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TITLE PAGE

Title

Expanding the role of non-physician medical staff in German Primary Care – a Mixed-Methods study protocol exploring Physicians' perspective in rural practices

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ABSTRACT

Introduction

Primary Care faces substantial challenges worldwide through an increasing mismatch in supply and demand, particularly in rural areas. One viable option to address this mismatch might be increasing efficiency by delegation of tasks to non-physician medical staff. Possible influencing factors, motives, and beliefs regarding delegation to non-physician medical staff and the potential of an expanded role, as perceived by Primary care Physicians, remain unclear. This mixed-methods study describes our approach to assess these factors as basis for potential interventions to expand the role of non-physician medical staff in rural Primary Care in Germany.

Methods and Analysis

This mixed-methods study consists of a survey and an interview, using the Theoretical Domain Framework (TDF) as its theoretical foundation. The survey, to be sent to all primary care physicians active in rural Baden-Wuerttemberg, includes 37 items: 15 assessing personal and practice characteristics, 15 matching TDF-Domains and seven assessing opportunities for delegation. The interview, to be performed in a subsample, consists of 11 questions covering additional TDF-Domains. Triangulation will be achieved by following up themes emerging in either part of the study to the other, seeking confirmation, disagreement or further details.

Ethics and Dissemination

The study has been approved by the ethics committee of Heidelberg University. Results will be disseminated via publications in peer-reviewed journals and talks at conferences. By combining quantitative and qualitative methods, our results will support future research for crafting interventions to expand the role of non-physician medical staff in rural Primary Care.

ARTICLE SUMMARY

Strengths and Limitations of this study

- This study will provide initial insights into potential areas of focus for future interventions that seek to expand the role of non-physician medical staff in rural Primary Care in Germany.
- Use of mixed-methods and a theory-guided approach promises to generate rich data on a topic that has not previously been well characterised.
- The exploratory design may help to identify previously undiscovered themes and motives.
- The current study will not explore the perspectives of patients or non-physician medical staff, even though their attitudes and beliefs may have significant bearing on decisions to delegate tasks differently in primary care practices.

INTRODUCTION

Primary Care (PC) faces substantial challenges worldwide. It functions as the first access point to health care,**[1]** resulting in a high volume of patients being cared for. The demand for PC continues to increase as a result of needs of an ageing population and increased prevalence of chronic diseases.**[2, 3]** Simultaneously, as health care is increasingly provided by physicians in a rising number of specialties and subspecialties, the need for PC-physicians (PCPs) as coordinators of care assumes greater importance.**[4]**

Delivering PC in rural areas faces additional challenges arising from a greater imbalance of supply and demand in PC and structural problems in service delivery. The proportion of older people in rural areas, for example, has increased to a greater extent than in urban areas,**[5]** leading to an even greater increase in the prevalence of chronic diseases and a higher demand for PC. The supply of PCPs in rural areas also appears increasingly limited given an ageing PCP workforce**[6-9]** and the low rate at which retiring PCPs are replaced.**[10]**

The reduced accessibility of PC-practices in rural areas (e.g., longer drives or fewer options for public transport)**[11]** and the legal obligation of German PCPs to perform home visits when necessary represent further complications compared to urban areas. Home Visits in particular occupy a higher proportion of a PCP's typical workload in rural areas,**[12]** resulting in less time spent in practice and fewer patients receiving care per PCP. In combination with the rising demand and the insufficient supply, this potentially leads to a further increase in health disparities between rural and urban areas. As rising demand appears to be a given, increasing the supply of those delivering PC represents an evident focus. In contrast to other countries such as England or the Netherlands, however, options for augmenting the PC-workforce (e.g., through involvement of other healthcare professions) are limited in Germany given the relative underdevelopment of the public health infrastructure and the absence of other groups of health professionals who might contribute to the delivery of PC.**[13]** Similarly, recently implemented policy measures to increase the number of PCPs, including quotas for medical schools for committing students to work in rural areas in the future, fail to offer a short-term solutions. However, an approach that has not yet been fully explored focuses on creating greater practice efficiency through changes to practice structure and processes.

PC in Germany is primarily delivered in PCP-owned solo practices that employ Medical Assistants (MA), the only other established health profession active in German PC.**[13]** MAs are responsible for practice organisation, administration and performing simple medical procedures including phlebotomy and vaccination. Since 2008, two major training programs for MAs have been introduced: Healthcare Assistant in Primary Care practice (HAPCP; *Versorgungsassistent/-assistentin in der Hausarztpraxis*) and Non-physician Practice Assistant (NPPA; *Nichtaerztliche/-r Praxisassistent/-assistentin*). Both provide comparable training over 200 hours covering practice and emergency management and training in more advanced medical procedures.**[14]** Although both allow MAs to take responsibility for selected, more advanced tasks, these qualifications are less extensive compared with those of non-physician medical staff (NPMS) in other countries.**[13]**

International examples suggest that a team-based approach involving NPMS in patient care may result in greater efficiency in PC.**[15, 16]** Two recent systematic reviews, including one by the Cochrane Collaborative, further suggest that team-based PC improves care coordination**[17]** and that using NPMS as substitutes for PCPs might improve patient mortality and quality of life in some cases.**[18]** The applicability of this evidence between health care systems, however, may be limited, as the conditions under which NPMS are included in patient care vary between *delegation*, in which PCPs remain responsible for any task performed by NPMS, and *substitution*, in which NPMS perform tasks autonomously without supervision of PCPs. The latter, as described by Laurant et al.,**[18]** is currently prohibited by law in Germany. Taken together, current organisational structure in German PC might neither be most effective nor most efficient in organising and delivering PC.**[15]** The extent, however, to which efficiency and effectiveness in German PC might be improved by expanded roles of NPMS and the acceptability of promoting further delegation, implementing substitution, or integrating further professions in PC is currently unclear.

Several factors may influence an expansion in the roles of NPMS in the delivery of PC in rural areas. Especially in solo-practices, PCPs often act as primary decision-makers for practice organisation, making their motives and beliefs regarding delegation particularly important. Previous studies in Germany suggest some, yet conflicting results on influencing factors on PCPs motives and beliefs regarding delegation.**[19, 20]** Even less is known about PCPs specific motives and beliefs in rural Germany, where they might differ due to scarcer resources and a stronger focus on personal doctor-patient relationships.**[21]** To guide development of future interventions promoting an expanded role of NPMS in rural PC, a greater appreciation of influencing factors on and PCPs' motives and beliefs regarding delegation of tasks to NPMS might be valuable.

To guide development of future potential interventions that seek to increase practice efficiency by expanding roles for NPMS in rural PC, a greater appreciation of influencing factors on and PCPs' motives and beliefs toward delegation of tasks to NPMS is needed. The purpose of this study,

therefore, is to describe methods we will use to will probe these issues in a large sample of PCPs in rural Germany.

METHODS AND ANALYSIS

We use a mixed-methods design consisting of a survey and semi-structured interviews. This approach will allow us to triangulate results for a deeper understanding of influencing factors, motives and beliefs regarding delegation and to discover insights in an area that has been the focus of limited investigation in the past.**[22]**

Setting

The proposed study will be conducted in Baden-Wuerttemberg, one of the largest federal states in Germany (population 11,000,000) located in southwestern Germany with a physician density**[23]** and age distribution**[24]** comparable to that of Germany as a whole.

Two definitions for rural areas in Germany are provided by the Federal Office for Building and Regional Planning and applied at the county level. One is based on population density per unit of area while the other assesses population size reachable by a pre-defined amount of travel time.**[25]** Twelve of the 44 counties in Baden-Wuerttemberg match one or both definitions of being rural (approximate population size 2,000,000) and represent the setting in which our study will be performed.

Participants

Eligible participants include all PCPs currently working in PC in one of the study areas. PC in Germany encompasses General Internal Medicine, General Medicine/General Practice/Family Practice and Paediatrics. We will exclude Paediatricians from this study as they might be less impacted by the increase in demand for PC and long-term treatment and management of chronic diseases in general and thus their motives and beliefs regarding delegation as a strategy for practice efficiency may be both quantitatively and qualitatively different. No further exclusion criteria will be applied.

Data from the Associations of Statutory Health Insurance Physicians suggests that the pool of potential respondents in the study areas for the quantitative portion of the study is approximately 1.250. A database provided by commercial marketing agencies targeting physicians will be used to obtain contact information including practice address and specialty. Invitations to a qualitative, semi-structured interview following completion of the survey (described below) will be extended to a convenience sample of respondents.

Recruitment will take place in the form of a mailing consisting of a printed survey, a response-form, a return envelope and a second envelope without identifier to contain the completed survey to ensure response anonymity. Reminders will be sent using the same form.

The response form serves three purposes: to identify non-responders to whom a second mailing will be sent after four weeks; to assess four characteristics (sex, age, reason for non-participation and general attitude towards delegation), only to be filled out by participants not willing to complete the whole survey; and to give consent to being contacted at a later date for interviews.

To increase response rates, we based survey design, cover letter, and study forms on the Total Design Method.**[26]** Specifically, to limit response burden and encourage participation, we developed a brief, participant-friendly questionnaire introduced by a personalised cover letter.**[27]**

Possible participants for the interviews will be identified via the response forms and by asking participants to suggest colleagues with potentially differing views, who might be willing to participate as well. We anticipate the need to recruit up to 20 participants using this process to achieve theme saturation.**[28]** Theme saturation will be assessed by performing and analysing six initial interviews and counting the unique themes identified in these. The number of unique themes identified in each pair of subsequent interviews will be counted. Theme saturation will be assumed when the number of new emerging themes in a pair of subsequent interviews is less than 5% of initial themes.**[29]**

Theoretical Framework

Implementing new routines in PC such as delegating tasks differently involves organisational and individual behaviour change. As the objective of this investigation is to identify factors relevant for

future interventions, it is natural to consider behavioural change theory. In previous work, existing theories were reviewed and sorted into 84 constructs and 14 domains comprising the Theoretical Domains Framework (TDF).**[30]** Since its original development in 2005, the TDF has been widely used in health services research to explore factors that influence behaviour change.**[31]**

We applied the TDF**[30]** to ensure representation of all domains in either the survey, the interview or both (Table 1) and as a strategy that might permit triangulation of insights. To this end, we developed an initial pool of items consisting of at least one item per domain for both the survey and interview guide. The wording of survey items was informed, when possible, by previous work**[32]** and their content in relation to the research objectives was discussed on multiple occasions within the research group and with independent PCPs and social scientists. Additionally, we considered the extent to which survey items in the initial pool adequately represented specific domains. This review suggested that some domains were rather complex and could be misinterpreted or that previous work provided limited guidance in developing an item that clearly tapped a specific domain. In these instances, the domain was addressed using qualitative methods. Although the qualitative approach can be used to detect multiple emerging themes potentially related to multiple domains, the elements of the interview guide were developed with the intention that each represented a single domain. Three domains, "Optimism", "Emotion" and "Behavioural regulation" were even felt to be too broad to be addressed in a specific question and were thought to be best analysed as part of the content analysis of the interview. To reduce participant burden, we limited the number of survey items so that they would fit on one page front and back: the interview guide was developed so that each session would last no more than 45 minutes. An English language translation of the survey was reviewed by a bilingual native speaker and back translated into German by an independent party to ensure accuracy of content and intended meaning.

Table 1: Theoretical Domain Framework and Matching Items

Domain	Representing Items	
Knowledge An awareness of the existence of something	Survey Interview	4.4 1.1
Skills	Interview	2.1

An ability or proficiency acquired through practice		
Social/professional role and identity A coherent set of behaviours and displayed personal qualities of an individual in a social or work setting	Survey Interview	4.2, 4.15 4.1
Beliefs about capabilities Acceptance of the truth, reality, or validity about an ability, talent, or facility that a person can put to constructive use	Survey	4.3
Optimism The confidence that things will happen for the best or that desired goals will be attained		
Beliefs about consequences Acceptance of the truth, reality, or validity about outcomes of a behaviour in a given situation	Survey Interview	4.8, 4.9, 4.10, 4.11 3.1
Reinforcements Increasing the probability of a response by arranging a dependent relationship, or contingency, between the response and a given stimulus	Survey	4.12
Intentions A conscious decision to perform a behaviour or a resolve to act in a certain way	Survey	4.7
Goals Mental representations of outcomes or end states that an individual wants to achieve	Survey	4.6
Memory, attention, and decision process The ability to retain information, focus selectively on aspects of the environment and choose between two or more alternatives	Survey Interview	4.5 3.2
Environmental context and resources Any circumstance of a person's situation or environment that discourages or encourages the development of skills and abilities, independence, social competence, and adaptive behaviour	Survey	4.1, 4.13, 4.14
Social influences Those interpersonal processes that can cause individuals to change their thoughts, feelings, or behaviours	Interview	4.1
Emotion A complex reaction pattern, involving experiential, behavioural, and physiological elements, by which the individual attempts to deal with a personally significant matter or event		
Behavioural regulation Anything aimed at managing or changing objectively observed or measured actions		

Survey

The final survey consists of 37 items in five subsections (Table 2). Personal characteristics highlighted in previous work assess potential influences on beliefs regarding delegation (items 1.1-1.6).**[19, 20, 33-38]** Practice characteristics are assessed using six items. These include self-perceived location of the practice to confirm that it meets our definition of rurality and practice organisation, an important factor in determining reimbursement schemes and the amount of organisational influence a single physician has along with their motives and beliefs regarding delegation to NPMS (items 2.1+2.2).

