GPS' PERSPECTIVE AND PRACTICES RELATED TO HEALTH CHECK-UPS

Ine Vanden Bogaert

Promotor: prof. dr. Stefan Heytens, Universiteit Gent

Co-promotor: dr. Veerle Piessens, Universiteit Gent

Master of Family Medicine

Masterproef Huisartsgeneeskunde
Academiejaar: 2023 – 2026

Deze masterproef is een examendocument dat niet werd gecorrigeerd voor eventueel vastgestelde fouten. Zonder voorafgaande schriftelijke toestemming van zowel de promotor(en) als de auteur(s) is overnemen, kopiëren, gebruiken of realiseren van deze uitgave of gedeelten ervan verboden. Voor aanvragen tot of informatie i.v.m. het overnemen en/of gebruik en/of realisatie van gedeelten uit deze publicatie, wendt u tot de universiteit waaraan de auteur is ingeschreven.

Voorafgaande schriftelijke toestemming van de promotor(en) is eveneens vereist voor het aanwenden van de in dit afstudeerwerk beschreven (originele) methoden, producten, schakelingen en programma's voor industrieel of commercieel nut en voor de inzending van deze publicatie ter deelname aan wetenschappelijke prijzen of wedstrijden.

This master's thesis is an examination document that has not been corrected for any errors that may have been identified. Reproduction, copying, use, or implementation of this publication or any part thereof is prohibited without the prior written permission of both the supervisor(s) and the author(s). Requests for or information concerning the reproduction and/or use and/or implementation of parts of this publication should be addressed to the university at which the author is enrolled.

The prior written permission of the supervisor(s) is also required for the use of the (original) methods, products, circuits, and programs described in this thesis for industrial or commercial purposes, as well as for submitting this publication for participation in scientific prizes or competitions.

1. Abstract

Context: Health checks zijn een frequente reden voor een consultatie bij de huisarts. Tot op heden is er echter geen overtuigend bewijs dat health checks de algemene gezondheid verbeteren en komen ze bovendien niet zonder risico's. Zo zijn onnodige kosten voor patiënt en maatschappij, vals positieve resultaten, of onnodige vervolg consultaties bij ambigue resultaten voorbeelden van mogelijke nadelige effecten. Desondanks blijft de health check een frequente reason for encounter in de huisartsenpraktijk. Om tot een gezondheidszorg te komen waarbij de juiste screening de juiste mensen bereikt is het ook belangrijk te weten hoe de zorgverleners die deze zorg verlenen denken en werken met het begrip "health check".

Onderzoeksvraag: Welke gedachten, emoties of opinies hebben huisartsen omtrent het begrip "check-up" en wat doen ze in de praktijk?

Methode: Voor deze scoping review werd een zoekstrategie ontwikkeld voor PubMed en Web of Science, opgebouwd rond drie thema's: "huisartsen", "perspectieven en praktijk" en "check-up". De zoekstrategie leverde 7817 resultaten op. Na het manueel toepassen van de in- en exclusiecriteria volgens een 3-voudige screeningsronde (eerst op titel, daarna op abstract, daarna op full-tekst) werden finaal 11 artikels geïncludeerd.

Resultaten: Uit de geïncludeerde artikels kwamen verschillende thema's naar voren, die werden onderverdeeld in twee hoofdcategorieën: perspectieven en praktijken. De door artsen vermelde items werden binnen deze categorieën gegroepeerd en systematisch opgelijst. Er bleek geen consensus te bestaan over het concept "health check", noch tussen de verschillende artikels, noch binnen individuele studies. Wanneer huisartsen een health check uitvoerden, bestond deze uit één of meer van deze vijf componenten: anamnese, gezondheidsbevordering, klinisch onderzoek, laboratoriumonderzoek en andere technische onderzoeken (bv. ECG).

Conclusie: Het beperkte aantal geïncludeerde artikels benadrukt de huidige schaarste aan onderzoek naar de perspectieven en praktijken van huisartsen met betrekking tot health checks. De bevindingen van deze review kunnen als uitgangspunt dienen voor verder kwalitatief en kwantitatief onderzoek, bijvoorbeeld aan de hand van interviews en vragenlijsten**.** Uiteindelijk kan deze informatie bijdragen aan de ontwikkeling van een verbeterproject of een richtlijn voor artsen om op een evidence-based manier met het concept "health check" om te gaan. Dit om ervoor te zorgen dat de juiste preventieve onderzoeken de juiste personen bereiken en dat de mogelijke nadelige effecten van screening tot een minimum worden beperkt.

2. Abstract (ENG)

Background: Health checks are a frequent reason for consultation in general practice. However, to date, there is no evidence that general health checks provide a meaningful health benefit at the population level, and they are not without potential risks. Unnecessary costs for patients and society, false-positive results or unnecessary follow-up consultations and investigations following ambiguous findings are some potential risks. Despite this, health checks remain a common reason for encounter in general practice. To develop a healthcare system in which appropriate screening reaches the people most likely to benefit, it is also important to understand how the healthcare professionals delivering this care perceive and approach the concept of a "health check".

Research question: What are GPs' perspectives, perceptions, and attitudes towards the concept of a "health check", and how do they approach and implement health checks in clinical practice?

Methods: A scoping review was conducted using a search strategy developed for PubMed and Web of Science. The search strategy consisted of three themes: "general practitioners", "perspectives and practices", and "health check". The search yielded 7,817 records. Following the manual application of the predefined inclusion and exclusion criteria through a three-stage screening process (title, abstract, and full-text screening), 11 articles were ultimately included.

Results: Several themes emerged from the included articles, which were categorized into two main domains: perspectives and practices. Items reported by physicians were grouped and systematically summarized within these domains. No consensus was identified among physicians across the included articles, or even within individual studies, regarding the concept and content of a "health check". When health checks were performed they consisted of one or more of five main components: history-taking, health promotion, physical examination, laboratory investigations, and/or other technical investigations (for example an ECG).

Conclusion: The number of included studies highlights the scarcity of evidence regarding physicians' perspectives and practices concerning health checks. This review provide an overview of the ideas and practices currently described in the literature and may serve as a starting point for further research, for example through qualitative interviews and quantitative questionnaires. Ultimately, a better understanding of GPs' perspectives and practices could inform the development of quality improvement initiatives or clinical guidelines to support an evidence-based approach to health checks, ensuring that appropriate preventive interventions reach the people most likely to benefit from them while minimizing unnecessary testing and its potential adverse consequences.

Content

1. Abstract 3

2. Abstract (ENG) 4

3. Introduction 7

4. Material and methods 9

4.1. Search in PubMed 9

4.2. Search in Web Of Science (WOS) 10

4.3. Inclusion and exclusion criteria 10

4.4. Article selection process 11

4.5. Data extraction and synthesis 11

5. Results 12

5.1. Demographics of the primary care physicians 14

5.2. GPs' perspective on health check-up's 17

5.2.1. Overall attitude concerning health checks 17

5.2.2. Perceived benefits 17

5.2.3. Perceived disadvantages/risks 18

5.2.4. Facilitators to perform health checks 20

5.2.5. Barriers to perform health checks 21

5.2.6. Who should perform health checks? 23

5.2.7. Where should health checks be performed? 24

5.3. GPs' practices related to health check-up's 26

5.3.1. Medical History 26

5.3.2. Health promotion 27

5.3.3. Physical examination 27

5.3.4. Laboratory screening 28

5.3.5. Other specific tests 30

6. Discussion 32

7. Conclusion 35

8. Limitations 35

References 36

3. Introduction

“An ounce of prevention is worth a pound of cure.” Prevention has become an increasingly important focus within contemporary healthcare, with growing attention to proactive approaches to maintaining health and preventing disease. This is also reflected in patients’ behavior, as individuals increasingly seek to actively monitor and manage their health. A consultation with a general practitioner (GP) specifically requesting a health check is therefore not uncommon.

