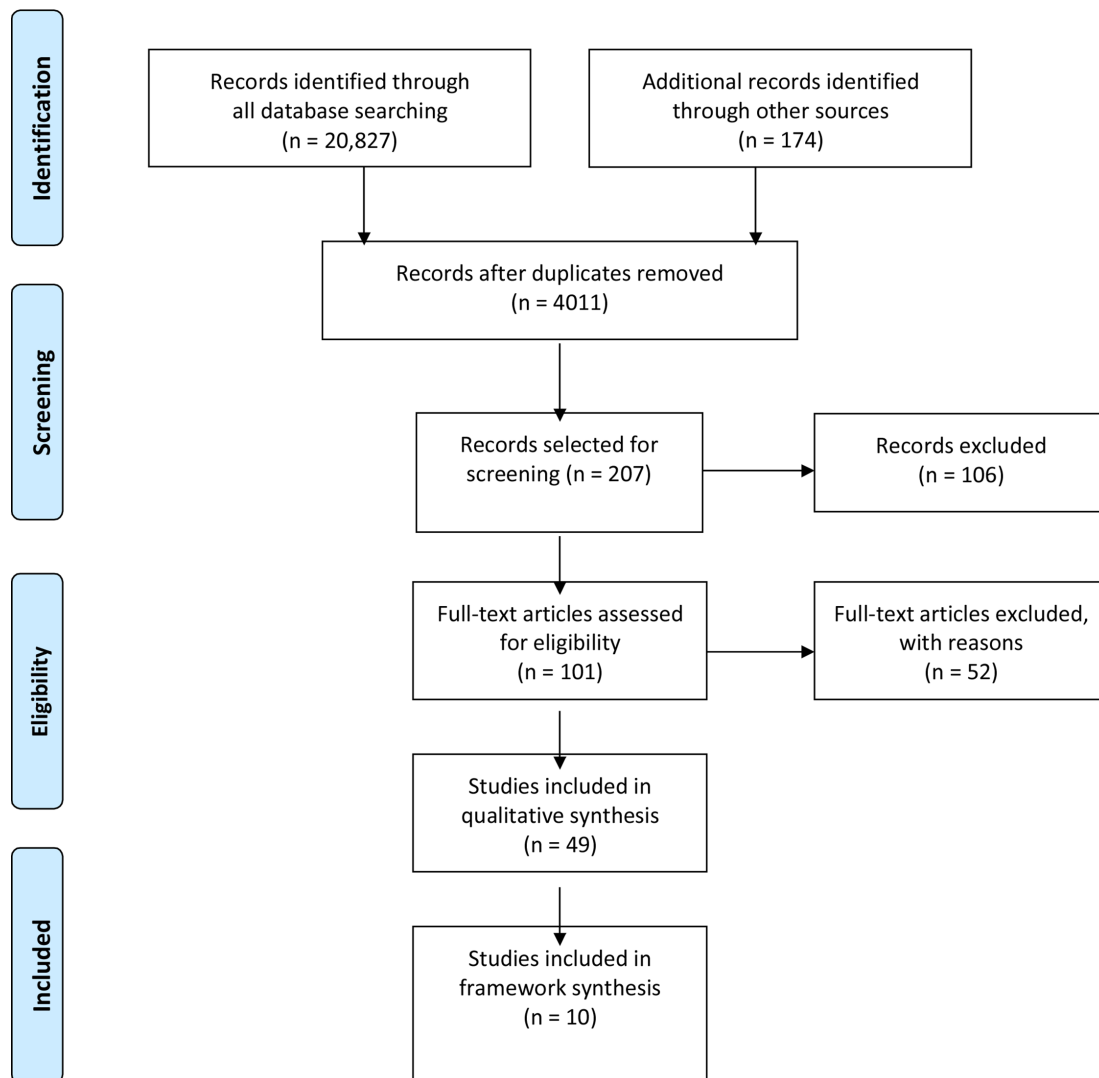
Level 2 learning: participant understanding of the training (eg, change in attitude, increase in knowledge or skills).