Practice workload (item 2.3) is assessed using a common metric in the German health care system that reflects the number of individual patients treated per quarter year (referred to as a "Scheine", item 2.4).**[19, 20, 33-37].** Practice workforce size (2.5) and workforce composition (2.6) will be measured in full-time-Equivalents (FTE), calculated by asking for the total number of employees for each basic professional qualification working more than 50% FTE and working 50% or less**[20, 34-37]** and as the number of employees with basic and additional professional training, respectively. The latter is important given that a higher number of employees with diverse qualifications might provide more possibilities for implementing or facilitating delegation.

We assess the current activity profile using three items (items 3.1-3.3) to explore the extent to which delegation might be used in direct and indirect patient care and in non-patient care related work.

Motives and beliefs regarding delegation of tasks to NPMS (Section 4) is the focus of 15 items developed to represent nine TDF-Domains using a five-point Likert scale (1= "don't agree at all"; 5= "completely agree").

Section 5 assesses current and future potential for delegating tasks to NPMS. Although previous studies mostly used task lists to evaluate delegation and potential expansion of skill-mix,**[20, 33, 34, 37, 39, 40]** this approach limits respondents' ability to represent ideas they feel relevant to the topic. To better explore this area, we use open-ended questions to assess tasks performed currently as well as tasks potentially performed in the future by MAs in general and those with additional HAPCP/NPPA training (Items 5.1-5.4). Related to this, we will probe physicians' perceptions of possible areas of future training programs for NPMS and for the integration of other professionals not yet working in PC (Items 5.5 + 5.7).

Table 2: Survey

#	Question Text	Item structure/Response options	References
1.	**Personal Characteristics**		
1.1	Sex	**Single Answer** Male, female, various	[19, 20, 33-37]
1.2	Age	**Numeric box** Age in years	[19, 20, 33-36]
1.3	Years as Primary-Care Physician	**Numeric box** Years	[37]

1.4	Ø working hours per week	**Numeric box** Full hours	[36, 37]
1.5	Working as	**Single Answer** Self-employed, Employee	[36, 37]
1.6	Specialist in	**Single Answer** Family Medicine, General internal Medicine, General practitioner (no specialist training), Other	[19, 33]
2.	**Practice Characteristics**		
2.1	How would you describe the location of your practice?	**Single Answer** Urban, Suburban, Rural	[19, 20, 33-35, 37]
2.2	How is your practice organised?	**Single Answer** Medical Care Centre, Group practice, Joint practice, Solo Practice	[19, 20, 33-37]
2.3	How many „Scheine" do you personally handle on average per quarter year?	**Numeric box** Number in full hundreds	[19, 20, 33-37]
2.4	Does your practice participate in the GP-centred care program?	**Single Answer** Yes, No	[20, 34, 35]
2.5	How many people are working in your practice?	**Numeric box** (each for full-/part-time): Physicians (incl. You), Medical assistants, Other	[20, 34-37]
2.6	How many non-physician employees have completed additional training? (If a single person has multiple qualifications, please enter each)	**Numeric box** HAPCP, NPPA, Practice manager, Wound manager, Other	[20, 34-37]
3.	**Current activity profile**		
What proportion of your time (in percentages) is currently spent in:			
3.1	direct patient care at your work? (incl. nursing home/home visits and associated travel time)	**Numeric box** Percentages	[20, 34, 35, 37]
3.2	indirect patient care at your work? (e.g.: Reviewing laboratory results)	**Numeric box** Percentages	[20, 34, 35, 37]
3.3	non-patient activity at your work? (e.g.: billing)	**Numeric box** Percentages	[20, 34, 35, 37]
4.	**Attitudes toward delegation of medical tasks to non-physician medical staff in your practice**		
Likert Scale: Completely agree, Agree, Neither agree nor disagree, Disagree, Completely disagree			
4.1	I work in a region where there is currently a shortage in primary care supply.	**Primary Domain:** Environmental context and resources	
4.2	I am one of the first to implement new models in health care or practice organisation.	**Primary Domain** Social/Professional Role and Identity	
4.3	I am able to implement changes to the processes in my practice.	**Primary Domain:** Belief about the capabilities	[32]
4.4	I am well informed about the possibilities of delegation.	**Primary Domain:** Knowledge	[20, 32, 34, 35, 37]
4.5	When I think about efficiency in my practice, the use of delegation plays a role.	**Primary Domain:** Memory, attention, and decision process	
4.6	My goal for this practice is to achieve the highest efficiency possible.	**Primary Domain:** Goals	
4.7	I will delegate as many tasks as possible to my non-physician medical staff in the future.	**Primary Domain:** Intentions	[20, 32, 34, 35]
I think that an increase in delegation of medical tasks to non-physician medical staff in my practice…			
4.8	…increases patient satisfaction.	**Primary Domain:** Beliefs about Consequences	[19, 32, 33]
4.9	…impairs the treatment of my patients.	**Primary Domain**: Beliefs about Consequences	[19, 32, 33]
4.10	…reduces my workload.	**Primary Domain**:	[19, 32, 33]

		Beliefs about Consequences	
4.11	…increases efficiency in my practice.	**Primary Domain**: Beliefs about Consequences	[32]
4.12	…is financially worthwhile for my practice.	**Primary Domain**: Reinforcements	[19, 32, 33]
4.13	I can imagine delegating additional medical activities to my practice personnel.	**Primary Domain:** Environmental context and resources	
4.14	I can imagine delegating additional medical activities to my practice personnel, if they obtained additional training.	**Primary Domain**: Intentions	[32]
4.15	I could imagine transferring medical tasks to my practice personnel in the sense of substitution.	**Primary Domain**: Social/professional role and identity	[37]
	Substitution refers to the complete assumption of responsibility for tasks by non-physician medical staff. An example is the independent recall, treatment, and control of diabetes mellitus type 2 patients by non-physician medical staff. You would only be included in the treatment if there were problems beyond the skills of the staff.		
5.	**Opportunities to delegate medical activities to non-physician medical staff in your practice**		
Please list (several if possible) examples of the most relevant tasks that…			
5.1	… Medical Assistants without additional training typically perform in your practice at present.	**Open ended**	
5.2	… Medical Assistants without additional training could perform in your practice in the future.	**Open ended**	
5.3	… Medical Assistants with additional training as a HAPCP/NPPA typically perform in your practice at present.	**Open ended**	
5.4	… Medical Assistants with additional training as a HAPCP/NPPA could perform in your practice in the future.	**Open ended**	
5.5	… Non-physician Medical Staff could perform in your practice in the future, if further additional training were provided. (Please also consider training, that is not yet available, but might be in the future)	**Open ended**	
5.6	What is the greatest factor influencing delegation of physician tasks in your practice? a) Facilitating b) Hindering	**Open ended**	
5.7	Are there other professionals with which you would like to work in your practice in the future? If so, what types?...	**Open ended**	[37]

Interview

An interview guide following a semi-structured format and consisting of 11 questions (Table 3) has been developed to focus on the TDF domains described above including those not addressed in the survey, while maintaining freedom to explore new topics and themes that may emerge.

Section one addresses knowledge about delegation to NPMS in the practice and general motives and beliefs. In section two, we address the current situation to explore the extent to which delegation is currently implemented, approaches to delegation and which factors play a facilitating or hindering role. In section three, we explore the potential for delegation, potentially adding to insights arising from responses provided in section five of the survey. A fourth section explores perceived social

influences, whether by patients or other physicians, while section five explores thoughts and ideas on future developments including both potential barriers and facilitators that might allow greater delegation to NPMS from the physician's perspective. The interview ends with a summary of responses documented by the interviewer and provides an opportunity for validation, clarification of misunderstandings and member checking.

As with development of the survey, we performed multiple pre-tests and made adjustments according to feedback regarding the phrasing of the elements in the semi-structured guide and interview procedures.

Although conducted in German, an English language version of the interview guide (Table 2) was developed following the same translation/back translation cycle as the survey.

Table 3: Elements of the Interview guide and corresponding primary domain of the Theoretical Domains Framework

#	Key question/Follow-up questions	Primary Domain
1.	**Introduction**	
1.1	When did you first encounter the issue of delegation of medical tasks? a) What have you learned about delegation since then? b) Is there anything you would like to know about delegation that you do not know so far?	Knowledge
1.2	Can you tell me about your perspective on the delegation of medical tasks to non-physician medical staff in your practice?	
2.	**Current situation**	
2.1	How is it decided in your practice who takes on which tasks? a) Can you tell me more about this? b) Can you tell me about the expectations you currently have, when delegating to your staff?	Skills
3.	**Potential of delegation**	
3.1	Can you tell me about the potential of delegation of medical tasks to non-physician medical staff in your practice? a) Can you give me examples? b) Can you tell me more about this? c) What would have to happen to delegate these tasks? d) How would you describe your likelihood to delegate these tasks under these circumstances? e) How would you describe your expectation to your staff if you delegated these additional tasks? f) Can you imagine, to transfer tasks to non-physician Medical Staff in the sense of Substitution?	Beliefs about Consequences
3.2	Can you tell me what comes to mind about the efficiency in Primary Care practice? a) Does the issue of delegation play a role in considerations of efficiency in your practice?	Memory, attention, and decision process
3.3	Can you tell me what comes to mind about efficiency in Primary Care practice? a) Does the issue of delegation play a role in considerations of efficiency in your practice?	Social/Professional Role and Identity
4.	**Expectations of delegation**	

4.1	When you think of your patients, how do you think they would react to an increased delegation to non-physician medical staff? a) Can you tell me more about this? b) Can you give me examples? c) Can you imagine the opposite? d) Can you imagine why this might be the case?	Social influences
4.2	When you think of your medical colleagues, how do you think they would react to an increased delegation to non-physician medical staff? a) Can you tell me more about this? b) Can you give me examples? c) Can you imagine the opposite? d) Can you imagine why this might be the case? e) Can you tell me, how you would think about this, if we were talking about substitution?	Social/Professional Role and Identity
5.	**Future Development**	
5.1	How do you think delegation of medical tasks will develop in the future?	
5.2	Can you think about something else on this topic that is important to you?	
6.	**Summary/Member Checking**	
6.1	If I have understood you correctly ... (Summary Interviewer) a) Delegation in general b) Current situation c) Expectations and potential d) Colleagues/patients	

Data Management

Surveys responses will be scanned, text digitally converted, and results uploaded into a database available only to the research team. If written responses are not legible, data will be censored. Surveys will be archived in paper-based and digital formats. Audio-recordings of the interview will be transcribed and will only be available during the transcription process. Written transcripts will be validated against the Audio files by the researcher conducting the interview and deleted after. The Dataset generated in the survey and the interviews will be available from the corresponding author on reasonable request. The Audio files will not be available to external researchers.

Data Analysis

Before data triangulation, preliminary analyses of the survey and interviews will be performed individually.

Survey data will be analysed descriptively. Incomplete survey-data will be included in the analysis. Individual responses will be checked for plausibility (e.g., identical responses across all items) and excluded on a case-by-case basis. Floor/ceiling effects will be assumed if more than 80% of

participants' responses fall in either of the extreme response categories. These items will be excluded unless context can be given in the triangulation process.

The interviews will be subjected to content analysis according to Mayring.**[41]** We will use both inductive and deductive practices to compare our findings to previous research, as well as to generate new insights and possible hypotheses for future follow-up studies. The analysis will use the TDF as a template for identifying themes potentially relevant for supporting organisational behaviour change in the future around the theme of delegation. No data from the semi-structured interviews will be excluded from analyses.

Finally, as neither the survey nor the interviews are designed to separately cover all domains of the TDF, we will attempt to triangulate insights arising from data from both to identify potential influencing factors, motives, and beliefs regarding delegation of tasks to NPMS. Triangulation will be performed iteratively by identifying possible themes emerging from the preliminary analyses of either the quantitative or the qualitative part of the study and following it across to the other part, seeking confirmation, disagreement or further insights. This process will be repeated until no further insights on emerging themes can be generated.**[42, 43]** The TDF will then be used as a guide to sort and summarise emerging themes.