Despite the popularity of health checks among the general population, there is currently no evidence supporting the routine provision of a general health check to the entire asymptomatic population. However, “health check” is a frequent reason for encounter as said above. This is particularly relevant because health checks are not necessarily without disadvantages. The indiscriminate use of laboratory tests [12] and other investigations may result in incidental or clinically ambiguous findings, potentially leading to additional investigations, follow-up consultations, and interventions that may ultimately provide little or no benefit to the patient or even harm them in some way. [14, 15, 16] Such unnecessary investigations may also contribute to increased healthcare expenditure at both the individual and population level.

The World Health Organization (WHO) notes the following regarding health checks on its official website:

“*There appears to be a growing trend in the WHO European Region towards more health checks and screening for noncommunicable diseases, yet a clear evidence base for effectiveness may be missing. Policy-makers, health professionals and the public may be unaware of the potential harm of screening, its cost and burden on the health system, and the need for strong quality assurance.”* [13]

To develop a healthcare system in which preventive care achieves maximum benefit while minimizing the potential adverse effects of screening, it is important to understand the perspectives, ideas, and practices of the healthcare professionals delivering this care. There is already a body of literature exploring patients’ motivations, expectations, and perceptions when requesting a health check from their GP. But considerably less is known about the perspectives and practices of GPs themselves. What does a “health check” mean to GPs in clinical practice? What are their motivations, expectations, and attitudes towards such consultations? Which preventive interventions or investigations do they perform or not, and how do they decide?

The aim of this scoping review is therefore to map the available scientific literature on GPs' perspectives and practices regarding health check-ups. By exploring how GPs perceive and approach health checks in real-world primary care this review seeks to provide insight into the gap between the lacking evidence regarding generalized health checks and their occurrence in clinical practice. A better understanding of physicians' perspectives, decision-making, and practical approaches may be valuable when considering on a policy-maker level how preventive care should be organized and whether, and in what form, guidance on health checks could be developed. Such guidance could potentially help ensure that preventive interventions are targeted towards patients who are most likely to benefit, while limiting unnecessary testing, incidental findings, subsequent investigations, and avoidable healthcare expenditure.

4. Material and methods

A literature search concerning the subject was conducted in the Medline Database (through PubMed) and Web Of Science.

4.1. Search in PubMed

The search strategy combined three main concepts: (1) general practitioners / primary care physicians, (2) perspectives, attitudes, and practices, and (3) health check-ups or preventive examinations.

(1)	"general practitioners"[MeSH Terms] OR "physicians, family"[MeSH Terms] OR "physicians, primary care"[MeSH Terms] OR “general practitioner*”[TIAB] OR “GP”[TIAB] OR “GPs”[TIAB] OR “general practice physician*”[TIAB] OR “primary care physician*”[TIAB] OR “family physician*”[TIAB] OR “family doctor”[TIAB] OR “primary care provider*”[TIAB]
(2)	“Practice Patterns, Physicians'”[MeSH Terms] OR "attitude of health personnel"[MeSH Terms] OR “practice patterns”[TIAB] OR “professional practice”[TIAB] OR “perspective*”[TIAB] OR “perception*”[TIAB] OR “attitude”[TIAB] OR “point of view”[TIAB] OR “view”[TIAB] OR “opinion”[TIAB] OR “experience*”[TIAB] OR “approach”[TIAB] OR “actions”[TIAB] OR “beliefs”[TIAB] OR “ideas”[TIAB] OR “expectation*”[TIAB] OR “motive*”[TIAB] OR “standpoint”[TIAB] OR “assumption*”[TIAB] OR “presumption”[TIAB] OR “outlook”[TIAB] OR “thoughts”[TIAB]
(3)	"Physical Examination"[Mesh:NoExp] OR "preventive health services"[MeSH Terms] OR “health check*”[TIAB] OR “check-up*”[TIAB] OR “general check-up”[TIAB] OR “checkup*”[TIAB] OR “routine exam*”[TIAB] OR “preventive visit*”[TIAB] OR “general medical exam*”[TIAB] OR “periodic health evaluation*”[TIAB] OR “routine visit*”[TIAB] OR “wellness visit*”[TIAB] OR “routine physical exam*”[TIAB] OR “annual physical”[TIAB] OR “routine blood test*”[TIAB]

Table 1, coded PubMed search string

4.2. Search in Web Of Science (WOS)

The same 3 concepts were coded and combined in the search builder in WoS. The search was conducted in the Web Of Science Core collection. The search string is find below.

(1)	TS=("general practiti*" OR “GP” OR “GP’s” OR “general practice physician*” OR “primary care physician*” OR “family physician*” OR “family doctor*” OR “primary care provider*”)
(2)	TS=("attitude of health personnel" OR “practice patterns” OR “professional practice*” OR “perspective*” OR “perception*” OR “attitude*” OR “point of view” OR “view” OR “opinion*” OR “experience*” OR “approach” OR “actions” OR “beliefs” OR “idea*” OR “expectation*” OR “motive*” OR “standpoint” OR “assumption*” OR “presumption” OR “outlook” OR “thoughts”)
(3)	TS=("preventive health service*” OR “health check*” OR “check-up*” OR “general check-up” OR “checkup*” OR “routine exam*” OR “preventive visit*” OR “general medical exam*” OR “periodic health evaluation*” OR “routine visit*” OR “wellness visit*” OR “routine physical exam*” OR “annual physical” OR “routine blood test*”)

Table 2, coded web of science search string

4.3. Inclusion and exclusion criteria

All articles concerning ideas, perspectives and practices of general physicians concerning the health check-up in asymptomatic patient published in the 21st century world-wide were withheld. However, articles focusing solely on secondary, tertiary or even quaternary prevention were not withheld as they are considered out of scope for this review. The same goes for articles focusing on disease specific check’s (e.g. focusing specifically on a mental health check or limiting it to a cardiovascular health check) or disease specific guidelines/protocols. Furthermore, articles without full-text were excluded as well. The included articles concerned quantitative and qualitative studies and literature reviews. The reader may find the table containing all exclusion criteria on the next page (*table 3*).

Exclusion Criteria	
1	Articles published before 2000.
2	Duplicate records (identified in Web of Science and PubMed).
3	Articles reporting solely the opinions and/or practices of students
4	Articles focusing exclusively on the opinions and/or evaluation of predefined health check-up protocols, guidelines, or standardized programs
5	Full text unavailable through EndNote, PubMed, Ghent University Library, or Google Scholar
6	Articles addressing only a specific component of a health check-up or the opinions and/or practices regarding a single predetermined health check marker (e.g., vitamin D testing in primary care).
7	Articles concerning health check-ups for a specific non-communicable disease (e.g., routine 3-monthly blood tests for patients with diabetes).
8	Articles focusing exclusively on secondary, tertiary, or quaternary prevention.