Level 3 behaviour: participant utilisation of learning (eg, change in behaviours)

Level 4 results: impact on participants' work and personal environments/organisations, for example, a hospital, private practice or household.

Most of the 49 included articles focused on GME trainees in a variety of specialty areas, although some addressed UME needs. All 49 articles (100%) reported that participants were ill prepared to make financial decisions and 42 articles (86%) recommended that UME or GME institutions provide financial literacy education for their medical students and trainees.

As shown in [table 2](#), each of these articles addressed general financial planning principles and/or a variable number of finance topics, such as debt/liabilities, savings/assets, investing, budgeting, money basics (eg, time-value of money, discounting and compounding), contract negotiation, selecting and interacting with financial advisors, children's college savings plans, insurance (life, disability, property and casualty), retirement planning, estate planning and taxes. The number of topics discussed in each article varied, with two articles addressing only general financial planning,<sup>35 39</sup> while seven covered 10 or more topics.<sup>9 10 22 25 38 55 56</sup> The most covered topic was debt (90%), followed by retirement



**Figure 1** PRISMA protocol literature search results. PRISMA, Preferred Reporting Items for Systematic Reviews and Meta-Analyses.

planning (78%), budgeting (67%) and investing (65%). Children's college planning (10%), money basics (16%), contract negotiation (18%) and estate planning (18%) were the least popular.

Ten studies discussed financial literacy curricula. [Table 1](#) summarises the study characteristics, key findings, BEME Strength of Findings and Kirkpatrick Model scores. For the Strength of Findings summary scores, two articles were graded a 2,<sup>57 58</sup> three articles received a 3<sup>2 11 32</sup> and the remaining five articles received a 4.<sup>10 13 30 33 38</sup> [online supplemental table A3](#) lists the reconciled scores for each criterion of the modified Côté-Turgeon assessment tool as well as the total score for each study. Bar-Or<sup>38</sup> and Ng<sup>33</sup> tied for the top score. The number of conflicts requiring reconciliation varied: Dhaliwal: 1 conflict<sup>30</sup>; Boehnke, Walsh and Ng: 2 conflicts each<sup>2 11 33</sup>; Bar-Or: 3 conflicts<sup>38</sup>; Shappell 4: conflicts<sup>13</sup>; Mizell: 5 conflicts<sup>32</sup>; Liebrecht: 7 conflicts<sup>57</sup>; Grewal: 7 conflicts<sup>10</sup> and Meleca: 10 conflicts.<sup>58</sup> In general, individual scores ranged from 2 to 5, and were higher for components assessing research question definition, study objectives and participant selection. Most

studies had lower scores for components assessing validity and generalisability.

We were unable to assign criterion 14, 'Depth of curriculum,' scores to the two online curricula papers<sup>10 13</sup> as we could not quantify the amount of time spent by participants on each curriculum component. Criterion 9, 'The quotations make it easier to understand the results,' disadvantaged the four papers which did not include participant quotes.<sup>11 13 33 58</sup> If we ignore these two criteria, Ng 2022<sup>33</sup> is the highest scoring paper. Exclusion of our breadth and depth measures also results in Ng 2022<sup>33</sup> scoring highest.

For the Kirkpatrick Model grades, all applicable scores were 3 or greater, with all studies reporting favourable participant reactions to personal finance literacy education (Reaction).<sup>2 10 11 13 30 32 33 38 57 58</sup> Most studies also reported increased knowledge (Learning),<sup>2 10 11 13 32 57 58</sup> with two studies demonstrating increased retention of knowledge in the following months.<sup>2 58</sup> One of these studies found that self-assessed learning overestimated actual learning as assessed by objective quiz results.<sup>32</sup>