Ethics and Dissemination

The study has been approved by Ethics committee of Heidelberg University, Mannheim Medical Faculty in April 2021 (Approval No. 2021–530). Written informed consent will be obtained from each participant before each interview. Following consent, the interview will be audio recorded and transcribed to allow analysis. Consent for participation in the survey will be assumed when the survey has been returned. Financial incentives will not be offered for survey completion although interviewees will receive an incentive of 40€ as a small token of appreciation for their participation.

Insights gained in this study will inform current and future projects aiming to improve PC in rural areas and further be provided to local and regional governments and key stakeholders in planning outpatient

health care, especially in Baden-Wuerttemberg. Additionally, we will include publications in peer-reviewed journals as well as conference talks and poster presentations in our dissemination plan.

DISCUSSION

Mismatch in supply and demand for German PC is increasing, especially in rural areas. Delegating greater responsibility for the performance of selected tasks to NPMS may address this mismatch by fostering greater practice efficiency. However, building potential interventions in PC-practices should be preceded by efforts to understand structures and processes in PC.**[44]** Thus, we take a first step in better understanding PC by exploring influencing factors, motives, and beliefs regarding delegation.

The proposed study is the first to use theory as an organisational foundation for specifically identifying potential influencing factors, motives and beliefs regarding delegation of tasks to NPMS and probing the potential of further integrating NPMS in German PC-practices using both qualitative and quantitative methods. Previous German studies on this topic, in contrast, have been largely atheoretical, have relied heavily on a quantitative approach**,** and delivered conflicting results.**[19, 20, 37, 45]** By using a theory-based approach combined with mixed methods research techniques, the proposed study has the potential to contribute to a clearer, more comprehensive picture of potential barriers and facilitators to taking a more team-based approach in PC from the physician's perspective. While the methods we will use in this study are largely descriptive and exploratory in nature, we view this as an important strength, especially in view of the currently limited knowledge base addressing motives and beliefs regarding delegation. Combining qualitative interviews with an open-ended approach and theory-guided survey allows for a broader and deeper exploration of prevailing motives, beliefs and potential influencing factors and promises to inform the focus of future interventions that seek to expand the role of NPMS. Especially as the interview opens opportunity to address any topic relevant to participants and as we specifically ask participants to name relevant factors in the survey, we anticipate an ability to uncover influencing factors not previously identified. Indeed, the added value of a qualitative approach and the triangulation process is the opportunity to identify and explore

factors not previously uncovered that are relevant and must be considered in the design of any future intervention.**[22]**

Responses to the future results of this study may take many forms. Interventions at the PCP- or health systems-levels, for example, may be required before designing and implementing interventions to expand team-based care, such as educational programs for PCPs or adjustments in practice compensation. Additional research may be required to evaluate different practice styles and identify best practice examples for task delegation in PC-practices.

This study promises to shed a broader light on tasks performed by NPMS at present and those that might be possible in the future. Previous studies provided task lists,**[20, 33, 34, 37, 39, 40]** which might constrain answers on the most frequent tasks typically performed by MAs or HAPCP/NPPA, even though the tasks performed in PC are broad and particularly diverse.**[46]** The potential for delegation in the future remains unclear in amount and area, as previous studies identified either assuming responsibility for home-visits**[45]** or organisational tasks as being most relevant to PCPs.**[20, 37]**

Although our study has a narrow focus, the approach we describe may be applicable in other research settings, especially those involving organisational behaviour change. Combining the TDF as an organising framework in quantitative and qualitative research may yield unexpected and valuable insights for work in other fields.

Surveys are subject to potential errors and resulting biases in data-analysis, especially sampling, non-coverage, measurement and nonresponse error.**[26]** We address sampling and non-coverage bias by using a broad definition of “rural” and by including all PCPs in rural areas in Baden-Wuerttemberg. To address sampling and non-coverage error in the interviews, we will specifically sample PCPs with differing views by asking participants for such and by achieving theme saturation using the method proposed by Guest et al.**[29]**

Our survey consists of items, especially those pertaining to the TDF, that have not been psychometrically tested, potentially resulting in measurement error. We have attempted to address this, in part, by carefully reviewing previous work to identify validated items**[32]** and by performing

multiple pilot-tests and discussions within the research group and with external experts. Additionally, we included Items such as Item 4.9 and assured anonymity of responses to minimise acquiescence and social desirability effects. Measurement error in the interviews will be addressed using member-checking and having multiple researchers code the interviews.

Nonresponse error remains a major factor in any survey study. We aimed to maximise response-rate by designing survey and the means of returning responses following the Total-Design-Method. To reduce respondent burden, we limited the survey to two pages, maximised consistency in its design, used personalised cover letters, post-paid response letters and reminders after four weeks to all non-respondents.**[26]**

This study will focus solely on the PCPs' perspective as they currently have the greatest influence on decisions related to practice structure and processes. The perspectives of patients and NPMS, however, remain both highly important and largely unexplored. Although previous research in other settings suggests that delegation is generally well accepted by patients,**[47]** the patients' perspective as well as that of NPMS should be assessed in future research.

List of Abbreviations

PC – Primary Care

PCP – Primary Care Physician

MA – Medical Assistant

HAPCP – Healthcare Assistant in Primary Care Practice

NPPA – Non-physician practice assistant

NPMS – Non-physician medical staff

TDF – Theoretical Domains Framework

FTE – Full-time-Equivalent

DECLARATIONS

Author contributions

HA (Principal Investigator) conceptualised the study as part of his dissertational project. DL and JF advised on the study design. HA produced the first draft of the manuscript which was revised by DL and JF. All authors reviewed and approved the final version of the manuscript.

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Competing interests

The authors declare that they have no competing interests

Footnotes

We use the term “primary care” as translation for the term commonly used in Germany: “hausaerztliche Versorgung”. Other translations for the German term may include “Family Medicine” or “General Practice”, depending on the specific roles assumed by physicians in different health care systems

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Expanding the role of non-physician medical staff in German Primary Care: protocol for a mixed-methods study exploring physicians' perspective in rural practices

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TITLE PAGE

Title

Expanding the role of non-physician medical staff in German Primary Care: protocol for a mixed-methods study exploring physicians' perspective in rural practices

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ABSTRACT

Introduction

Primary Care faces substantial challenges worldwide through an increasing mismatch in supply and demand, particularly in rural areas. One option to address this mismatch might be increasing efficiency by delegation of tasks to non-physician medical staff. Possible influencing factors, motives, and beliefs regarding delegation to non-physician medical staff and the potential of an expanded role, as perceived by Primary care Physicians, however, remain unclear. The aim of this study is to assess these factors to guide development of potential interventions for expanding the role of non-physician medical staff in delivering primary care services in rural Germany.

Methods and Analysis

This mixed-methods study based on the Theoretical Domain Framework (TDF) consists of survey and interviews conducted sequentially. The survey, to be sent to all primary care physicians active in rural Baden-Wuerttemberg (estimated N=1,250), includes 37 items: 15 assessing personal and practice characteristics, 15 matching TDF-Domains and seven assessing opportunities for delegation. The interview, to be performed in a subsample (estimated N=12-20), will be informed by results of the survey. The initial interview-guide consists of 11 questions covering additional TDF-Domains. Perspectives toward delegation will be maximised by comparing data emerging in either part of the study, seeking confirmation, disagreement or further details.

Ethics and Dissemination

The ethics committee of Heidelberg University approved this study (Approval No. 2021–530). Written informed consent will be obtained before each interview; consent for participation in the survey will

be assumed when the survey has been returned. Results will be disseminated via publications in peer-reviewed journals and talks at conferences. By combining quantitative and qualitative methods, our results will support future research for crafting potential interventions to expand the role of non-physician medical staff in rural Primary Care.

ARTICLE SUMMARY

Strengths and Limitations of this study

- This study will provide initial insights into potential areas of focus for future interventions that seek to expand the role of non-physician medical staff in rural Primary Care in Germany.
- Use of mixed-methods and a theory-guided approach promises to generate rich data on a topic that has not previously been well characterised.
- The exploratory design may help to identify previously undiscovered themes and motives.
- The current study will not explore the perspectives of patients or non-physician medical staff, even though their attitudes and beliefs may have significant bearing on decisions to delegate tasks differently in primary care practices.

INTRODUCTION

Primary Care (PC) faces substantial challenges worldwide. It functions as the first access point to health care,**[1]** which, in turn, reflects high demand. This demand continues to increase as populations age and the prevalence of chronic diseases grows.**[2, 3]** As demand for services to address some chronic diseases is increasingly provided by physicians in specialties and subspecialties, the need for PC-physicians (PCPs) as coordinators of care assumes even greater importance.**[4]**

Delivering PC in rural areas faces additional challenges arising from a greater imbalance of supply and demand in PC and structural problems in service delivery. The proportion of older people in rural areas, for example, has increased to a greater extent than in urban areas,**[5]** leading to an even greater

increase in the prevalence of chronic diseases and a higher demand for PC. The supply of PCPs in rural areas also appears increasingly limited given an ageing PCP workforce**[6-9]** and the low rate at which retiring PCPs are replaced.**[10]**

The reduced accessibility of PC-practices in rural areas (e.g., longer drives or fewer options for public transport)**[11]** and the legal obligation of German PCPs to perform home visits when necessary, result in additional challenges. Home visits in particular occupy a higher proportion of a PCP's typical workload in rural areas,**[12]** resulting in less time spent in practice and fewer patients receiving care per PCP. Importantly, rising demand and insufficient supply have the potential to lead to increased health disparities between rural and urban areas.**[13]**

As rising demand appears to be a given, increasing the supply of those delivering PC represents an evident focus. In contrast to other countries such as England or the Netherlands, however, options for augmenting or expanding roles within the PC-workforce are currently limited in Germany given the relative underdevelopment of the public health infrastructure and the absence of health professionals trained to contribute to the delivery of PC.**[14]** Recently implemented policy measures to increase the number of PCPs, including quotas for medical schools for committing students to work in rural areas in the future, fail to offer a short-term solution. However, opportunities for creating greater practice efficiency through changes to practice structure and processes have yet to be explored.

PC in Germany is primarily delivered in PCP-owned solo practices that employ Medical Assistants (MA), the only other established health profession active in German PC.**[14]** MAs are responsible for practice organisation, administration and performing simple medical procedures including phlebotomy and vaccination. Currently, only two major training programs for MAs are established in German PC to allow MAs to take additional responsibility for selected, more advanced tasks (See Appendix). Still, the role of MAs in patient care is less extensive compared with those of non-physician medical staff (NPMS) working in primary care settings in other countries.**[14]** In contrast to German PC-practices, NPMS elsewhere often consists of Nurses, Pharmacists, Social workers or Dietitians, resulting in a broader availability of services and a more team-based approach.**[14]**

International examples suggest that this team-based approach may also result in greater efficiency in PC.**[15, 16]** Two recent systematic reviews, including one by the Cochrane Collaborative, further suggest that team-based PC improves care coordination**[17]** and that using NPMS as substitutes for PCPs might improve patient mortality and quality of life in some cases.**[18]** The generalisability of this evidence across health care systems, however, is limited as the conditions under which NPMS are included in patient care vary between *delegation*, in which PCPs remain responsible for any task performed by NPMS, and *substitution*, in which NPMS perform tasks autonomously without supervision of PCPs. The latter, as described by Laurant et al.,**[18]** is currently prohibited by law in Germany. Taken together, current organisational structure in German PC might neither be most effective nor most efficient in organising and delivering PC.**[15]** The extent, however, to which efficiency and effectiveness in German PC might be improved by expanded roles of NPMS and the acceptability of promoting further delegation, implementing substitution, or integrating further professions in PC is currently unclear.

Several factors may influence an expansion in the roles of NPMS in the delivery of PC in rural areas. Especially in solo-practices, PCPs often act as primary decision-makers for practice organisation and operation, making their motives and beliefs regarding delegation particularly important. Previous studies in Germany exist in this area, yet offer conflicting results on factors influencing PCPs motives and beliefs regarding delegation.**[19, 20]** Even less is known about PCPs specific motives and beliefs in rural Germany, where they might differ due to scarcer resources and a stronger focus on personal doctor-patient relationships.**[21]** To guide development of future interventions that advance practice efficiency by promoting an expanded role of NPMS in rural PC, a clearer appreciation of influencing factors on and PCPs' motives and beliefs regarding delegation of tasks to NPMS might be valuable.