Table 3, exclusion criteria

4.4. Article selection process

The selection of eligible articles was conducted through a three-stage screening process, with the predefined inclusion and exclusion criteria applied manually at each stage.

1. The first selection took place by screening on title.
2. A second selection round was based on reading the abstracts.
3. Lastly a third and final selection consisted of reading the entire article and checking if any exclusion criteria were met.

4.5. Data extraction and synthesis

Once the articles meeting all predefined inclusion and exclusion criteria had been identified, the full texts were reviewed multiple times. A descriptive approach to data synthesis was adopted. This was considered appropriate for a scoping review with the aim of providing as comprehensive an overview as possible of the currently available evidence regarding physicians' perspectives, perceptions, and practices concerning health checks.

5. Results

Article selection process.

The total number of yielded results before applying the exclusion criteria was 7817 (7,232 results in PubMed and 585 results in Web of Science). After excluding papers published before the year 2000 a total of 6474 references were left.

Through the use of endnote2025® 96 duplicates were identified. After checking manually and confirming these hits were in fact duplicates, the total number of articles was reduced to 6378.

From there on, further refinement of the articles deemed in scope was achieved by the following manual screening strategy by applying the in- and exclusion criteria in 3 rounds:

1. The first selection took place by screening on title. It reduced to total number of articles from 6378 to 178.
2. A second selection round was based on reading the abstracts. Only 11 articles were withheld after applying the exclusion criteria.
3. Lastly a third and final selection consisted of reading the entire article and checking if any exclusion criteria were. All remaining articles were included after this.

See also *figure 1, article screening process* for an overview of this process on the next page.

The 11 included articles were published from 2000 until 2025 and originate from different countries all-around the world, except no papers from the South-American continent were retrieved. Three papers were published from research done in Saudia-Arabia, 1 in Japan, 1 in Ireland, 2 in the USA, 1 in Denmark, 1 in the UK and Netherlands combined, 1 in Malaysia and 1 in different countries from the Eastern Mediterranean Region.

The included papers showed information derived from (group) interviews, self-administered questionnaires and a scoping review. The sample sizes of primary care physicians involved varied from 19 to 1235. For an overview and more information also see *table 4, characteristics of included articles*, on pages 15-16.

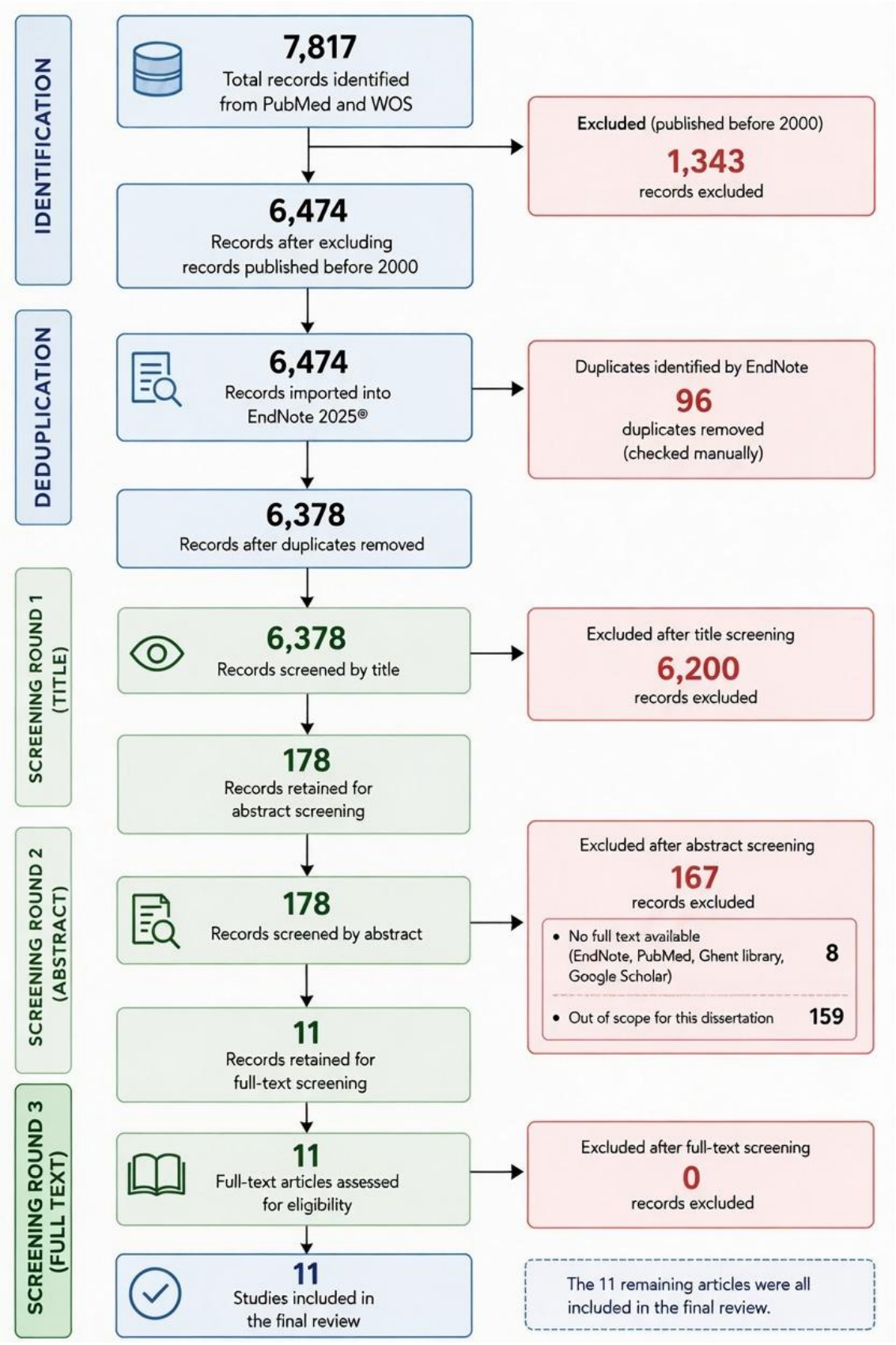


Figure 1, article screening process.

Data extraction and synthesis.

During the repeated reading of the articles, several subthemes were identified within the two main domains of “perspectives” and “practices”. These subthemes are presented under sections 5.1 to 5.3. For each subtheme, for example “perceived benefits of health checks”, the relevant findings from the individual articles were extracted and summarized. For each subtheme, the number of the 11 included articles reporting relevant information was recorded, together with an indication of whether the findings were based on qualitative or quantitative data. This distinction is relevant when interpreting the findings, as the method of data collection may have influenced which perspectives and practices were identified. For example, questionnaire-based studies may not have captured all practices performed by GPs if these were not explicitly included among the response options. Consequently, some perspectives or practices may have been underrepresented. On the other hand, the interviewer’s perspective may play a role in how questions are formulated and potentially also in how the results are subsequently interpreted.

The identified items were subsequently presented in overview tables for each subtheme. These tables were organized according to the number of articles in which each item was reported, allowing the items most frequently mentioned across the included literature to be readily identified.

For example *“good for patient-doctor relationship”* was an item identified under *“perceived benefits”*.