**Table 1** Characteristics and qualitative assessments of studies offering curricula

Article	Methodology	Key findings	Participants (N)	BEME grade	Kirkpatrick model scores
<i>(Journal of General Internal Medicine)</i> <sup>30</sup>	90 min, faculty-led personal finance seminar; Preintervention financial literacy test and attitude assessment. Postintervention assessment followed 2–10 months later by a behaviour change assessment of retirement account choices.	Seminar attendees were more likely to switch from a default low-yield savings account to a higher-yield mutual fund investment.	Internal medicine residents (52)	4	Reaction 5 Learning - Behaviour 4 Results -
<i>(Medical Education)</i> <sup>57</sup>	3.5-hour workshop led by the associate director of the financial aid and scholarships and a physician with expertise in personal finance. Workshop utilised a quiz show format. Postintervention survey administered online.	71% felt capable of crafting a budget and improving credit and identity protections. 79% intended to develop a saving strategy.	Senior medical students (117)	2	Reaction 4 Learning 3 Behaviour - Results -
<i>(Journal of Surgical Research)</i> <sup>32</sup>	18-hour curriculum spanning practice management and personal finance topics delivered by a physician who is also a certified financial planner, a surgeon with coding and reimbursement knowledge, a hospital attorney and others. Practice management topics were delivered monthly during the daytime. Personal finance topics were delivered monthly in the evenings. Self-assessment surveys at onset and conclusion of the curriculum. Pretest and post-test administered after each session.	Participants showed increased interest, knowledge and responsible behaviour relating to personal and practice financial management. Participant self-assessed learning overestimated actual learning as assessed by objective quiz results. Tangents from planned lecture content led to engaging and useful conversations.	Surgery residents (28 involved; 16 paired responses)	3	Reaction 5 Learning 3 Behaviour - Results -
<i>(Medical Student Research Journal)</i> <sup>58</sup>	10 hours, student initiated elective curriculum spanning personal finance and medical business topics. Each 1-hour lecture was led by physicians, business owners, or financial counsellors. Pre-education and posteducation surveys	Self-assessed personal and business financial literacy nearly doubled. 90% expressed interest in a business and finance elective. 85% felt they benefited from participation. Difficult to maintain a student-led course due to leadership turnover.	Medical students (48)	2	Reaction 5 Learning 3 Behaviour - Results -
<i>(Journal of the American College of Radiology)</i> <sup>2</sup>	60 min lecture designed and delivered by physicians. Pretest and 6-month post-test surveys obtained.	6-month basic financial literacy knowledge increased. 90% 'definitely' or 'probably' will apply acquired knowledge to their own finances.	Radiology residents and fellows (23 (attended lecture); 20 (completed pretest and post-test))	3	Reaction 4 Learning 4 Behaviour - Results -
<i>(Cureus)</i> <sup>38</sup>	8-hour curriculum delivered in four 2-hour sessions by a business professor with expertise in physician personal finance with input from three physicians involved in GME. Participants also received online spreadsheet templates and resources. Preintervention and 2-week postintervention surveys.	Self-reported proactive decisions made in areas including retirement planning, investing, insurance, contracting and debt management.	Cardiovascular disease, infectious disease and pulmonary and critical care fellows (18)	4	Reaction 5 Learning - Behaviour 3 Results -
<i>(Cureus)</i> <sup>10</sup>	Online curriculum delivered over 4 weeks, with recorded content, readings, online discussions and weekly live video conferences. Preintervention and postintervention surveys.	Substantial self-reported increases in fiscal knowledge and confidence in managing personal finances.	4th-year medical students (201 took course, 123 completed initial questionnaire and post-course survey)	4	Reaction 5 Learning 3 Behaviour - Results -
<i>(Academic Emergency Medicine Educational Training)</i> <sup>13</sup>	Online curriculum delivered over 5 weeks. Content hosted online and supplemented by two synchronous webinars. Preintervention and postintervention knowledge assessments, survey of reaction to content and a postintervention assessment of behavioural changes.	Improved performance on knowledge assessment postintervention. Most residents reported behavioural changes.	Emergency medicine residents (37 enrolled, 20 completed the curriculum)	4	Reaction 5 Learning 4 Behaviour 4 Results -