The aims of this study, therefore, are to probe these influencing factors, motives and beliefs and to characterise the potential for an expanded role of NPMS in delivering primary care in rural settings in Germany. More specifically, the study question centres on which influencing factors, motives and beliefs of PCPs might affect the delegation of tasks to NPMS in PC in rural Germany.

METHODS AND ANALYSIS

We implement a sequential mixed-methods design, often used in exploratory study designs, consisting of a survey complemented by semi-structured interviews.**[22]** This approach will allow us to connect results from both methods to form a deeper understanding of influencing factors, motives and beliefs regarding delegation and to discover insights in an area that has been the focus of limited investigation in the past.**[23]**

Setting

As major parts of healthcare systems in Germany are organised and administered on the state level, it is natural to seek potential drivers of and starting points for interventions that often differ by state. The proposed study will be conducted in Baden-Wuerttemberg, one of the largest federal states in Germany (population 11,000,000) located in southwestern Germany with a physician density**[24]** and age distribution**[25],** comparable to that of Germany as a whole. Baden-Wuerttemberg was specifically selected as opportunities for access to our target population, supported by longstanding institutional connections with the state ministry of health and regional physician organisations, were strongest.

Participants and Recruitment

Publicly available geocoded data on practice location are not available in Germany. To identify PCPs active in rural areas, we started with two county-level definitions for rurality (population density per unit of area and population size reachable by a pre-defined amount of travel time)**[26]** provided by the Federal Office for Building and Regional Planning. Twelve of the 44 counties in Baden-Wuerttemberg met one or both definitions (approximate population size 2,000,000).

Physicians working in the German equivalent fields of General Internal Medicine or General Medicine/General Practice/Family Practice in a rural county are considered eligible. Although normally considered a primary care specialty, we exclude Paediatricians as they might be less impacted by the increase in long-term treatment and management of chronic diseases in general and thus their motives

and beliefs regarding delegation as a strategy for practice efficiency may be both quantitatively and qualitatively different. No further exclusion criteria will be applied. Data from the Associations of Statutory Health Insurance Physicians suggests the pool of potentially eligible respondents to be approximately 1250.

We will use a database provided by commercial marketing agencies targeting physicians to identify potentially eligible respondents in rural counties and obtain their practice address. To increase response rates and limit respondent burden, we use the Total Design Method to design all study forms including a brief, participant-friendly survey (one page front and back) introduced by a personalised cover letter.**[27]**. Study forms, sent by standard mail, include a description of study purpose, the printed survey, a response-form, a return envelope and a second envelope without identifier to contain the completed survey to ensure respondent anonymity. The response form serves three specific purposes: to identify non-responders to whom a second mailing will be sent after four weeks; to assess four characteristics (gender, age, reason for non-participation and general attitude towards delegation) to be completed by those not willing to complete the entire survey; and to give consent for future contact for interviews.

Those agreeing to a possible interview or those identified from survey responses as colleagues with potentially differing views and who might be willing to participate will be contacted. Interviews will be conducted until theme saturation assessed *a posteriori* during data analysis (see below) is reached. We anticipate the need to recruit between 12**[28]** to 20 participants.**[29]**

Theoretical Framework

Implementing new routines in PC such as delegating tasks differently involves organisational and individual behaviour change. As the objective of this investigation is to identify factors relevant for future interventions, it is natural to consider behavioural change theory. In previous work, existing theories were reviewed and sorted into 84 constructs and 14 domains comprising the Theoretical Domains Framework (TDF).**[30]** Since its original development in 2005, the TDF has been widely used in health services research to explore factors that influence behaviour change.**[31]**

We applied the TDF**[30]** to ensure representation of all domains in either the survey, the interview or both (Table 1) and as a strategy that might permit complementary insights. To this end, we developed an initial pool of items consisting of at least one item per domain for both the survey and interview guide.

Table 1: Domain Definitions for the Theoretical Domain Framework and their Representation, by Mode of Data Collection

Domain	Representing Items	
Knowledge An awareness of the existence of something	Survey Interview	4.4 1.1
Skills An ability or proficiency acquired through practice	Interview	2.1
Social/professional role and identity A coherent set of behaviours and displayed personal qualities of an individual in a social or work setting	Survey Interview	4.2, 4.15 4.1
Beliefs about capabilities Acceptance of the truth, reality, or validity about an ability, talent, or facility that a person can put to constructive use	Survey	4.3
Optimism The confidence that things will happen for the best or that desired goals will be attained		
Beliefs about consequences Acceptance of the truth, reality, or validity about outcomes of a behaviour in a given situation	Survey Interview	4.8, 4.9, 4.10, 4.11 3.1
Reinforcements Increasing the probability of a response by arranging a dependent relationship, or contingency, between the response and a given stimulus	Survey	4.12
Intentions A conscious decision to perform a behaviour or a resolve to act in a certain way	Survey	4.7
Goals Mental representations of outcomes or end states that an individual wants to achieve	Survey	4.6
Memory, attention, and decision process The ability to retain information, focus selectively on aspects of the environment and choose between two or more alternatives	Survey Interview	4.5 3.2
Environmental context and resources Any circumstance of a person's situation or environment that discourages or encourages the development of skills and abilities, independence, social competence, and adaptive behaviour	Survey	4.1, 4.13, 4.14
Social influences Those interpersonal processes that can cause individuals to change their thoughts, feelings, or behaviours	Interview	4.1
Emotion A complex reaction pattern, involving experiential, behavioural, and physiological elements, by which the individual attempts to deal with a personally significant matter or event		
Behavioural regulation		

Anything aimed at managing or changing objectively observed or measured actions

Survey

The final survey, consisting of 37 items in five subsections (Table 2), is informed by previous work that describes 32 validated question-stems representing various domains of the TDF. Item wording is modified to match the research-question by inserting “action”, “context”, “time” and “target” of the intended behaviour into the question stem. **[32]** All items in the initial pool we created were then discussed on multiple occasions within the research group, with social scientists and independent PCPs, for clarity, consistency of content with the research objective and the extent to which survey items in the initial pool adequately represented specific domains. This review suggested that some domains were rather complex and could be misinterpreted or that previous work provided limited guidance in developing an item that clearly tapped a specific domain. In these instances, the domain was marked for exploration using qualitative methods instead. Finally, as not all items were directly applicable to our study objective and to limit participant burden, we focused on 15 items to represent nine TDF-Domains using a five-point Likert scale (1= “don’t agree at all”; 5= “completely agree”).

Personal characteristics highlighted in previous work are included to assess potential influences on beliefs regarding delegation (items 1.1-1.6).**[19, 20, 33-38]** Practice characteristics are assessed using six items. These include self-perceived location of the practice to confirm congruence with our definition of rurality and practice organisation, an important factor in determining both reimbursement schemes and the amount of organisational influence a single physician has regarding opportunities for delegation to NPMS (items 2.1+2.2). As no public records on workload or workforce in PC-practices in Germany exist, we use a common metric in the German health care system that reflects the number of individual patients treated per quarter year (item 2.3).**[19, 20, 33-37].** Enrolment in the “GP-centred care plan”, a form of health care delivery in Germany similar to Preferred Provider and Health Maintenance Organisations elsewhere, will be assessed as this has potential influence on reimbursement and thus the potential for delegation of tasks to MAs with additional

qualifications (item 2.4). Practice workforce size (2.5) and workforce composition (2.6) will be assessed by the number of employees working full- or part time **[20, 34-37]** and as the number of employees with basic and additional professional training (items 2.5, 2.6). The latter is important given that practices with a larger number of employees with additional qualifications might have greater possibilities for implementing or facilitating delegation.

We assess the current activity profile using three items (items 3.1-3.3) to explore the extent to which delegation might be used in direct and indirect patient care and in non-patient care related work.

Section 5 assesses current and future potential for delegating tasks to NPMS. Although previous studies mostly used task lists to evaluate delegation and potential expansion of skill-mix,**[20, 33, 34, 37, 39, 40]** this approach limits respondents' ability to represent ideas they feel relevant to the topic. To better explore this area, we use open-ended questions to assess tasks performed currently as well as tasks potentially performed in the future by MAs in general and those with additional training (Items 5.1-5.4). Related to this, we will probe physicians' perceptions of possible areas of future training programs for NPMS and for the integration of other professionals not yet working in PC (Items 5.5 + 5.7).

A bilingual native English-speaking physician (DL) reviewed the German language survey alongside its proposed translations and made suggested revisions that were back translated into German by an independent party, discussed by the research team and either accepted or deleted by consensus. The final survey was pre-tested using cognitive interviews with two participants of the study sample to assess item clarity and interpretation.

Table 2: Survey

#	Question Text	Item structure/Response options	References
1.	**Personal Characteristics**		
1.1	Gender	**Single Answer** Male, female, non-binary	[19, 20, 33-37]
1.2	Age	**Numeric box** Age in years	[19, 20, 33-36]
1.3	Years as Primary-Care Physician	**Numeric box** Years	[37]
1.4	Ø working hours per week	**Numeric box** Full hours	[36, 37]
1.5	Working as	**Single Answer**	[36, 37]

		Self-employed, Employee	
1.6	Specialist in	**Single Answer** Family Medicine, General internal Medicine, General practitioner (no specialist training), Other	[19, 33]
2.	**Practice Characteristics**		
2.1	How would you describe the location of your practice?	**Single Answer** Urban, Suburban, Rural	[19, 20, 33-35, 37]
2.2	How is your practice organised?	**Single Answer** Medical Care Centre, Group practice, Joint practice, Solo Practice	[19, 20, 33-37]
2.3	How many „Scheine"* do you personally handle on average per quarter year?	**Numeric box** Number in full hundreds	[19, 20, 33-37]
2.4	Does your practice participate in the GP-centred care program+?	**Single Answer** Yes, No	[20, 34, 35]
2.5	How many people are working in your practice?	**Numeric box** (each for full-/part-time): Physicians (incl. You), Medical assistants, Other	[20, 34-37]
2.6	How many non-physician employees have completed additional training? (If a single person has multiple qualifications, please enter each)	**Numeric box** Open text	[20, 34-37]
3.	**Current activity profile**		
What proportion of your time (in percentages) is currently spent in:			
3.1	direct patient care at your work? (incl. nursing home/home visits and associated travel time)	**Numeric box** Percentages	[20, 34, 35, 37]
3.2	indirect patient care at your work? (e.g.: Reviewing laboratory results)	**Numeric box** Percentages	[20, 34, 35, 37]
3.3	non-patient activity at your work? (e.g.: billing)	**Numeric box** Percentages	[20, 34, 35, 37]
4.	**Attitudes toward delegation of medical tasks to non-physician medical staff in your practice**		
Likert Scale: Completely agree, Agree, Neither agree nor disagree, Disagree, Completely disagree			
4.1	I work in a region where there is currently a shortage in primary care supply.	**Primary Domain:** Environmental context and resources	
4.2	I am one of the first to implement new models in health care or practice organisation.	**Primary Domain** Social/Professional Role and Identity	
4.3	I am able to implement changes to the processes in my practice.	**Primary Domain:** Belief about the capabilities	[32]
4.4	I am well informed about the possibilities of delegation.	**Primary Domain:** Knowledge	[20, 32, 34, 35, 37]
4.5	When I think about efficiency in my practice, the use of delegation plays a role.	**Primary Domain:** Memory, attention, and decision process	
4.6	My goal for this practice is to achieve the highest efficiency possible.	**Primary Domain:** Goals	
4.7	I will delegate as many tasks as possible to my non-physician medical staff in the future.	**Primary Domain:** Intentions	[20, 32, 34, 35]
I think that an increase in delegation of medical tasks to non-physician medical staff in my practice…			
4.8	…increases patient satisfaction.	**Primary Domain:** Beliefs about Consequences	[19, 32, 33]
4.9	…impairs the treatment of my patients.	**Primary Domain**: Beliefs about Consequences	[19, 32, 33]
4.10	…reduces my workload.	**Primary Domain**: Beliefs about Consequences	[19, 32, 33]
4.11	…increases efficiency in my practice.	**Primary Domain**: Beliefs about Consequences	[32]

4.12	…is financially worthwhile for my practice.	**Primary Domain**: Reinforcements	[19, 32, 33]
4.13	I am open to delegating additional medical activities to my practice personnel.	**Primary Domain:** Environmental context and resources	
4.14	I am open to delegating additional medical activities to my practice personnel, if they obtained additional training.	**Primary Domain**: Intentions	[32]
4.15	I am open to transferring medical tasks to my practice personnel in the sense of substitution.	**Primary Domain**: Social/professional role and identity	[37]
	Substitution refers to the complete assumption of responsibility for tasks by non-physician medical staff. An example is the independent recall, treatment, and control of diabetes mellitus type 2 patients by non-physician medical staff. You would only be included in the treatment if there were problems beyond the skills of the staff.		
5.	**Opportunities to delegate medical activities to non-physician medical staff in your practice**		
Please list (several if possible) examples of the most relevant tasks that…			
5.1	… Medical Assistants without additional training typically perform in your practice at present.	**Open ended**	
5.2	… Medical Assistants without additional training could perform in your practice in the future.	**Open ended**	
5.3	… Medical Assistants with additional training typically perform in your practice at present.	**Open ended**	
5.4	… Medical Assistants with additional could perform in your practice in the future.	**Open ended**	
5.5	… Non-physician Medical Staff could perform in your practice in the future, if further additional training were provided. (Please also consider training, that is not yet available, but might be in the future)	**Open ended**	
5.6	What is the greatest factor influencing delegation of physician tasks in your practice? a) Facilitating b) Hindering	**Open ended**	
5.7	Are there other professionals with which you would like to work in your practice in the future? If so, what types?	**Open ended**	[37]

*"Scheine" or "bills" reflects the number of individual patients treated per quarter year
+ A form of health care delivery in Germany similar to Preferred Provider and Health Maintenance Organisations elsewhere

Interview

An initial interview guide following a semi-structured format and consisting of 11 questions (Table 3) has been developed to cover TDF domains described above and those not addressed in the survey. Although the qualitative approach can be used to detect emerging themes potentially related to multiple domains, the elements of the interview guide were developed with the intention that each represented a single domain.