Given the limited sample of studies and their methodological and contextual heterogeneity, it was not considered appropriate (and often not even possible) to report absolute frequencies or to draw quantitative conclusions regarding the prevalence of specific practices or perspectives. Instead, the occurrence of each item was recorded dichotomously, based on whether or not it was reported in a particular article. The implications of this approach and its limitations are discussed further in section 6 “discussion”.

5.1. Demographics of the primary care physicians

All papers included female and male physicians in different age groups. Four out of 11 papers included other specialties as well (gynecologists and/or pediatricians and/or internal medicine) because they are seen as part of the primary healthcare in the respective countries [4,6,9,10]. The participants worked in different settings going from rural areas to city centers, private practices to community practices. (Also see table 4).

	Title	authors	publication date	type of data	method	sample size	country
1	Primary health care physicians' views on periodic health evaluation in Saudi Arabia	al-Rowais, N., Khoja, T., al-Farra, M. & al-Nahedh, N	2000	combined qualitative-quantitative research	self-administered and pre-tested questionnaire	1235	saudi-arabia
2	Barriers to routine checkups use among Saudis from the perspective of primary care providers: A qualitative study	Alzahrani, A.M., Quronfulah, B.S., Felix, H.C. & Khogeer, A.A.	2022	qualitative research	interviews	19	saudi-arabia
3	Facilitators for Routine Medical Checkups Use from the Perspective of Primary Care Providers: A qualitative study	Alzahrani, A.M., Quronfulah, B.S., Felix, H.C. & Khogeer, A.A.	2025	qualitative research	interviews	19	saudi-arabia
4	Attitudes of Japanese primary care physicians toward publicly endorsed periodic health examinations: a cross sectional survey	Miyazaki, K., Sato, J., Mukohara, K., Kitamura, K., Saito, S. & Ban, N.	2007	quantitative research	cross-sectional, questionnaire	722/1971	Japan
5	The 'general check-up' in the asymptomatic adult—a study of GPs in the North West of Ireland	Murphy, M., McGloughlin, M. & Walkin, S.	2015	combined qualitative-quantitative research	a cross-sectional postal-survey	97/136	Ireland

Table 4, characteristic of included articles

	Title	authors	publication date	type of data	method	sample size	country
6	Support of evidence-based guidelines for the annual physical examination: a survey of primary care providers	Prochazka, A.V., Lundahl, K., Pearson, W., Oboler, S.K. & Anderson, R.J.	2005	quantitative research	a cross-sectional postal-survey	783/1679	USA
7	Health Promotion, Disease Prevention and Periodic Health Checks: Perceptions and Practice among Family Physicians in Eastern Mediterranean Region	Qidwai, W., Nanji, K., Khoja, T., Rawaf, S., Al Kurashi, N., Alnasir, F.,	2015	combined qualitative-quantitative research	a cross-sectional survey, questionnaire through e-mail	100/140	multi-country (Eastern mediterranean region)
8	Diversity and ambivalence in general practitioners' attitudes towards preventive health checks - a qualitative study	Søndergaard, A., Christensen, B. & Maindal, H.T.	2012	qualitative research	focus group interviews	16/100	Denmark
9	The adult screening physical examination: what physicians do	Wildes, T. & Anderson, R.	2004	quantitative research	questionnaire	144/279	USA
10	Implementation of Annual Health Assessments for Adults With Intellectual Disabilities: An Integrative Review	Breau, G., Tiwari, R., Ravindran, S. & Gijssel, E.	2025	combined qualitative-quantitative research	scoping review	35/6189 (articles)	high-income English speaking countries (articles)
11	Physician's intention to initiate health check-up discussions with men: a qualitative study	Tong, S.F., Low, W.Y., Ismail, S.B., Trevena, L. & Willcock, S.	2010	qualitative research	in-depth interviews and focus group discussions	52	Malaysia

Table 4, characteristic of included articles

5.2. GPs' perspective on health check-up's

5.2.1. Overall attitude concerning health checks

Five articles provided information about the overall rather positive or negative attitude of primary care physicians towards periodic health examination (PHE), the other 6 did not discuss this specific topic. The articles involved all gathered quantitative information about this topic through a questionnaire. In [1] the investigators asked if GPs would recommend a PHE "to all, some or no clients" or if they expressed "no preference". 89.5% of the interrogated GPs ticked the box to recommend a PHE to all (68.7%) or some (20.7%) of their patients. 9.6% would not recommend a PHE at all and 0.7% had no preference regarding this statement. Article [4] asked if the physicians believed "a PHE is effective in general", 85% of the involved physicians ticked the box "yes". Of the other 15% participants, 12.3% did not answer this question. In the Irish study [5] the authors state that 60% of participants found a PHE useful, 22% found them not useful an 18% were unsure. In [6] 65% of the physicians agreed or strongly agreed (other options were "disagree" or "strongly disagree") with the statement that an annual physical is necessary for asymptomatic adults. Paper [7] asked through a questionnaire "do you recommend PHE". Here 53% ticked the box "always", 47% ticked "sometimes" and 0% ticked "never".

In the included articles in this dataset, the majority of physicians were in favor of health checks as in every study 50% or more of the physicians would recommend PHE to all or some patients or more than half of the physicians found health checks to be useful.

5.2.2. Perceived benefits

Across the included articles, 9 perceived benefits of periodic health examinations (PHEs) were identified. These benefits were reported in six of the 11 included articles [1, 4, 5, 6, 8, 10]. In two of these studies [4, 6], the data were collected using questionnaires, meaning that the reported benefits were not necessarily spontaneously identified by the GPs themselves. However, the majority of GPs in these studies expressed agreement with the proposed benefits. The nine identified benefits are summarized in Table 5.

Perceived benefits (9 items)	
Item	Source Reference(s)
Early detection of disease	1, 4, 6
An opportunity for health promotion/Lifestyle advice/counseling	1, 5, 6
Improving the patient-physician relationship	1, 5, 6
Improving public health	1, 4
Meeting patient expectations	1, 6
Reaching patients who would not have come otherwise	8, 10
Reducing negative effects of disease	1
Good for the business of the practice	5
Detection of unmet needs	10

Table 5, perceived benefits

5.2.3. Perceived disadvantages/risks

Overall, seven perceived disadvantages or potential risks of periodic health examinations (PHEs) were identified across three of the 11 included articles [5, 7, 8]. All but one of these items were identified through interviews and were therefore 'spontaneously' reported by GPs. The exception was "interference with daily work and disease treatment", which was assessed through a questionnaire in article [7]. For this item, respondents could answer "yes", "no", or "don't know". Of the respondents, 29% answered "yes", 33% answered "no", and 38% answered "don't know".

It is important to note that the majority of the identified disadvantages were reported in a single article [5]. Table 6 provides an overview of the identified risks.

Perceived disadvantages/risks (7 items)	
Item	Source Reference(s)
Patients being falsely reassured	5, 8
Patient anxiety in case of abnormal findings	5, 8
Increased workload for GPs	5
Overdiagnosis	5
False positives and/or negatives	5
Creation of a 'worried-well' group	5
Interference with daily work and disease treatment	7

Table 6, perceived disadvantages/risks

Summary of results regarding overall attitude, benefits and disadvantages of PHE.