Continued

Table 1 Continued

Article	Methodology	Key findings	Participants (N)	BEME grade	Kirkpatrick model scores
( <i>Southern Medical Journal</i> ) <sup>11</sup>	Approximately 2 hours of content delivered at two sites (one offered four sessions and the other two sessions). Preintervention and postintervention surveys used to assess needs and measure effectiveness.	Personal finance knowledge improved postintervention. Improving finance knowledge may be associated with decreased feelings of burnout.	Internal medicine residents (122 responded to preintervention survey and 120 to postintervention survey)	3	Reaction 5 Learning 3 Behaviour - Results -
( <i>Academic Medicine</i> ) <sup>33</sup>	1.5–4.5-hour curricula delivered at three institutions, designed and delivered by physicians, and supported by an institutional financial advisor. Information provided on local resources and loan repayment programmes. Preintervention and immediate postintervention surveys as well as a longer-term year-end postintervention survey.	Intervention appeared to prompt financial planning actions. PGY 1 residents were more likely than PGY 2 and 3 to complete positive financial planning actions.	Internal medicine residents at 3 institutions (135 responded to preintervention survey, 130 to immediate postintervention survey and 61 to year-end survey)	4	Reaction 5 Learning - Behaviour 4 Results -

GME, graduate medical education.

Finally, two studies showed an increased utilisation of knowledge (Behaviour).<sup>13 30 33 38</sup> However, no study revealed the impact of the curricula on participant organisations, employers or households (Results).

The 10 curricula studies covered multiple topics, with 1 study particularly focused on retirement plans.<sup>30</sup> Curriculum content selection varied across the studies. For example, one study identified topics through review of the general academic literature supplemented with topics specific to GME trainees.<sup>2</sup> In another study, an expert financial literacy educator collated a topic list, which was then modified based on participant feedback.<sup>38</sup> Four studies appeared to rely on author consensus to determine content.<sup>10 11 13 30</sup> One indicated that ‘non-commercial curricular content’ was developed with the expertise of an institutional financial advisor.<sup>33</sup> The remaining three studies heavily relied on participant input.<sup>32 57 58</sup> One of these studies found that holding sessions during protected time slots helped to increase attendance.<sup>32</sup>

Instructor selection also varied. Four studies used faculty members with a personal interest in finance but with unclear levels of expertise.<sup>2 11 30 57</sup> One of those studies was led by the medical school’s associate director of financial aid and scholarships.<sup>57</sup> Two used business professors.<sup>10 38</sup> One of those was an academician with specific expertise in the field of physician personal finance.<sup>38</sup> Another involved ‘content experts with graduate-level expertise in their fields.’<sup>10</sup> One study involved a physician who owns a personal finance website and funding from the Council of Residency Directors in Emergency Medicine.<sup>13</sup> The three remaining studies used a combination of faculty and credentialed financial-services professionals.<sup>32 33 58</sup>

Two of the 10 studies were primarily offered asynchronously online.<sup>10 13</sup> The others were all primarily delivered in-person.

## DISCUSSION

Despite the importance attributed to personal finance literacy training by medical students and GME trainees, we found only 10 publications describing actual curricula. All 10 curricula were highly regarded by attendees, and most studies reported increased financial knowledge and beneficial effects on financial decision-making or well-being. While only four of the 10 studies assessed postintervention financial decision-making, there were tangible effects on retirement account choices and subjective improvements in financial decision-making. However, none of the 10 studies assessed unequivocal and lasting long-term impacts. Also, most studies had issues with validation and generalisability, differences in instructor selection and variations in curriculum selection, all of which are discussed in more detail below. Finally, there may have been conflicts of interest, including in our inclusion/exclusion criteria, as well as within the papers themselves, particularly in selecting instructors.