Section one addresses knowledge about delegation to NPMS in the practice and general motives and beliefs. In section two, we explore the extent to which delegation is currently implemented, approaches to delegation and which factors play a facilitating or hindering role. In section three, we

explore the potential for delegation, potentially adding to insights arising from responses provided in section five of the survey. A fourth section explores perceived social influences, whether by patients or other physicians, while section five explores thoughts and ideas on future developments including both potential barriers and facilitators that might allow greater delegation to NPMS from the physician's perspective. The interview ends with a summary of responses documented by the interviewer and provides an opportunity for validation, clarification of misunderstandings and member checking. Three TDF domains, "*Optimism*", "*Emotion*" and "*Behavioural regulation*" were considered too broad to be addressed in a specific question and were thought to be best analysed as part of the content analysis of the interview.

Each question of the preliminary interview-guide was discussed within the research team to ensure a clear relation to the research objectives. Pre-tests have been performed with two PCPs representing the target sample to ensure the questions are clear and understandable and to estimate interview length. The final interview-guide may be modified by results from the survey, to explore emerging themes, while being respectful of participants' busy schedules. Any modification will undergo a similar pre-testing process.

Table 3: Elements of the Interview guide and corresponding primary domain of the Theoretical Domains Framework

#	Key question/Follow-up questions	Primary Domain
1.	**Introduction**	
1.1	When did you first encounter the issue of delegation of medical tasks? a) What have you learned about delegation since then? b) Is there anything you would like to know about delegation that you do not know so far?	Knowledge
1.2	Can you tell me about your perspective on the delegation of medical tasks to non-physician medical staff in your practice?	
2.	**Current situation**	
2.1	How is it decided in your practice who takes on which tasks? a) Can you tell me more about this? b) Can you tell me about the expectations you currently have, when delegating to your staff?	Skills
3.	**Potential of delegation**	
3.1	Can you tell me about the potential of delegation of medical tasks to non-physician medical staff in your practice? a) Can you give me examples? b) What would have to happen to delegate these tasks? c) How would you describe your likelihood to delegate these tasks under these circumstances?	Beliefs about Consequences

	d) How would you describe your expectation to your staff if you delegated these additional tasks? e) Can you imagine, to transfer tasks to non-physician Medical Staff in the sense of Substitution?	
3.2	Can you tell me what comes to mind about efficiency in Primary Care practice? a) How does the issue of delegation play a role in considerations of efficiency in your practice?	Memory, attention, and decision process
3.3	Can you tell me what comes to mind if I ask you about tasks that are solely the physicians responsibility? a) What defines these tasks, that makes you think they must be performed by a physician?	Social/Professional Role and Identity
4.	**Expectations of delegation**	
4.1	When you think of your patients, how do you think they would react to an increased delegation to non-physician medical staff? a) Can you give me examples? b) Can you imagine the opposite? c) Can you imagine why this might be the case?	Social influences
4.2	When you think of your medical colleagues, how do you think they would react to an increased delegation to non-physician medical staff? a) Can you give me examples? b) Can you imagine the opposite? c) Can you imagine why this might be the case? d) Can you tell me how you would think about this if we were talking about substitution?	Social/Professional Role and Identity
5.	**Future Development**	
5.1	How do you think delegation of medical tasks will develop in the future?	
5.2	Can you think about anything else on this topic that is important to you?	
6.	**Summary/Member Checking**	
6.1	If I have understood you correctly ... (Summary Interviewer) a) Delegation in general b) Current situation c) Expectations and potential d) Colleagues/patients	

Data Management

Surveys responses will be scanned, text digitally converted, and results uploaded into a database available only to the research team. If written responses are not legible, data will be censored. Surveys will be archived in paper-based and digital formats. Audio-recordings of the interview will be transcribed and will only be available during the transcription process. Written transcripts will be validated against the audio files by the researcher conducting the interview and deleted thereafter. The dataset generated in the survey and the interviews will be available from the corresponding author on reasonable request. The Audio-transcripts files will not be available to external researchers.

Data Analysis

Data analysis will proceed in three steps: separate analysis of survey and interview data followed by a comparative assessment of both seeking complementary or new insights.**[22]**

Incomplete survey-data will be included in the analysis, although responses will be checked for plausibility (e.g., identical responses across all items) and excluded on a case-by-case basis. Floor/ceiling effects will be assumed if more than 80% of participants' responses fall in either of the extreme response categories. These items will be excluded unless context can be identified during the later comparative assessment stage. Descriptive analysis will include comparison of participants demographics with demographics of the sample group to check for over- and underrepresentation of subsamples. Analyses of survey data will use Stata Statistical Software: Release 16.**[41]**

As mentioned, insights arising from the analysis of survey data will inform decisions to refine the interview guide. Once conducted, interview data will be subjected to content analysis according to Mayring**[42]** using MAXQDA 2022 (VERBI Software, 2021). We will use both inductive and deductive practices to compare our findings to previous research, as well as to generate new insights and possible hypotheses for future follow-up studies. A template analysis based on the TDF will identify themes potentially relevant for supporting organisational behaviour change in the future around the theme of delegation. Theme saturation will be assumed, when both researchers conducting thematic analysis agree, that enough insights are generated to address the research objective.**[43]**

Finally, as neither the survey nor the interviews are designed to separately cover all domains of the TDF, we will attempt to connect insights arising from data from both to identify potential influencing factors, motives, and beliefs regarding delegation of tasks to NPMS.**[22, 23]**

This comparative analysis will be performed by identifying themes emerging from the analyses of either the quantitative or the qualitative part of the study and following it across to the other part, seeking confirmation, disagreement or further insights. This process will be repeated until no further insights on results of either part of the study can be generated.**[44, 45]** The TDF will then be used as a guide to sort and summarise results.

Patient and public involvement

There was no patient or public involvement in the study. Following completion of each interview, a copy of final study results will be offered and sent to interested participants at their request .

Ethics and Dissemination

The study has been approved by the Ethics Committee II of Heidelberg University, Mannheim Medical Faculty in April 2021 (Approval No. 2021–530). Written informed consent will be obtained from each participant before each interview. Following consent, the interview will be audio recorded and transcribed to allow analysis. Consent for participation in the survey will be assumed when the survey has been returned. Financial incentives will not be offered for survey completion although interviewees will receive an incentive of 40€ as a small token of appreciation for their participation. Insights emerging from this study will be shared with local and regional governmental agencies and key stakeholders in planning outpatient health care, especially in Baden-Wuerttemberg. Results will be disseminated through publications in peer-reviewed journals, conference talks and poster presentations.

Discussion

Mismatch in supply and demand for German PC is increasing, especially in rural areas. Delegating greater responsibility for the performance of selected tasks to NPMS may address this mismatch by fostering greater practice efficiency. However, building potential interventions in PC-practices should be preceded by efforts to understand structures and processes in PC.**[46]** Thus, we take a first step in better understanding PC by exploring influencing factors, motives, and beliefs regarding delegation. The proposed study is the first to use theory as an organisational foundation for specifically identifying potential influencing factors, motives and beliefs regarding delegation of tasks to NPMS and probing the potential of further integrating NPMS in German PC-practices using both qualitative and quantitative methods. Previous German studies on this topic, in contrast, are largely atheoretical, rely

heavily on a quantitative approach**,** and offer conflicting results.**[19, 20, 37, 47]** By using a theory-based approach combined with mixed methods research techniques, the proposed study has the potential to contribute to a clearer, more comprehensive picture of potential barriers and facilitators to taking a more team-based approach in PC from the physician's perspective.

While the methods we will use in this study are largely descriptive and exploratory in nature, we view this as an important strength, especially in view of the currently limited knowledge base addressing motives and beliefs regarding delegation. Combining qualitative interviews with an open-ended approach and theory-guided survey allows for a broader and deeper exploration of prevailing motives, beliefs and potential influencing factors and promises to inform the focus of future interventions that seek to expand the role of NPMS. Especially as the interview opens opportunity to address any topic relevant to participants and as we specifically ask participants to name relevant factors in the survey, we anticipate an ability to uncover influencing factors not previously identified. Indeed, the added value of a qualitative approach and the data connection process is the opportunity to identify and explore factors not previously uncovered that are relevant and must be considered in the design of any future intervention.**[22, 23]**

Responses to the future results of this study may take many forms. Interventions at the PCP- or health systems-levels, for example, may be required before designing and implementing interventions to expand team-based care, such as educational programs for PCPs or adjustments in practice compensation. Additional research may be required to evaluate different practice styles and identify best practice examples for task delegation in PC-practices.

This study promises to shed a broader light on tasks performed by NPMS at present and those that might be possible in the future. Previous studies provided task lists,**[20, 33, 34, 37, 39, 40]** which might constrain answers on the most frequent tasks typically performed by MAs or HAPCP/NPPA, even though the tasks performed in PC are broad and particularly diverse.**[48]** The potential for delegation in the future remains unclear in amount and area, as previous studies identify either the assumption

of responsibility for home-visits**[47]** or the performance organisational tasks as being most relevant to PCPs.**[20, 37]**

Although our study has a narrow focus, the approach we describe may be applicable in other research settings, especially those involving organisational behaviour change. Combining the TDF as an organising framework in quantitative and qualitative research may yield unexpected and valuable insights for work in other fields.

Although the TDF provides a comprehensive framework for identifying potential influencing factors, motives, and beliefs, previous experiences suggest that some factors on the “systems level" (for example, those that address cultural influences) might not be represented adequately.**[49]** This represents a limitation of this study, although we believe these factors might still be identified in context of the interviews even if not addressed explicitly.

Surveys are subject to potential errors and resulting biases in data-analysis, especially sampling, non-coverage, measurement and nonresponse error.**[50]** We address sampling and non-coverage bias by using a broad definition of “rural” and by including all PCPs in rural areas in Baden-Wuerttemberg. To address sampling and non-coverage error in the interviews, we will specifically sample PCPs with differing views by asking participants for such and by aiming to achieve theme saturation.

Sampling-error might arise from the address data to be obtained from commercial sources, as they might not accurately identify physicians of the target sample. In terms of potential selection bias, however, we are not aware of any reason that might make physicians more or less likely to be included in this database. Indeed, as a commercial data source, one would expect a strong incentive for ensuring inclusion of all actively practicing physicians would exist. To mitigate selection bias, survey analysis will include comparison of participant demographics with demographics of the full sample.**[9]**

Our survey consists of some items, especially those pertaining to the TDF that have not been psychometrically tested, potentially resulting in measurement error. We attempt to address this, in part, by carefully reviewing previous work to identify validated items**[32]** and by performing multiple pilot-tests with individuals representative of the target population and discussions within the research

group and with external experts. Additionally, we include Items that assess potential acquiescence or social desirability effects and use survey procedures that assure anonymity of responses. Measurement error in the interviews will be addressed using member-checking and having multiple researchers code the interviews.

Nonresponse error remains a major factor in any survey study**[50]**. We aim to maximise response-rate by designing survey and the means of returning responses following the Total-Design-Method. To reduce respondent burden, we limit the survey to two pages, maximise consistency in its design, use personalised cover letters, post-paid response letters and reminders after four weeks to all non-respondents. **[50]**

This study will focus solely on the PCPs' perspective as they currently have the greatest influence on operational decisions related to practice structure and processes. The perspectives of patients and NPMS, however, remain both important and largely unexplored. Although previous research in other settings suggests that delegation is generally well accepted by patients,**[51]** the patients' perspective as well as that of NPMS should be assessed in future research.