Several perceived advantages and disadvantages emerged from the included articles. “Improving the doctor–patient relationship” was mentioned most, in 3 articles [1, 5, 6], as was the perception that “disease could be detected at an earlier stage” [1, 4, 6]. False reassurance among patients and the potential induction of (avoidable) anxiety were each mentioned twice among the 11 articles as disadvantages [5, 8] and this made them the most commonly mentioned negative aspects related to health check ups. Within our small dataset, physicians identified more advantages then disadvantages. Nine different advantages were mentioned for a total of 18 times throughout the different articles. When looking into the disadvantages we found that a total of 7 separate disadvantages were mentioned separately for a total of 9 times across all articles. Among the 5 articles reporting on physicians’ overall attitudes towards health checks, the majority of physicians consistently expressed a positive attitude towards health checks [1, 4, 5, 6, 7]. Thus, within this group of physicians, there appears to be a generally favorable attitude towards some form of health check, with more perceived advantages than disadvantages. This is however a preliminary conclusion based on a limited sample size

5.2.4. Facilitators to perform health checks

GPs who supported the implementation of health checks identified several factors that could facilitate their provision. Overall, 16 facilitators were identified across four of the 11 included articles [3, 5, 10, 11]. These findings were primarily derived from qualitative data, except for one study being a scoping review [10]. The identified facilitators could be categorized into three main groups: factors related to the patient, the physician, and the healthcare system.

The facilitator most frequently reported across the included articles was “good knowledge and skills of the healthcare provider”, which was identified in three articles. This referred to the provider’s knowledge and expertise regarding screening and preventive health assessments. A “guideline or standardized format for health checks” was the second most frequently reported facilitator, identified in two articles. An overview of all identified facilitators is provided in Table 7.

Facilitators (16 items)	
Item	Source Reference(s)
Facilitators related to the patients	
Patients with good health literacy	3
patients awareness of periodic health examinations	3
Facilitators related to the physicians	
Good knowledge and skills of the provider	3, 10, 11
training for providers to perform health checks	10
perceived importance of (parts of) health checks by the physician	11
perceived receptivity to health checks of their patients	11
The physician-patient relationship (trust)	11
Facilitators related to the healthcare system	
a guideline/standard form for health checks	5, 10
Increased staff in primary care	3
specific centers for health checks/screenings	3
establishing a national program for routine medical checks	3
a scheduling system for health checks	3
a national invitation system for the public to take part in health checks (p. ex with phone messages, posters,..)	3
a financial incentive for physicians to perform health checks	10
Time available for routine check-ups	10
promotion of health checks by academic centers	10

Table 7, facilitators

5.2.5. Barriers to perform health checks

The GPs included in the studies also reported several barriers to the provision of health checks. In total, 19 barriers were identified across five of the 11 included articles [1, 2, 8, 10, 11]. The barriers were primarily identified through qualitative research using interviews, with the exception of article [10], which was a scoping review. Again, the identified items could be categorized into 3 main groups: barriers related to the patient, barriers related to the provider an barriers related to the healthcare system. An overview of the identified barriers is provided in Table 8.

Barriers (19 items)	
Item	Source Reference(s)
Barriers related to the patients	
Lack of knowledge on general health	2
Perception of healthcare (only seek healthcare services when sick)	2
Fear of discovering new health issues with screenings	2
Discomfort with certain procedures (p. ex. colonoscopy)	2
Fear of contracting illness from the clinic when not sick (p. ex. coronavirus)	2
Lack of transportation	2
Lack of time	2
Miscommunication	11
Barriers related to the physicians	
Lack of knowledge/skills in preventive services	2, 10
Negative attitude/sentiment towards check-ups	2
Perceived receptivity to health checks of their patients	11
Gender issues between physician an patient	11
Miscommunication	11
Barriers related to the healthcare system	
Time constraints	1, 2, 8, 10
Increased workload	1, 2
Lack of information	1
Financial issues	1
Shortage in manpower	2
Shortage of equipment	2

Table 8, barriers

Summary of results regarding barriers and facilitators.

When comparing the identified facilitators and barriers within this dataset, more barriers were identified (19 items) than facilitators (16 items). Note however, that a substantial proportion of both facilitators and barriers originated from two articles [2, 3] which were conducted by the same research group. Furthermore, several of the identified facilitators and barriers represented opposing aspects of the same underlying factor. This overlap should be taken into account when interpreting the apparent difference in the number of barriers and facilitators identified.

The analysis of perceived barriers and facilitators revealed three main themes: factors related to the patient, factors related to the physician, and factors related to the healthcare system in which physicians work. At the patient level, physicians highlighted the importance of health literacy, patients' understanding of the purpose of the healthcare system, and whether patients were able to attend a health check [2, 3, 11]. At the healthcare provider level, physicians particularly mentioned knowledge and skills related to preventive medicine and communication skills [2, 3, 10, 11], with these factors being described both as facilitators and as barriers. At the healthcare system level, the most prominent factors were the availability of financial resources, time, equipment, healthcare professionals, and access to clear guidelines [1, 2, 3, 5, 8, 10].

5.2.6. Who should perform health checks?

The opinions of the consulted primary care physicians differed when asked about by whom the health checks should (or could) be performed. A total of 6 out of 11 articles contained some information on this topic [1, 2, 3, 5, 7, 8].

Some considered the primary care physician the best person to exert this kind of check-ups, others suggested the hospital doctor, practice nurse or a specific educator in preventive health, or a cooperation between them.

Table 9 gives an overview of the collected data. Article [1] asked who the GPs thought was the best person to perform a PHE. Article [2], [3] and [8] collected data through interviews and merely stated that GPs, Practice nurse or a specific educator could perform the PHE. Article [7] offered 3 choices, namely "GP" , "hospital" doctor and "practice nurse" as possible conductors of a PHE and for each option, the correspondents could answer "yes", "no" or "don't know".

Who should perform PHEs?					
	GP	Hospital doctor	Practice nurse	Specific educator	Combination
Article 1 quantitative	28%	5.6%	1.3%	/	"Some" - no exact data given
Article 2 qualitative	x		x		
Article 3 qualitative	x			x	
Article 7 quantitative	99% yes 1% no 0% NA	45% yes 39% no 16% NA	43% yes 50% no 7% NA	/	/
Article 8 qualitative	x			x	

Table 9, who should perform PHEs

Article 5 did not entail any information on who the GPs thought should perform the PHE, but they did notice 70% of correspondents did not agree with private companies offering health checks. They also stated 20% did agree an 10% were unsure.

Note: the percentages cited in the table 9 for article 1 are not complete, this is because the article provides no information concerning the remaining 65.1% on this topic (this could be due to missing data, but this is not stated in the article).

5.2.7. Where should health checks be performed?

Concerning the place of the check, some were in favor of doing the health checks in de primary care health center (PHCC), others in the hospital or in a specific (maybe even mobile) clinic for health checks. Some also suggested carrying out health checks at patients' homes. A total of 4 articles out of 11 contained some information on this topic [1, 2, 3, 7]. Article [1] asked the participants through a questionnaire where they thought would be the best place to conduct a PHE. Article [2] found through qualitative research that a specific (mobile) clinic could be a possible place to perform PHEs but did not show opinions on the other possible places to conduct PHEs. So the physicians included did not necessarily found the other locations unfit to perform PHEs. The same goes for article [3] with home visitations for PHEs, as this was also merely a suggestion on a possible fit location rather a radical opinion as the only option. Article [7] gave 3 possible locations through a questionnaire and asked the correspondents to answer "yes", "no", or "don't know". The given locations were the Primary Health Care Center, the hospital or the patients home.