**Table 2** Financial literacy topics included in prior curricula or in prior surveys/commentaries

Study	Financial literacy topics covered in prior curricula				Financial literacy topics mentioned in survey-based studies				Financial planning in general				
	Debt/ liabilities	Savings/ assets	Investing	Budgeting (income and expenses)	Money basics	Contract negotiation	Selecting/ interacting with advisors	Children's College	Insurance	Retirement planning	Estate planning	Taxes	No of topics covered
Dhalliwal 2007 <sup>30</sup>	x			x	x				x		x		6
Liezeit 2011 <sup>57</sup>	x	x	x	x							x		6
Mizell 2014 <sup>22</sup>	x		x				x		x	x			7
Meleca 2014 <sup>58</sup>	x		x		x				x		x		5
Boehnke 2018 <sup>2</sup>	x		x		x				x				5
Bar-Or 2018 <sup>38</sup>	x	x	x	x	x	x	x		x				10
Grewal 2021 <sup>10</sup>	x	x	x		x	x		x	x	x			12
Shappell 2021 <sup>13</sup>	x		x				x						4
Walsh 2021 <sup>11</sup>		x	x	x					x				4
Ng 2022 <sup>33</sup>	x	x	x	x				x	x				6
Financial literacy topics mentioned in survey-based studies													
Teichman 2001 <sup>7</sup>	x			x					x				5
Burg 2001 <sup>36</sup>	x		x					x	x				4
Teichman 2005 <sup>16</sup>	x		x	x					x				6
Glaspy 2005 <sup>17</sup>	x			x									3
Brown 2010 <sup>62</sup>	x			x									3
Witek 2014 <sup>35</sup>													1
Ahmad 2017 <sup>24</sup>	x	x	x	x					x	x			7
Jayakumar 2017 <sup>1</sup>	x	x	x		x				x				6
Yoo 2017 <sup>63</sup>	x							x		x			4
Shappell 2018 <sup>8</sup>	x	x	x	x				x	x				6
McKillip 2018 <sup>18</sup>	x		x	x			x		x				6
Tevlis 2018 <sup>6</sup>	x	x	x	x					x				6
Wong 2018 <sup>5</sup>	x	x	x	x				x	x				6
Connelly 2018 <sup>21</sup>	x								x				3
Mizell 2019 <sup>56</sup>	x	x	x	x		x			x	x			10
Jennings 2019 <sup>37</sup>	x												2
Adetayo 2019 <sup>28</sup>	x	x	x				x		x				7
Sharma 2020 <sup>64</sup>	x		x	x	x			x	x	x			8
Huebinger (2021) <sup>65</sup>	x		x	x				x	x				6
Wang (2021) <sup>9</sup>	x	x	x	x		x		x	x	x			10
Cone (2022) <sup>12</sup>	x	x	x	x	x		x		x				7

Continued



**Table 2** Continued

Study	Debt/ liabilities	Savings/ assets	Investing	Budgeting (income and expenses)	Money basics	Contract negotiation	Selecting/ interacting with advisors	Children's College	Insurance	Retirement planning	Estate planning	Taxes	Financial planning in general	No of topics covered
Financial literacy topics mentioned in commentary/opinion articles														
Greene 2002 <sup>34</sup>	x		x	x						x		x	x	6
Prabhakaran 2011 <sup>66</sup>	x								x	x		x	x	5
Thacker 2014 <sup>23</sup>	x	x		x						x		x		5
Bar-Or 2015 <sup>39</sup>													x	1
Johnson 2016 <sup>55</sup>	x	x	x	x	x	x	x	x	x	x	x			10
Borrelli 2017 <sup>3</sup>	x	x	x	x									x	5
Daily 2017 <sup>22</sup>	x	x	x	x	x		x	x	x	x		x	x	10
Mills 2018 <sup>67</sup>	x			x	x		x	x	x	x				6
Lundgren 2018 <sup>4</sup>	x	x	x	x	x				x	x			x	7
Daily 2018 <sup>68</sup>	x		x	x		x			x	x				6
Poppler 2019 <sup>69</sup>	x	x		x	x	x			x	x			x	7
Daily 2019 <sup>27</sup>	x			x			x						x	4
Ivy 2020 <sup>70</sup>	x	x	x	x						x		x	x	6
Heilman 2020 <sup>71</sup>	x	x		x			x			x				5
Moriarity 2020 <sup>29</sup>				x	x					x			x	4
Ogunkua 2021 <sup>14</sup>	x	x	x	x	x	x			x	x			x	8
Collins 2021 <sup>25</sup>	x	x	x	x	x	x			x	x	x	x	x	11
Bartlett 2022 <sup>72</sup>	x												x	2
No of times topic appears in studies	44	29	32	33	8	9	13	5	28	38	9	14	27	
Frequency of topic appearing in studies (% of 49 studies)	90	59	65	67	16	18	27	10	57	78	18	29	55	