List of Abbreviations

PC – Primary Care

PCP – Primary Care Physician

MA – Medical Assistant

NPMS – Non-physician medical staff

TDF – Theoretical Domains Framework

FTE – Full-time-Equivalent

DECLARATIONS

Author contributions

HA (Principal Investigator) conceptualised the study as part of his dissertational project. DL and JF advised on the study design. HA produced the first draft of the manuscript which was revised by DL and JF. All authors reviewed and approved the final version of the manuscript.

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Competing interests

The authors declare that they have no competing interests

Footnotes

We use the term “primary care” as translation for the term commonly used in Germany: “hausaerztliche Versorgung”. Other translations for the German term may include “Family Medicine” or “General Practice”, depending on the specific roles assumed by physicians in different health care systems

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Table 1: Training and common role responsibilities of non-physician medical staff in German Primary Care Practices

Name	Entry Requirements	Training	Role responsibilities
Medical Assistant ["Medizinische Fachangestellte"]	9 years of Basic school education	3 year curriculum ❖ 1–2 days/week vocational school ❖ 3-4 days/week in practice settings ❖ Areas of training: ➢ Anatomy ➢ Physiology ➢ Hygiene ➢ Emergency management and First Aid ➢ Practice Management ➢ Disease prevention ➢ Communication training	Practice organisation and administration Performance of selected procedures including: ❖ phlebotomy ❖ injections ❖ electrocardiography ❖ spirometry ❖ patient education
Healthcare Assistant in Primary Care practice ["Versorgungsassistent/-assistentin in der Hausarztpraxis"]	Previous professional training as Medical assistant	150 hour curriculum ❖ 80 hours theoretical training ❖ 40 hours practical training ❖ 30 hours internship in primary care practices ❖ Specific areas of additional training: ➢ Case Management ➢ Prevention management ➢ Health Management ➢ Technical management ➢ Practice Management ➢ Home visits ➢ Emergency Management ➢ Wound management	Common additional responsibilities following qualification: ❖ Home visits ❖ Treatment plan coordination ❖ Confirmation of receipt of recommended vaccinations ❖ Performing routine Check-ups ❖ Geriatric assessment ❖ Assisting in Telemedicine visits ❖ Assisting in Emergency management ❖ Wound checks and dressing changes
Non-physician Practice Assistant ["Nichtaerztliche/-r Praxisassistent/-assistentin"]	Previous professional training as Medical assistant	190–271 hours depending on previous professional experience ❖ 150-201 hours theoretical training including: ❖ 20-50 hours practical training ❖ 20 hours emergency management ❖ Specific areas of additional training: ➢ Features of common chronic and acute diseases ➢ Case management ➢ Basics of nutrition ➢ Medication management ➢ Wound management ➢ Prevention management ➢ Basics of Telemedicine ➢ Emergency Management ➢ Communication (e.g., effective communication techniques) ➢ Documentation	

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Expanding the role of non-physician medical staff in primary care in Germany: protocol for a mixed-methods study exploring the perspectives of physicians in rural practices

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Expanding the role of non-physician medical staff in primary care in Germany: protocol for a mixed-methods study exploring the perspectives of physicians in rural practices

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ABSTRACT

Introduction

Primary care faces substantial challenges worldwide through an increasing mismatch in supply and demand, particularly in rural areas. One option to address this mismatch might be increasing efficiency by delegation of tasks to non-physician medical staff. Possible influencing factors, motives, and beliefs regarding delegation to non-physician medical staff and the potential of an expanded role, as perceived by primary care physicians, however, remain unclear. The aim of this study is to assess these factors to guide development of potential interventions for expanding the role of non-physician medical staff in delivering primary care services in rural Germany.

Methods and analysis

This mixed-methods study based on the Theoretical Domain Framework (TDF) consists of survey and interviews conducted sequentially. The survey, to be sent to all primary care physicians active in rural Baden-Wuerttemberg (estimated N=1,250), includes 37 items: 15 assessing personal and practice characteristics, 15 matching TDF-Domains and seven assessing opportunities for delegation. The interview, to be performed in a subsample (estimated N=12-20), will be informed by results of the survey. The initial interview-guide consists of 11 questions covering additional TDF-Domains. Perspectives toward delegation will be maximised by comparing data emerging in either part of the study, seeking confirmation, disagreement or further details.

Ethics and dissemination

The ethics committee of Heidelberg University approved this study (Approval No. 2021–530). Written informed consent will be obtained before each interview; consent for participation in the survey will be assumed when the survey has been returned. Results will be disseminated via publications in peer-reviewed journals and talks at conferences. By combining quantitative and qualitative methods, our results will support future research for crafting potential interventions to expand the role of non-physician medical staff in rural primary care.

Strengths and limitations of this study

- This study will provide initial insights into potential areas of focus for future interventions that seek to expand the role of non-physician medical staff in rural primary care in Germany.
- Use of mixed-methods and a theory-guided approach promises to generate rich data on a topic that has not previously been well characterised.
- The exploratory design may help to identify previously undiscovered themes and motives.

- The current study will not explore the perspectives of patients or non-physician medical staff, even though their attitudes and beliefs may have significant bearing on decisions to delegate tasks differently in primary care practices.

INTRODUCTION

Primary care (PC) faces substantial challenges worldwide. It functions as the first access point to health care,**[1]** which, in turn, reflects high demand. This demand continues to increase as populations age and the prevalence of chronic diseases grows.**[2, 3]** As demand for services to address some chronic diseases is increasingly provided by physicians in specialties and subspecialties, the need for PC-physicians (PCPs) as coordinators of care assumes even greater importance.**[4]**

Delivering PC in rural areas faces additional challenges arising from a greater imbalance of supply and demand in PC and structural problems in service delivery. The proportion of older people in rural areas, for example, has increased to a greater extent than in urban areas**,[5]** leading to an even greater increase in the prevalence of chronic diseases and a higher demand for PC. The supply of PCPs in rural areas also appears increasingly limited given an ageing PCP workforce**[6-9]** and the low rate at which retiring PCPs are replaced.**[10]**

The reduced accessibility of PC-practices in rural areas (e.g., longer drives or fewer options for public transport)**[11]** and the legal obligation of German PCPs to perform home visits when necessary, result in additional challenges. Home visits in particular occupy a higher proportion of a PCP's typical workload in rural areas,**[12]** resulting in less time spent in practice and fewer patients receiving care per PCP. Importantly, rising demand and insufficient supply have the potential to lead to increased health disparities between rural and urban areas.**[13]**

As rising demand appears to be a given, increasing the supply of those delivering PC represents an evident focus. In contrast to other countries such as England or the Netherlands, however, options for augmenting or expanding roles within the PC-workforce are currently limited in Germany given the

relative underdevelopment of the public health infrastructure and the absence of health professionals trained to contribute to the delivery of PC.**[14]** Recently implemented policy measures to increase the number of PCPs, including quotas for medical schools for committing students to work in rural areas in the future, fail to offer a short-term solution. However, opportunities for creating greater practice efficiency through changes to practice structure and processes have yet to be explored.

PC in Germany is primarily delivered in PCP-owned solo practices that employ Medical Assistants (MA), the only other established health profession active in German PC.**[14]** MAs are responsible for practice organisation, administration and performing simple medical procedures including phlebotomy and vaccination. Currently, only two major training programs for MAs are established in German PC to allow MAs to take additional responsibility for selected, more advanced tasks (See Appendix). Still, the role of MAs in patient care is less extensive compared with those of non-physician medical staff (NPMS) working in primary care settings in other countries.**[14]** In contrast to German PC-practices, NPMS elsewhere often consists of Nurses, Pharmacists, Social workers or Dietitians, resulting in a broader availability of services and a more team-based approach.**[14]**

International examples suggest that this team-based approach may also result in greater efficiency in PC.**[15, 16]** Two recent systematic reviews, including one by the Cochrane Collaborative, further suggest that team-based PC improves care coordination**[17]** and that using NPMS as substitutes for PCPs might improve patient mortality and quality of life in some cases.**[18]** The generalisability of this evidence across health care systems, however, is limited as the conditions under which NPMS are included in patient care vary between *delegation*, in which PCPs remain responsible for any task performed by NPMS, and *substitution*, in which NPMS perform tasks autonomously without supervision of PCPs. The latter, as described by Laurant et al.,**[18]** is currently prohibited by law in Germany. Taken together, current organisational structure in German PC might neither be most effective nor most efficient in organising and delivering PC.**[15]** The extent, however, to which efficiency and effectiveness in German PC might be improved by expanded roles of NPMS and the

acceptability of promoting further delegation, implementing substitution, or integrating further professions in PC is currently unclear.

Several factors may influence an expansion in the roles of NPMS in the delivery of PC in rural areas. Especially in solo-practices, PCPs often act as primary decision-makers for practice organisation and operation, making their motives and beliefs regarding delegation particularly important. Previous studies in Germany exist in this area, yet offer conflicting results on factors influencing PCPs motives and beliefs regarding delegation.**[19, 20]** Even less is known about PCPs specific motives and beliefs in rural Germany, where they might differ due to scarcer resources and a stronger focus on personal doctor-patient relationships.**[21]** To guide development of future interventions that advance practice efficiency by promoting an expanded role of NPMS in rural PC, a clearer appreciation of influencing factors on and PCPs' motives and beliefs regarding delegation of tasks to NPMS might be valuable.

The aim of this study, therefore, are to assess these factors to guide development of potential interventions for expanding the role of non-physician medical staff in delivering primary care services in rural Germany. More specifically, the study question centres on which influencing factors, motives and beliefs of PCPs might affect the delegation of tasks to NPMS in PC in rural Germany.

METHODS AND ANALYSIS

We implement a sequential mixed-methods design, often used in exploratory study designs, consisting of a survey complemented by semi-structured interviews.**[22]** This approach will allow us to connect results from both methods to form a deeper understanding of influencing factors, motives and beliefs regarding delegation and to discover insights in an area that has been the focus of limited investigation in the past.**[23]**

Patient and public involvement

There was no patient or public involvement in the study. Following completion of each interview, a copy of final study results will be offered and sent to interested participants at their request.

Setting

As major parts of healthcare systems in Germany are organised and administered on the state level, it is natural to seek potential drivers of and starting points for interventions that often differ by state. The proposed study will be conducted in Baden-Wuerttemberg, one of the largest federal states in Germany (population 11,000,000) located in southwestern Germany with a physician density**[24]** and age distribution**[25],** comparable to that of Germany as a whole. Baden-Wuerttemberg was specifically selected as opportunities for access to our target population, supported by longstanding institutional connections with the state ministry of health and regional physician organisations, were strongest.

Participants and recruitment

Publicly available geocoded data on practice location are not available in Germany. To identify PCPs active in rural areas, we started with two county-level definitions for rurality (population density per unit of area and population size reachable by a pre-defined amount of travel time)**[26]** provided by the Federal Office for Building and Regional Planning. Twelve of the 44 counties in Baden-Wuerttemberg met one or both definitions (approximate population size 2,000,000).

Physicians working in the German equivalent fields of General Internal Medicine or General Medicine/General Practice/Family Practice in a rural county are considered eligible. Although normally considered a primary care specialty, we exclude Paediatricians as they might be less impacted by the increase in long-term treatment and management of chronic diseases in general and thus their motives and beliefs regarding delegation as a strategy for practice efficiency may be both quantitatively and qualitatively different. No further exclusion criteria will be applied. Data from the Associations of Statutory Health Insurance Physicians suggests the pool of potentially eligible respondents to be approximately 1250.

We will use a database provided by commercial marketing agencies targeting physicians to identify potentially eligible respondents in rural counties and obtain their practice address. To increase response rates and limit respondent burden, we use the Total Design Method to design all study forms

including a brief, participant-friendly survey (one page front and back) introduced by a personalised cover letter.**[27]**. Study forms, sent by standard mail, include a description of study purpose, the printed survey, a response-form, a return envelope and a second envelope without identifier to contain the completed survey to ensure respondent anonymity. The response form serves three specific purposes: to identify non-responders to whom a second mailing will be sent after four weeks; to assess four characteristics (gender, age, reason for non-participation and general attitude towards delegation) to be completed by those not willing to complete the entire survey; and to give consent for future contact for interviews.