Table 10 provides an overview of this information.

Where should PHEs be performed?				
	PHCC	Hospital	Specific Clinic	Patient home
Article 1 Quantitative	42.1%	6.7%	/	0.5%
Article 2 Qualitative			x	
Article 3 Qualitative				x
Article 7 Quantitative	98% yes 2% no 0% NA	46% yes 49% no 5% NA	/	20% yes 77% no 3% NA

Table 10, where should PHEs be performed

Out of the four above options, the patients home was always least favored when mentioned as a possible location for conducting PHEs.

Note: the percentages from article 1 are again incomplete, due to lacking information from the article.

Summary of results regarding preferred provider and setting for health checks

No clear consensus emerged regarding who should perform health checks or where they should take place if performed at all. Some physicians considered the general practitioner to be the most appropriate healthcare professional, whereas others favored hospital physicians or nurses. A third group suggested the involvement of a dedicated health educator. Potential settings included the general practice, the hospital, a dedicated potentially mobile health-check clinic, and the patient's home. [1, 2, 3, 5, 7, 8].

5.3. GPs' practices related to health check-up's

Almost all papers explored which examinations were performed when a check-up was carried out. The main major parts of PHE mentioned were: 1. taking a medical history, 2. health promotion, 3. performing a physical examination, 4. requesting laboratory tests and 5. other specific tests (such as a PAP smear, ECG, ..).

5.3.1. Medical History

A first identified part of a health check was a thorough medical history taking. In 3 out of 11 articles information was found concerning this topic [5, 7, 8]. Even though 19 items were identified, it should be kept in mind that only 3 articles discussed the medical history taking as part of the check-up.

Two of the three articles [5, 8] gathered this information, at least partly, through qualitative methods, including open questions [5] and interviews [8]. In contrast, article [7] used a structured questionnaire in which participants were presented with a predefined list of potential items and asked whether they would perform each item "always", "sometimes", or "never". For the item "travel vaccination status", the majority of GPs (54%) indicated in the questionnaire that they (would) "never" perform this as part of a health check. The identified 19 items are listed in table 11.

Medical History (19 items)	
Item	Source Reference(s)
Psychological well-being	5, 7, 8
Smoking status/cessation	5, 7
Alcohol history	5, 7
Exercise	5, 7
Diet history/dietary pattern	5, 7
Habit forming drugs	7
Personal issues	5
Skin/mole history	5
Occupational history	5
Sleep history	5
Sexual history	5
Family history of diseases	5
Family history of diabetes	7
Checking concerns or fears	5
Cervical or breast screening attendance	5
Full systems review (history)	5
Men's health issues	5
Adult vaccine status	7
Travel vaccine status	7

Table 11, medical history

5.3.2. Health promotion

Two articles [5, 7] discussed 'health promotion' as part of the health check. Article 5 partly through open questions and partly through a premade list of possible items. Article [7] through a questionnaire with a predefined list of items, again with the options '"always", "sometimes" and "never". No GPs in article 7 chose the option "never" for the items listed below.

Dietary advice and exercise advice were mentioned in both articles as part of the health check.

Table 12 provides an overview.

Health Promotion (5 items)	
Item	Source Reference(s)
Dietary advice	5, 7
Exercise advice	5, 7
Alcohol advice	5
Obesity	7
Smoking	7

Table 12, health promotion

5.3.3. Physical examination

In 6 out of the 11 articles a physical examination was mentioned as part of the health check. The majority of the included GPs performed some kind of physical examination in these articles [1, 4, 5, 6, 7, 9]. It should be noted that five of the mentioned articles acquired this information through questionnaires with a premade list of possible items. Only article [5] also explored spontaneous answer with open questions. Table 13 provides an overview of the identified 21 items.

In article [1] the authors note that more than 60% of participating physicians would include height, weight and blood pressure check, lymph node check, oral cavity check, lungs, heart abdomen and thyroid check. The other mentioned items from article [1] were presented as restricted for certain clients. The article contained no percentage of how many GPs agreed with this statement.

In article [4] the GPS were given the option "effective", "effective for certain age group", "not effective" or the authors reported missing data. For all of the included items the majority chose "effective" or "effective for certain age groups". In Fact, for all items except for "examination of hearing" the majority (>50% of participants) even chose "effective".

Article [6] reported that >95% all believed that height, weight and blood pressure check should be part of annual physical.

Article [7] only reported blood pressure measurement and BMI in their questionnaire as physical items. Respectively 98% and 80% would perform them, always or sometimes, as part of a PHE.

Note: article [9] offered a list of 90 possible items to physicians and asked them if they performed them during a medical check-up. The items enlisted in this section were the most mentioned items. Some items were nearly never carried out. For the full table see article [9].

Physical Examination (21 items)	
Item	Source Reference(s)
Blood pressure	1, 4, 5, 6, 7, 9
Measurement of weight	1, 4, 5, 6, 9
Abdominal examination	1, 4, 5, 9
Measurement of height	1, 4, 6
Cardiac auscultation	1, 5, 9
Pulmonary auscultation	1, 5, 9
Breast examination	1, 4, 5
BMI	5, 7
Pulse check	5, 9
Lymph nodes evaluation	1, 9
Examination of hearing	1, 4
Neurological clinical evaluation	1, 5
Eye examination	1, 4
Examination of chest in general	4
Thyroid examination	1
Edema evaluation	9
Check for varicosities of lower extremities	9
Inspection of the oral cavity	1
Pelvic examination	1
Genital and rectal examination for males	1
Check for skin lesions	5

Table 13, physical examination

5.3.4. Laboratory screening

A fourth potential component of the health check was laboratory screening. In total, five articles provided information on this topic. Four of these studies [1, 4, 6, 7] collected data using questionnaires that presented participants with a predefined list of possible laboratory tests. Article [5] used a combination of open-ended questions and a predefined list of items. An overview of the identified laboratory investigations is provided in Table 14.

In article [1] the GPs were given the option “for all”, “for selected groups”, “not needed”, “not sure if needed” about the enlisted items. In all of the included items the majority of the participants (>80%) chose “for all” or “for selected groups”.

In article [4] more than 70% of the GPS found the proposed laboratory tests in the questionnaire to be “effective” as part of a PHE.

Article [6] noted that “a large proportion of PCPs reported that a number of tests should be performed as part of an annual physical examination”, after which the enlisted laboratory tests were enlisted. Percentages of PCPs reporting these test varied from 21% (thyroid test) tot 48% (lipid profile).

In article [7] two laboratory tests were “never” done as part of a PHE by the majority of the physicians. The two tests involved were serum vitamin D (52% chose “never”) and Prostate specific Antigen (73% chose “never).