### Validation and generalisability

To our knowledge, none of the studies used truly validated preintervention or postintervention surveys and knowledge tests, although one study partially addressed validation.<sup>13</sup> Due to lack of validation, some questions measuring participant knowledge and attitudes could have been unclear or overestimated learning. In fact, one of the studies compared self-assessments with tests of financial concepts and found a significant discrepancy between the two.<sup>32</sup> Reliable assessment of long-term knowledge was also uncertain, because the three studies that reported long-term outcomes lacked controls.<sup>2 30 33</sup>

Also, the reviewed studies may not have had generalisable results. Most publications were single-institution studies or involved trainees from one specialty. For example, one study focused on California-specific retirement plans, which are unlikely to be relevant for residents in other states. Further, most studies had relatively small sample sizes and only four had more than 100 participants,<sup>10 11 33 57</sup> which also constrained the significance of results.

### Instructor selection

Studies varied in selecting instructors, with most relying on physician instructors affiliated with the target audience (eg, faculty, residency programme directors or advisors). One study recommended using credentialed financial industry professionals as a cost-saving measure.<sup>32</sup> Another used a financial advisor to develop and present 'noncommercial curricular content'.<sup>33</sup> However, reliance on these types of professionals, such as insurance agents, brokers and financial advisors, is problematic. Although they are a cheaper resource willing to volunteer their time, they have an inherent interest in selling and marketing financial products and are therefore distrusted by participants.<sup>8 10 14 18 23 32 38 39</sup> Even with some oversight mitigating overt commercial agendas, there is a possibility that content and/or presentation will be biased. This spotlights a key dilemma for UME and GME programmes: delivering a low-cost curriculum utilising industry professionals versus expending more resources to secure instructors who have no conflicts. The choice is further complicated by the relative scarcity of unbiased, expert instructors. Local business schools may be a good source of instructors, but likely in limited numbers since more business faculty examine the financial services profession from a corporate perspective rather than from the perspective of consumers. One feasible method for instructor recruitment is the 'train-the-trainer' model, in which interested physicians learn the material from qualified, unbiased sources and then use that knowledge to deliver curricula at their home institutions. An alternative is to mandate financial literacy education in every programme and develop future expert faculty from earlier generations of programme participants.<sup>25</sup>

### Curriculum content

Curriculum content selection varied across studies, with some emphasising participant input,<sup>32 58</sup> and others with topics selected by instructors or provided by external

sources. Regardless of the method of topic selection, most studies covered debt management, investing, insurance and retirement planning. In contrast, fewer addressed children's college planning, contract negotiation or estate planning. The latter topics may reflect a relative lack of interest by medical students and trainees. For example, contract negotiation is only applicable to trainees who are poised to take their first full-time jobs. Similarly, children's college planning and estate planning are less relevant for younger trainees, who are less likely to have families or assets requiring protection. Nonetheless, more comprehensive financial literacy curricula included these topics, since financial needs can quickly change due to life events. Therefore, our proposed curriculum (online supplemental table A4) provides a comprehensive standardised programme to prepare undergraduate medical students and trainees for important financial decisions.

### Conflicts of interest

As noted in our inclusion and exclusion criteria, we rejected papers authored by finance industry professionals as well as those whose authors accept payment from the financial services industry. We acknowledge a potential conflict in paper selection as one of our authors (YDB-O) is paid to teach personal finance topics (fewer than 6 days a year) to healthcare professionals and has written books on the subject.