Those agreeing to a possible interview or those identified from survey responses as colleagues with potentially differing views and who might be willing to participate will be contacted. Interviews will be conducted until theme saturation assessed *a posteriori* during data analysis (see below) is reached. We anticipate the need to recruit between 12**[28]** to 20 participants.**[29]**

Theoretical framework

Implementing new routines in PC such as delegating tasks differently involves organisational and individual behaviour change. As the objective of this investigation is to identify factors relevant for future interventions, it is natural to consider behavioural change theory. In previous work, existing theories were reviewed and sorted into 84 constructs and 14 domains comprising the Theoretical Domains Framework (TDF).**[30]** Since its original development in 2005, the TDF has been widely used in health services research to explore factors that influence behaviour change.**[31]**

We applied the TDF**[30]** to ensure representation of all domains in either the survey, the interview or both (Table 1) and as a strategy that might permit complementary insights. To this end, we developed an initial pool of items consisting of at least one item per domain for both the survey and interview guide.

Table 1: Domain definitions for the Theoretical Domain Framework and their representation, by mode of data collection

Domain	Representing	Items
Knowledge An awareness of the existence of something	Survey Interview	4.4 1.1
Skills An ability or proficiency acquired through practice	Interview	2.1
Social/professional role and identity A coherent set of behaviours and displayed personal qualities of an individual in a social or work setting	Survey Interview	4.2, 4.15 4.1
Beliefs about capabilities Acceptance of the truth, reality, or validity about an ability, talent, or facility that a person can put to constructive use	Survey	4.3
Optimism The confidence that things will happen for the best or that desired goals will be attained		
Beliefs about consequences Acceptance of the truth, reality, or validity about outcomes of a behaviour in a given situation	Survey Interview	4.8, 4.9, 4.10, 4.11 3.1
Reinforcements Increasing the probability of a response by arranging a dependent relationship, or contingency, between the response and a given stimulus	Survey	4.12
Intentions A conscious decision to perform a behaviour or a resolve to act in a certain way	Survey	4.7
Goals Mental representations of outcomes or end states that an individual wants to achieve	Survey	4.6
Memory, attention, and decision process The ability to retain information, focus selectively on aspects of the environment and choose between two or more alternatives	Survey Interview	4.5 3.2
Environmental context and resources Any circumstance of a person's situation or environment that discourages or encourages the development of skills and abilities, independence, social competence, and adaptive behaviour	Survey	4.1, 4.13, 4.14
Social influences Those interpersonal processes that can cause individuals to change their thoughts, feelings, or behaviours	Interview	4.1
Emotion A complex reaction pattern, involving experiential, behavioural, and physiological elements, by which the individual attempts to deal with a personally significant matter or event		
Behavioural regulation Anything aimed at managing or changing objectively observed or measured actions		

Survey

The final survey, consisting of 37 items in five subsections (Table 2), is informed by previous work that describes 32 validated question-stems representing various domains of the TDF. Item wording is

modified to match the research-question by inserting “action”, “context”, “time” and “target” of the intended behaviour into the question stem. **[32]** All items in the initial pool we created were then discussed on multiple occasions within the research group, with social scientists and independent PCPs, for clarity, consistency of content with the research objective and the extent to which survey items in the initial pool adequately represented specific domains. This review suggested that some domains were rather complex and could be misinterpreted or that previous work provided limited guidance in developing an item that clearly tapped a specific domain. In these instances, the domain was marked for exploration using qualitative methods instead. Finally, as not all items were directly applicable to our study objective and to limit participant burden, we focused on 15 items to represent nine TDF-Domains using a five-point Likert scale (1= “don’t agree at all”; 5= “completely agree”).

Personal characteristics highlighted in previous work are included to assess potential influences on beliefs regarding delegation (items 1.1-1.6).**[19, 20, 33-38]** Practice characteristics are assessed using six items. These include self-perceived location of the practice to confirm congruence with our definition of rurality and practice organisation, an important factor in determining both reimbursement schemes and the amount of organisational influence a single physician has regarding opportunities for delegation to NPMS (items 2.1+2.2). As no public records on workload or workforce in PC-practices in Germany exist, we use a common metric in the German health care system that reflects the number of individual patients treated per quarter year (item 2.3).**[19, 20, 33-37].** Enrolment in the “GP-centred care plan”, a form of health care delivery in Germany similar to Preferred Provider and Health Maintenance Organisations elsewhere, will be assessed as this has potential influence on reimbursement and thus the potential for delegation of tasks to MAs with additional qualifications (item 2.4). Practice workforce size (2.5) and workforce composition (2.6) will be assessed by the number of employees working full- or part time **[20, 34-37]** and as the number of employees with basic and additional professional training (items 2.5, 2.6). The latter is important given that practices with a larger number of employees with additional qualifications might have greater possibilities for implementing or facilitating delegation.

We assess the current activity profile using three items (items 3.1-3.3) to explore the extent to which delegation might be used in direct and indirect patient care and in non-patient care related work.

Section 5 assesses current and future potential for delegating tasks to NPMS. Although previous studies mostly used task lists to evaluate delegation and potential expansion of skill-mix,**[20, 33, 34, 37, 39, 40]** this approach limits respondents' ability to represent ideas they feel relevant to the topic. To better explore this area, we use open-ended questions to assess tasks performed currently as well as tasks potentially performed in the future by MAs in general and those with additional training (Items 5.1-5.4). Related to this, we will probe physicians' perceptions of possible areas of future training programs for NPMS and for the integration of other professionals not yet working in PC (Items 5.5 + 5.7).

A bilingual native English-speaking physician (DL) reviewed the German language survey alongside its proposed translations and made suggested revisions that were back translated into German by an independent party, discussed by the research team and either accepted or deleted by consensus. The final survey was pre-tested using cognitive interviews with two participants of the study sample to assess item clarity and interpretation.

Table 2: Survey

#	Question Text	Item structure/Response options	References
1.	**Personal Characteristics**		
1.1	Gender	**Single Answer** Male, female, non-binary	[19, 20, 33-37]
1.2	Age	**Numeric box** Age in years	[19, 20, 33-36]
1.3	Years as primary care physician	**Numeric box** Years	[37]
1.4	Ø working hours per week	**Numeric box** Full hours	[36, 37]
1.5	Working as	**Single Answer** Self-employed, Employee	[36, 37]
1.6	Specialist in	**Single Answer** Family Medicine, General internal Medicine, General practitioner (no specialist training), Other	[19, 33]
2.	**Practice Characteristics**		
2.1	How would you describe the location of your practice?	**Single Answer** Urban, Suburban, Rural	[19, 20, 33-35, 37]
2.2	How is your practice organised?	**Single Answer**	[19, 20, 33-37]

		Medical Care Centre, Group practice, Joint practice, Solo Practice	
2.3	How many „Scheine"* do you personally handle on average per quarter year?	**Numeric box** Number in full hundreds	[19, 20, 33-37]
2.4	Does your practice participate in the GP-centred care program+?	**Single Answer** Yes, No	[20, 34, 35]
2.5	How many people are working in your practice?	**Numeric box** (each for full-/part-time): Physicians (incl. You), Medical assistants, Other	[20, 34-37]
2.6	How many non-physician employees have completed additional training? (If a single person has multiple qualifications, please enter each)	**Numeric box** Open text	[20, 34-37]
3.	**Current activity profile**		
What proportion of your time (in percentages) is currently spent in:			
3.1	direct patient care at your work? (incl. nursing home/home visits and associated travel time)	**Numeric box** Percentages	[20, 34, 35, 37]
3.2	indirect patient care at your work? (e.g.: Reviewing laboratory results)	**Numeric box** Percentages	[20, 34, 35, 37]
3.3	non-patient activity at your work? (e.g.: billing)	**Numeric box** Percentages	[20, 34, 35, 37]
4.	**Attitudes toward delegation of medical tasks to non-physician medical staff in your practice**		
Likert Scale: Completely agree, Agree, Neither agree nor disagree, Disagree, Completely disagree			
4.1	I work in a region where there is currently a shortage in primary care supply.	**Primary Domain:** Environmental context and resources	
4.2	I am one of the first to implement new models in health care or practice organisation.	**Primary Domain** Social/Professional Role and Identity	
4.3	I am able to implement changes to the processes in my practice.	**Primary Domain:** Belief about the capabilities	[32]
4.4	I am well informed about the possibilities of delegation.	**Primary Domain:** Knowledge	[20, 32, 34, 35, 37]
4.5	When I think about efficiency in my practice, the use of delegation plays a role.	**Primary Domain:** Memory, attention, and decision process	
4.6	My goal for this practice is to achieve the highest efficiency possible.	**Primary Domain:** Goals	
4.7	I will delegate as many tasks as possible to my non-physician medical staff in the future.	**Primary Domain:** Intentions	[20, 32, 34, 35]
I think that an increase in delegation of medical tasks to non-physician medical staff in my practice…			
4.8	…increases patient satisfaction.	**Primary Domain:** Beliefs about Consequences	[19, 32, 33]
4.9	…impairs the treatment of my patients.	**Primary Domain**: Beliefs about Consequences	[19, 32, 33]
4.10	…reduces my workload.	**Primary Domain**: Beliefs about Consequences	[19, 32, 33]
4.11	…increases efficiency in my practice.	**Primary Domain**: Beliefs about Consequences	[32]
4.12	…is financially worthwhile for my practice.	**Primary Domain**: Reinforcements	[19, 32, 33]
4.13	I am open to delegating additional medical activities to my practice personnel.	**Primary Domain:** Environmental context and resources	
4.14	I am open to delegating additional medical activities to my practice personnel, if they obtained additional training.	**Primary Domain**: Intentions	[32]
4.15	I am open to transferring medical tasks to my practice personnel in the sense of substitution.	**Primary Domain**: Social/professional role and identity	[37]

	Substitution refers to the complete assumption of responsibility for tasks by non-physician medical staff. An example is the independent recall, treatment, and control of diabetes mellitus type 2 patients by non-physician medical staff. You would only be included in the treatment if there were problems beyond the skills of the staff.		
5.	**Opportunities to delegate medical activities to non-physician medical staff in your practice**		
Please list (several if possible) examples of the most relevant tasks that…			
5.1	… Medical Assistants without additional training typically perform in your practice at present.	**Open ended**	
5.2	… Medical Assistants without additional training could perform in your practice in the future.	**Open ended**	
5.3	… Medical Assistants with additional training typically perform in your practice at present.	**Open ended**	
5.4	… Medical Assistants with additional could perform in your practice in the future.	**Open ended**	
5.5	… Non-physician Medical Staff could perform in your practice in the future, if further additional training were provided. (Please also consider training, that is not yet available, but might be in the future)	**Open ended**	
5.6	What is the greatest factor influencing delegation of physician tasks in your practice? a) Facilitating b) Hindering	**Open ended**	
5.7	Are there other professionals with which you would like to work in your practice in the future? If so, what types?	**Open ended**	[37]

*"Scheine" or "bills" reflects the number of individual patients treated per quarter year
+ A form of health care delivery in Germany similar to Preferred Provider and Health Maintenance Organisations elsewhere

Interviews

An initial interview guide following a semi-structured format and consisting of 11 questions (Table 3) has been developed to cover TDF domains described above and those not addressed in the survey. Although the qualitative approach can be used to detect emerging themes potentially related to multiple domains, the elements of the interview guide were developed with the intention that each represented a single domain.

Section one addresses knowledge about delegation to NPMS in the practice and general motives and beliefs. In section two, we explore the extent to which delegation is currently implemented, approaches to delegation and which factors play a facilitating or hindering role. In section three, we explore the potential for delegation, potentially adding to insights arising from responses provided in section five of the survey. A fourth section explores perceived social influences, whether by patients or other physicians, while section five explores thoughts and ideas on future developments including both potential barriers and facilitators that might allow greater delegation to NPMS from the physician's perspective. The interview ends with a summary of responses documented by the

interviewer and provides an opportunity for validation, clarification of misunderstandings and member checking. Three TDF domains, "*Optimism*", "*Emotion*" and "*Behavioural regulation*" were considered too broad to be addressed in a specific question and were thought to be best analysed as part of the content analysis of the interview.

Each question of the preliminary interview-guide was discussed within the research team to ensure a clear relation to the research objectives. Pre-tests have been performed with two PCPs representing the target sample to ensure the questions are clear and understandable and to estimate interview length. The final interview-guide may be modified by results from the survey, to explore emerging themes, while being respectful of participants' busy schedules. Any modification will undergo a similar pre-testing process.