Laboratory screening tests (18 items)	
Item	Source Reference(s)
Blood sugar	1, 4, 5, 6, 7
Lipid profile/cholesterol	1, 4, 5, 6, 7
Liver Function	1, 4, 5, 6, 7
Thyroid function	1, 5, 6, 7
Complete Blood count	4, 5, 6
Renal function/serum creatinine	4, 6, 7
Urinalysis	4, 5, 6
Fecal occult blood test	1, 4, 7
Hemoglobin	1, 7
HbA1c	5, 7
Electrolytes	1, 7
Prostate Specific Antigen (PSA)	5, 7
Urine dipstick	1, 7
Urea	1
Ferritin iron	5
Serum vitamin D	7
Hepatitis B surface antigen	4
Hepatitis C surface antigen	4

Table 14, Laboratory screening tests

5.3.5. Other specific tests

The final main theme within the practical components of the health check were other specific tests. Information on this topic was available in five of the 11 included articles. All five studies collected this information using predefined lists of potential investigations. Consequently, the eight items identified within this category were all proposed by the researchers rather than spontaneously reported by the GPs.

Article [1] proposed 4 other tests to its participants: chest x-ray, ECG, cervical smear and mammography. The majority of physicians chose to perform this as part of a PHE "for selected groups", so not for all. The percentages varied from 61.1.% for "chest x-ray" to 75.1% for "ECG".

Article [4] proposed chest x-ray, Upper GI series and cervical smear under the theme "cancer screening tests". It is stated that 70-80% of the GPs valued the role of these tests as "effective".

Article [5] presented chest X-ray, ECG, and spirometry as potential components of a PHE and asked physicians to rate the importance of including each of these investigations. The authors reported that most GPs expressed a neutral view regarding the inclusion of ECG as part of a health check. For spirometry and chest X-ray, the majority of GPs considered these investigations either unnecessary or of limited importance as components of a PHE.

Article [6] noted that the participating GPS found ECG, chest X-ray or exercise treadmill rarely indicated. However 60% would propose a cervical smear as part of a health check and 44% would propose a mammography.

In article [7], the majority of GPs selected "sometimes" for chest X-ray, ECG, mammography, and bone density measurement as potential components of a health check. For cervical smear, in contrast, the majority of GPs selected "never".

Other Specific Tests (8 items)	
Item	Source Reference(s)
Chest X-ray	1, 4, 5, 6, 7
ECG	1, 5, 6, 7
Cervical smear	1, 4, 6, 7
Mammography	1, 6, 7
Upper gastro-intestinal series	4
Spirometry	5
Exercise treadmill	6
Bone density measurement	7

Table 15, Other specific tests

Summary of results regarding the practices

The practices that physicians reported performing, or would perform, during a health check could be divided into five subthemes: history-taking (19 items), health promotion (5 items), physical examination (21 items), laboratory investigations (18 items), and other specific tests (8 items).

Within the medical history as listed in table 11, assessment of mental health was mentioned most frequently, followed by smoking status, alcohol consumption, and dietary habits. All other items were mentioned only once. Regarding health promotion, physicians most frequently mentioned providing advice on diet and physical activity as shown in table 12.

Within the physical examination as listed in table 13, blood pressure measurement was mentioned most frequently - with six mentions - followed by measurement of weight, abdominal examination, measurement of height, cardiac and pulmonary auscultation, and breast examination. Genital examination, assessment for skin abnormalities, examination of the oral cavity and thyroid, and examination for oedema or varicose veins were mentioned least frequently. One consideration here is that there may have been some overlap between the reported items, as these could not always be grouped together in the table due to differences in wording and the absence of sufficiently detailed descriptions in the articles. For example, “examination of the chest” may potentially include both cardiac and pulmonary auscultation. If this were the case, the frequency of namesakes of cardiac and pulmonary auscultation would be higher. However, as this was not specified in the original article, we cannot assume what exactly these kind of examinations included and therefore cannot simply combine them.

Among laboratory investigations, blood glucose measurement was the most frequently mentioned test, together with lipid profiling and liver function tests as shown in table 14. Urea, ferritin, hepatitis testing, and vitamin D were mentioned least frequently as part of screening blood tests. A minor consideration here is that HbA1c and blood glucose measurement were treated as separate items. In principle, both represent screening for abnormalities in glucose metabolism and, when combined, constitute the most frequently requested laboratory investigation. It is possible that the use of HbA1c or fasting blood glucose differs between countries based on local guidelines or reimbursement policies; however, no conclusions regarding this can be drawn from the present study. Lastly, table 15 shows the most frequently mentioned additional technical investigation was a chest X-ray, followed by cervical smear and a screening ECG in this dataset. There was no info available on the motivation for these technical tests except in article [4] where all items listed, except “ECG”, were valued by the majority (70-80%) of GPs in the health check as cancer screening tests.

6. Discussion

This scoping review revealed there was no consensus on perspectives nor practices concerning health checks among the GPs throughout the included articles. None of the 122 items listed in the tables under sections 5.2. (perspectives) or 5.3. (practices) were mentioned in all 11 articles. For example “measurement of blood” pressure was mentioned in 6 out of 11 articles, other items were only mentioned once, etc. What factors might explain the heterogeneity in GPs’ perspectives and practices regarding health checks observed in this dataset?

First of all, the included articles contained a heterogeneous group of form of studies ranging from pre-prepared questionnaires distributed among the doctors to semi-structured interviews with doctors spread across the world and with variable sample sizes as shown in Table 4. So not all articles may have focused on the same sub-topics. The absence of for example “measuring blood pressure” does not necessarily mean that the GPs in the other 5 articles would not prefer them to be incorporated into a health check. Although this could be the case, it might as well point towards interviewers not going deeper into the topic of physical examinations. In this case no data on GPs’ attitudes on the relevance of blood pressure measuring would be generated. The same could reasonably be expected for different topics discussed by different articles.

Secondly the results demonstrated a lack of consensus among the physicians included in the studies regarding what a health check-up should entail and even regarding whether health check-ups should be performed at all. Opinions ranged from advocating a standardized health check to be offered to the entire population to a more person-centered approach in which preventive checks are incorporated into routine consultations rather than being conducted as a separate, stand-alone encounter, to none at all. This variation in perspectives should be considered when interpreting the findings.

Furthermore, it is important to acknowledge that the included articles may themselves have been influenced by the perspective, assumptions, background and education of the researchers themselves. For example, Article 2 introduces the study by stating that “routine checkups are beneficial for detecting diseases in early stages” which may suggest that the researchers consider health check-ups to be beneficial and potentially support their broader implementation, possibly at a population level. In contrast, Article 5 begins by highlighting the limited evidence supporting general health check-ups and their lack of cost-effectiveness, while noting that physicians nevertheless continue to perform them. This framing may indicate a more skeptical perspective towards health check-ups, or at least towards generalized health checks for the entire population. It should be noted

that the angle with which researchers approach the primary care physicians may impact the generated and reported data. Such differences in the framing and underlying assumptions of the included studies may have influenced the research questions, methods, and interpretation of findings. Consequently, they may also have contributed to differences in which perspectives, practices, barriers, and facilitators were identified across the studies. This potential influence of researcher perspective should therefore be taken into account when interpreting the heterogeneous findings of this review.

A third consideration is that the included articles originate from a heterogeneous group of countries and time periods. Table 4 shows that the studies were done in diverse regions of the world and spanning over a period of 25 years. Opinions are subject to both time and the reference frame you grew up with. Local cultural, political, economical differences and preferences, both from the GPs themselves as well as from the country they have to work in, play a role and influence the GPs' perspectives. Differences in the organization of the local healthcare system may also play an important role. The balance between costs and benefits may differ between regions when determining what a health check should entail. No data on the economic impact or cost-effectiveness of health checks were available in the present study, so we cannot draw conclusions about this topic.