A significant conflict applies in instructor selection for teaching personal finance in UME and GME programmes, as acknowledged by several curriculum papers discussing potential instructor bias by finance industry professionals.<sup>10 32 33 38</sup>

### Development of curriculum

Since there are strong benefits for comprehensive, standardised financial literacy curricula for physicians, we compiled a sample curriculum encompassing all the financial themes identified in this review. The recommended curriculum and objectives are described in online supplemental table A4. The curriculum topics are all derived from the studies summarised in table 2, and are also considered core subjects in a standard personal financial planning textbook.<sup>59</sup>

This model curriculum may be delivered over the course of a semester or in a more concentrated fashion. If there are time constraints, the topics labelled as optional may be dropped. Of note, the curricula may be delivered in-person or virtually as recommended by Shappell *et al.*<sup>8</sup> and as executed by Shappell *et al.*<sup>13</sup> and Grewal and Sweeney.<sup>10</sup> Virtual content can be delivered either synchronously or asynchronously. The latter may be particularly advantageous due to common scheduling challenges faced by medical students and trainees. Based on prior studies, we hypothesise that the comprehensive curriculum will improve Kirkpatrick model<sup>43</sup> Learning scores, and an exclusion of potentially biased instructors will likely lead to better Behaviour scores. Ultimately, there will also be improved Results scores.



## Limitations

This review highlights several challenges, including a paucity of validated measures to evaluate curricula and the lack of higher-level Kirkpatrick (Results) scores. In addition, it was difficult to compare the relative merits of the 10 studies due to varied depths of reporting, especially for the two brief reports.<sup>2 57</sup> Furthermore, participants varied from medical students to residents and fellows and spanned many specialties. Consequently, the resulting curricula were heterogeneous, shaped by a variety of scheduling challenges, time constraints and objectives. Also, we were unable to assess the quality or accuracy of the content offered to participants. We could not observe the researchers in action, so our Côté-Turgeon and Kirkpatrick Model assessments are based only on what we were able to glean from the written word.

We did not review popular bloggers who are active in this space. Their participation may be considered positive in providing relevant content, but it must be noted that some of them receive money from the financial services industry, raising concerns regarding their objectivity.

Finally, our review may have excluded relevant articles by limiting our attention to physicians and medical trainees, even though dentists, nurses and pharmacists, to name a few professions, have similar personal finance concerns. We assessed only articles written in the English language and omitted articles from outside the USA, which may have useful recommendations, including two high-quality Canadian studies.<sup>31 60</sup> Although some terminology and accounting rules differ across national jurisdictions, concepts such as financial planning, saving, investing, budgeting, taxation, retirement planning, insurance coverage, estate planning and dealing with financial advisors are important for professionals worldwide.

## Future research

Further research is critical to determine the most effective modes of instruction and assessment. Quantifying knowledge retention is particularly important because the value of financial literacy interventions dissipates over time.<sup>61</sup> Also, rigorous longitudinal studies are needed to quantify the impact of financial literacy curricula on decision-making and wellness; and to explore whether alternative instructional modalities, such as webinars or asynchronous online presentations, are more effective than traditional in-person instruction. Identification of effective alternative delivery methods is especially important because novel modalities could help overcome scheduling challenges. Further study should also assess the impact of personal finance training for medical students on choice of specialty, and in particular selection of primary care careers.

## CONCLUSIONS

Our study is the first review of existing research on personal finance literacy for medical students and physician trainees. It is also the first study that proposes a curriculum guided by extensive review of published curricula. Our review confirms strong interest in financial literacy among medical students

and physician trainees in a variety of specialties and highlights the importance of financial decision-making as a necessary personal skill. Further research is needed to quantitatively examine longitudinal outcomes, including changes in quality and quantity of actual financial decisions, and impact on physician wellness. Our proposed curriculum, covering all major personal finance topics, may provide the opportunity to investigate these areas through impact evaluation.

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