Table 3: Elements of the interview guide and corresponding primary domain of the Theoretical Domains Framework

#	Key question/Follow-up questions	Primary Domain
1.	**Introduction**	
1.1	When did you first encounter the issue of delegation of medical tasks? a) What have you learned about delegation since then? b) Is there anything you would like to know about delegation that you do not know so far?	Knowledge
1.2	Can you tell me about your perspective on the delegation of medical tasks to non-physician medical staff in your practice?	
2.	**Current situation**	
2.1	How is it decided in your practice who takes on which tasks? a) Can you tell me more about this? b) Can you tell me about the expectations you currently have, when delegating to your staff?	Skills
3.	**Potential of delegation**	
3.1	Can you tell me about the potential of delegation of medical tasks to non-physician medical staff in your practice? a) Can you give me examples? b) What would have to happen to delegate these tasks? c) How would you describe your likelihood to delegate these tasks under these circumstances? d) How would you describe your expectation to your staff if you delegated these additional tasks? e) Can you imagine, to transfer tasks to non-physician Medical Staff in the sense of Substitution?	Beliefs about Consequences
3.2	Can you tell me what comes to mind about efficiency in primary care practice? a) How does the issue of delegation play a role in considerations of efficiency in your practice?	Memory, attention, and decision process
3.3	Can you tell me what comes to mind if I ask you about tasks that are solely the physicians responsibility? a) What defines these tasks, that makes you think they must be performed by a physician?	Social/Professional Role and Identity
4.	**Expectations of delegation**	

4.1	When you think of your patients, how do you think they would react to an increased delegation to non-physician medical staff? a) Can you give me examples? b) Can you imagine the opposite? c) Can you imagine why this might be the case?	Social influences
4.2	When you think of your medical colleagues, how do you think they would react to an increased delegation to non-physician medical staff? a) Can you give me examples? b) Can you imagine the opposite? c) Can you imagine why this might be the case? d) Can you tell me how you would think about this if we were talking about substitution?	Social/Professional Role and Identity
5.	**Future Development**	
5.1	How do you think delegation of medical tasks will develop in the future?	
5.2	Can you think about anything else on this topic that is important to you?	
6.	**Summary/Member Checking**	
6.1	If I have understood you correctly ... (Summary Interviewer) a) Delegation in general b) Current situation c) Expectations and potential d) Colleagues/patients	

Data management

Surveys responses will be scanned, text digitally converted, and results uploaded into a database available only to the research team. If written responses are not legible, data will be censored. Surveys will be archived in paper-based and digital formats. Audio-recordings of the interview will be transcribed and will only be available during the transcription process. Written transcripts will be validated against the audio files by the researcher conducting the interview and deleted thereafter. The dataset generated in the survey and the interviews will be available from the corresponding author on reasonable request. The Audio-transcripts files will not be available to external researchers.

Data analysis

Data analysis will proceed in three steps: separate analysis of survey and interview data followed by a comparative assessment of both seeking complementary or new insights.**[22]**

Incomplete survey-data will be included in the analysis, although responses will be checked for plausibility (e.g., identical responses across all items) and excluded on a case-by-case basis. Floor/ceiling effects will be assumed if more than 80% of participants' responses fall in either of the extreme response categories. These items will be excluded unless context can be identified during the

later comparative assessment stage. Descriptive analysis will include comparison of participants demographics with demographics of the sample group to check for over- and underrepresentation of subsamples. Analyses of survey data will use Stata Statistical Software: Release 16.**[41]**

As mentioned, insights arising from the analysis of survey data will inform decisions to refine the interview guide. Once conducted, interview data will be subjected to content analysis according to Mayring**[42]** using MAXQDA 2022 (VERBI Software, 2021). We will use both inductive and deductive practices to compare our findings to previous research, as well as to generate new insights and possible hypotheses for future follow-up studies. A template analysis based on the TDF will identify themes potentially relevant for supporting organisational behaviour change in the future around the theme of delegation. Theme saturation will be assumed, when both researchers conducting thematic analysis agree, that enough insights are generated to address the research objective.**[43]**

Finally, as neither the survey nor the interviews are designed to separately cover all domains of the TDF, we will attempt to connect insights arising from data from both to identify potential influencing factors, motives, and beliefs regarding delegation of tasks to NPMS.**[22, 23]**

This comparative analysis will be performed by identifying themes emerging from the analyses of either the quantitative or the qualitative part of the study and following it across to the other part, seeking confirmation, disagreement or further insights. This process will be repeated until no further insights on results of either part of the study can be generated.**[44, 45]** The TDF will then be used as a guide to sort and summarise results.

Ethics and Dissemination

The study has been approved by the Ethics Committee II of Heidelberg University, Mannheim Medical Faculty in April 2021 (Approval No. 2021–530). Written informed consent will be obtained from each participant before each interview. Following consent, the interview will be audio recorded and transcribed to allow analysis. Consent for participation in the survey will be assumed when the survey has been returned. Financial incentives will not be offered for survey completion although interviewees will receive an incentive of 40€ as a small token of appreciation for their participation.

Insights emerging from this study will be shared with local and regional governmental agencies and key stakeholders in planning outpatient health care, especially in Baden-Wuerttemberg. Results will be disseminated through publications in peer-reviewed journals, conference talks and poster presentations.

DISCUSSION

Mismatch in supply and demand for German PC is increasing, especially in rural areas. Delegating greater responsibility for the performance of selected tasks to NPMS may address this mismatch by fostering greater practice efficiency. However, building potential interventions in PC-practices should be preceded by efforts to understand structures and processes in PC.**[46]** Thus, we take a first step in better understanding PC by exploring influencing factors, motives, and beliefs regarding delegation.

The proposed study is the first to use theory as an organisational foundation for specifically identifying potential influencing factors, motives and beliefs regarding delegation of tasks to NPMS and probing the potential of further integrating NPMS in German PC-practices using both qualitative and quantitative methods. Previous German studies on this topic, in contrast, are largely atheoretical, rely heavily on a quantitative approach**,** and offer conflicting results.**[19, 20, 37, 47]** By using a theory-based approach combined with mixed methods research techniques, the proposed study has the potential to contribute to a clearer, more comprehensive picture of potential barriers and facilitators to taking a more team-based approach in PC from the physician's perspective.

While the methods we will use in this study are largely descriptive and exploratory in nature, we view this as an important strength, especially in view of the currently limited knowledge base addressing motives and beliefs regarding delegation. Combining qualitative interviews with an open-ended approach and theory-guided survey allows for a broader and deeper exploration of prevailing motives, beliefs and potential influencing factors and promises to inform the focus of future interventions that seek to expand the role of NPMS. Especially as the interview opens opportunity to address any topic relevant to participants and as we specifically ask participants to name relevant factors in the survey, we anticipate an ability to uncover influencing factors not previously identified. Indeed, the added

value of a qualitative approach and the data connection process is the opportunity to identify and explore factors not previously uncovered that are relevant and must be considered in the design of any future intervention.**[22, 23]**

Responses to the future results of this study may take many forms. Interventions at the PCP- or health systems-levels, for example, may be required before designing and implementing interventions to expand team-based care, such as educational programs for PCPs or adjustments in practice compensation. Additional research may be required to evaluate different practice styles and identify best practice examples for task delegation in PC-practices.

This study promises to shed a broader light on tasks performed by NPMS at present and those that might be possible in the future. Previous studies provided task lists,**[20, 33, 34, 37, 39, 40]** which might constrain answers on the most frequent tasks typically performed by MAs or HAPCP/NPPA, even though the tasks performed in PC are broad and particularly diverse.**[48]** The potential for delegation in the future remains unclear in amount and area, as previous studies identify either the assumption of responsibility for home-visits**[47]** or the performance organisational tasks as being most relevant to PCPs.**[20, 37]**

Although our study has a narrow focus, the approach we describe may be applicable in other research settings, especially those involving organisational behaviour change. Combining the TDF as an organising framework in quantitative and qualitative research may yield unexpected and valuable insights for work in other fields.

Although the TDF provides a comprehensive framework for identifying potential influencing factors, motives, and beliefs, previous experiences suggest that some factors on the “systems level" (for example, those that address cultural influences) might not be represented adequately.**[49]** This represents a limitation of this study, although we believe these factors might still be identified in context of the interviews even if not addressed explicitly.

Surveys are subject to potential errors and resulting biases in data-analysis, especially sampling, non-coverage, measurement and nonresponse error.**[50]** We address sampling and non-coverage bias by

using a broad definition of "rural" and by including all PCPs in rural areas in Baden-Wuerttemberg. To address sampling and non-coverage error in the interviews, we will specifically sample PCPs with differing views by asking participants for such and by aiming to achieve theme saturation.

Sampling-error might arise from the address data to be obtained from commercial sources, as they might not accurately identify physicians of the target sample. In terms of potential selection bias, however, we are not aware of any reason that might make physicians more or less likely to be included in this database. Indeed, as a commercial data source, one would expect a strong incentive for ensuring inclusion of all actively practicing physicians would exist. To mitigate selection bias, survey analysis will include comparison of participant demographics with demographics of the full sample.**[9]**

Our survey consists of some items, especially those pertaining to the TDF that have not been psychometrically tested, potentially resulting in measurement error. We attempt to address this, in part, by carefully reviewing previous work to identify validated items**[32]** and by performing multiple pilot-tests with individuals representative of the target population and discussions within the research group and with external experts. Additionally, we include Items that assess potential acquiescence or social desirability effects and use survey procedures that assure anonymity of responses. Measurement error in the interviews will be addressed using member-checking and having multiple researchers code the interviews.

Nonresponse error remains a major factor in any survey study**[50]**. We aim to maximise response-rate by designing survey and the means of returning responses following the Total-Design-Method. To reduce respondent burden, we limit the survey to two pages, maximise consistency in its design, use personalised cover letters, post-paid response letters and reminders after four weeks to all non-respondents. **[50]**

This study will focus solely on the PCPs' perspective as they currently have the greatest influence on operational decisions related to practice structure and processes. The perspectives of patients and NPMS, however, remain both important and largely unexplored. Although previous research in other

settings suggests that delegation is generally well accepted by patients,**[51]** the patients' perspective as well as that of NPMS should be assessed in future research.

List of Abbreviations

PC – Primary care

PCP – Primary care physician

MA – Medical Assistant

NPMS – Non-physician medical staff

TDF – Theoretical Domains Framework

FTE – Full-Time Equivalent

Declarations

Contributors

HA (Principal Investigator) conceptualised the study as part of his dissertational project. DL and JF advised on the study design. HA produced the first draft of the manuscript which was revised by DL and JF. All authors reviewed and approved the final version of the manuscript.

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Competing interests

The authors declare that they have no competing interests

Footnotes

We use the term “primary care” as translation for the term commonly used in Germany: “hausaerztliche Versorgung”. Other translations for the German term may include “family medicine” or “general practice”, depending on the specific roles assumed by physicians in different health care systems.

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Table 1: Training and common role responsibilities of non-physician medical staff in German Primary Care Practices

Name	Entry Requirements	Training	Role responsibilities
Medical Assistant ["Medizinische Fachangestellte"]	9 years of Basic school education	3 year curriculum ❖ 1–2 days/week vocational school ❖ 3-4 days/week in practice settings ❖ Areas of training: ➢ Anatomy ➢ Physiology ➢ Hygiene ➢ Emergency management and First Aid ➢ Practice Management ➢ Disease prevention ➢ Communication training	Practice organisation and administration Performance of selected procedures including: ❖ phlebotomy ❖ injections ❖ electrocardiography ❖ spirometry ❖ patient education
Healthcare Assistant in Primary Care practice ["Versorgungsassistent/-assistentin in der Hausarztpraxis"]	Previous professional training as Medical assistant	150 hour curriculum ❖ 80 hours theoretical training ❖ 40 hours practical training ❖ 30 hours internship in primary care practices ❖ Specific areas of additional training: ➢ Case Management ➢ Prevention management ➢ Health Management ➢ Technical management ➢ Practice Management ➢ Home visits ➢ Emergency Management ➢ Wound management	Common additional responsibilities following qualification: ❖ Home visits ❖ Treatment plan coordination ❖ Confirmation of receipt of recommended vaccinations ❖ Performing routine Check-ups ❖ Geriatric assessment ❖ Assisting in Telemedicine visits ❖ Assisting in Emergency management ❖ Wound checks and dressing changes
Non-physician Practice Assistant ["Nichtaerztliche/-r Praxisassistent/-assistentin"]	Previous professional training as Medical assistant	190–271 hours depending on previous professional experience ❖ 150-201 hours theoretical training including: ❖ 20-50 hours practical training ❖ 20 hours emergency management ❖ Specific areas of additional training: ➢ Features of common chronic and acute diseases ➢ Case management ➢ Basics of nutrition ➢ Medication management ➢ Wound management ➢ Prevention management ➢ Basics of Telemedicine ➢ Emergency Management ➢ Communication (e.g., effective communication techniques) ➢ Documentation	