Fourthly, the reported frequencies of some items may underestimate their actual occurrence due to differences in terminology. For example, as mentioned earlier, "chest examination" may encompass both cardiac and pulmonary examination, but this cannot be assumed when the specific procedures were not defined. The lack of standardized terminology for the items makes comparison amongst the articles difficult.

Lastly it should be acknowledged that only a limited number of articles met the inclusion criteria, resulting in a limited dataset to work with. Therefore data depicted in this review is to be considered as purely descriptive and one should be cautious drawing conclusions and extrapolating the data on a larger scale.

The primary goal of this scoping review was to gather as much as possible existing information on the practice and attitude of physicians towards health checks. This review exposes a clear lack of standardized, streamlined and comparable data available in scientific literature to allow for a concrete and decisive response. The information discussed above can serve as an inspiration to develop questionnaires or an interview guide for further research on this topic which could in turn help close this lack of data and close the gap on how data may be compared.

Further research could provide a clearer understanding of GPs' perspectives, decision-making, and practices regarding health checks. This would be particularly relevant when considering the development of quality improvement initiatives or clinical guidelines aimed at reducing the use of investigations that lack sufficient evidence, while ensuring that targeted preventive interventions reach the patients who are most likely to benefit from them. Ultimately, this could benefit both patients and the healthcare system by supporting more effective and targeted preventive care, reducing healthcare expenditure associated with unnecessary investigations. It would also help reducing patient burden both physically and mentally by eliminating for example false positive cancer screening results leading to unnecessary biopsies and/or avoidable anxiety.

A mixed-methods approach, combining qualitative research, such as interviews, with quantitative research using structured questionnaires could be used. Qualitative research could provide a deeper understanding of GPs' reasoning, perceptions, and experiences, while quantitative research could help assess the prevalence and relative importance of the identified perspectives and practices across a larger population of GPs. In addition, it also may be valuable to explore the perspectives of policymakers, as they represent another important stakeholder in the development and implementation of a national preventive health program or clinical guideline. Understanding the views, priorities, and perceived barriers of policymakers could therefore complement the insights gained from research among GPs and contribute to the development of feasible and evidence-based approaches to preventive care.

7. Conclusion

In conclusion, the number of included studies was a limitation of this review. At the same time, this finding further highlights the scarcity of research exploring GPs' perspectives and practices regarding health checks. Despite the limited evidence base, this review identified a range of ideas, attitudes, and practices that may provide a valuable starting point for the development of questionnaires and interview guides in future research aimed at gaining a deeper understanding of GPs' perspectives and decision-making regarding health checks.

Further research is needed to better understand how health checks are perceived and implemented in everyday primary care. Such knowledge may inform a quality improvement initiative at a national level for example or contribute to the development of clinical guidelines and. Ultimately it may contribute to reducing unnecessary testing and the use of interventions that lack sufficient evidence, while ensuring that appropriate preventive interventions reach the patients most likely to benefit.

8. Limitations

An important limitation was already discussed in section five, namely the fact that the number of included studies was rather limited. Further more, it is possible that relevant literature may have been missed due to the limited number of databases searched. The literature search was conducted in PubMed and Web of Science, but did not include other potentially relevant databases such as the Cochrane Library. Also, given the predominantly medical focus of PubMed, relevant studies approaching health check-ups from a more sociological, behavioral, or healthcare-system perspective may not have been identified. Searching additional databases with a broader or more specific disciplinary focus, for example the database Scopus, could therefore provide complementary insights into the perspectives, practices, and attitudes surrounding health check-ups. This could be relevant for further research.

Lastly, the literature search and screening process were conducted by a single researcher. Although predefined inclusion and exclusion criteria were applied, the absence of a second independent reviewer may have increased the potential for subjectivity during the screening and selection of studies

References

(1-16)

1. al-Rowais N, Khoja T, al-Farra M, al-Nahedh N. Primary health care physicians' views on periodic health evaluation in Saudi Arabia. East Mediterr Health J. 2000;6(2-3):447–56.
2. Alzahrani AM, Quronfulah BS, Felix HC, Khogeer AA. Barriers to routine checkups use among Saudis from the perspective of primary care providers: A qualitative study. Saudi Med J. 2022;43(6):618–25.
3. Alzahrani AM, Quronfulah BS, Felix HC, Khogeer AA. Facilitators for Routine Medical Checkups Use from the Perspective of Primary Care Providers: A qualitative study. Pak J Med Sci. 2025;41(4):1023–9.
4. Miyazaki K, Sato J, Mukohara K, Kitamura K, Saito S, Ban N. Attitudes of Japanese primary care physicians toward publicly endorsed periodic health examinations: a cross sectional survey. Asian Pacific Journal of Cancer Prevention. 2007;8(2):258–62.
5. Murphy M, McGloughlin M, Walkin S. The 'general check-up' in the asymptomatic adult—a study of GPs in the North West of Ireland. Eur J Gen Pract. 2015;21(1):58–62.
6. Prochazka AV, Lundahl K, Pearson W, Oboler SK, Anderson RJ. Support of evidence-based guidelines for the annual physical examination: a survey of primary care providers. Arch Intern Med. 2005;165(12):1347–52.
7. Qidwai W, Nanji K, Khoja T, Rawaf S, Al Kurashi N, Alnasir F, et al. Health Promotion, Disease Prevention and Periodic Health Checks: Perceptions and Practice among Family Physicians in Eastern Mediterranean Region. World Family Medicine. 2015;13(5):44–51.
8. Søndergaard A, Christensen B, Maindal HT. Diversity and ambivalence in general practitioners' attitudes towards preventive health checks - a qualitative study. BMC Fam Pract. 2012;13:53.
9. Wildes T, Anderson R. The adult screening physical examination: what physicians do. Wmj. 2004;103(1):60–5.
10. Breau G, Tiwari R, Ravindran S, Gijssel E. Implementation of Annual Health Assessments for Adults With Intellectual Disabilities: An Integrative Review. Journal of Policy and Practice in Intellectual Disabilities. 2025;22(2).
11. Tong SF, Low WY, Ismail SB, Trevena L, Willcock S. Physician's intention to initiate health check-up discussions with men: a qualitative study. Fam Pract. 2011;28(3):307–16.
12. Delvaux N, Piessens V, Burghgraeve T, Mamouris P, Vaes B, Stichele RV, et al. Clinical decision support improves the appropriateness of laboratory test ordering in primary care without increasing diagnostic error: the ELMO cluster randomized trial. Implement Sci. 2020;15(1):100.
13. Worl Health Organisation, point of view on "screening" 2026. Available from: https://www.who.int/europe/teams/ncd-management/screening.
14. Araujo GC, Ribeiro CB, Costa MCM, Evangelista MLP, Lima MF, De Paula MC, et al. Evidence-Based Periodic Health Examinations for Adults: A Practical Guide. Cureus. 2025;17(3):e79963.
15. Krogsbøll LT, Jørgensen KJ, Grønhøj Larsen C, Gøtzsche PC. General health checks in adults for reducing morbidity and mortality from disease. Cochrane Database Syst Rev. 2012;10:Cd009009.
16. Liss DT, Uchida T, Wilkes CL, Radakrishnan A, Linder JA. General Health Checks in Adult Primary Care: A Review. Jama. 2021;325(22):2294–306.