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eMpower

“Recommendations for Physical Activity by Midwives
During and After Pregnancy”

Bachelor thesis

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Preface

The literature used for this thesis refers to "women" and "mothers". These terms have been adopted in the context of this work but are intended to include all people with a uterus who give birth and are not intended to discriminate based on gender.

According to Section 3 of the Midwives Act the professional title "midwife" covers all members of the profession and thus includes all genders (m/f/d).

Abstract

Background: Considering cardiovascular diseases being the leading cause of death in Europe and the global rise in diabetes the role of physical activity (PA) during and after pregnancy is of particular importance, pregnant and postpartum women can derive advantages by maintaining or adapting their activity levels, aligning with established guidelines. Midwives have a central role in promoting PA during and after pregnancy. Midwives promote PA during and after pregnancy in alignment with current guidelines, showing women the advantages of maintaining or adapting their activity levels.

Objective: Aim of the study was to investigate the knowledge, recommendations according to WHO guidelines, attitudes, and personal practices of midwives regarding PA during and after pregnancy. Besides, it aims to contribute valuable insights for enhancing PA promotion within maternal care.

Methods: The "eMpower" project administered an online questionnaire to midwives in the German-speaking region. A tool from the university of Alberta was translated and underwent rigorous adaptation for the survey. data collection spanned May to August 2023, utilizing QR codes, flyers, emails, and social media for distribution. Descriptive and group analyses involved 360 midwives, using IBM SPSS Statistics, with statistical significance set at $p < 0.05$.

Results: Midwives' knowledge of guidelines was limited, with only 16% aware of pregnancy-related guidelines. They were more likely to know guidelines on PA during pregnancy, when their PA met the recommendations for frequency (29,3% resp. 13,1%; $p=0,002$) and for duration (18,7% resp. 8,4%; $p=0,028$) according to the WHO guideline Recommendations often fell short of WHO guidelines. Midwives with previous work-related experiences of PA ($1,73\pm 0,724$; $p=0,009$) were more likely to provide appropriate recommendations on PA during pregnancy. In contrast more than 20 years of professional practice correlated to a higher number of midwives correct recommendations on PA in the postpartum period ($1,51\pm 0,611$; $p=0,030$). Midwives that worked as freelance ($1,48\pm 0,609$; $p=0,035$) were more likely to give more correct recommendations on PA after pregnancy.

Discussion: The study identified potential influences on midwives' recommendations, including personal PA and work-related characteristics. It emphasized the need for intervention, educational and occupational policy level. Limitations include potential biases and the exploratory design's generalizability constraints.

Conclusion: Strategies such as professional training, educational programs, and occupational health initiatives should be implemented to support midwives' development of com-

petencies on providing appropriate information and advice on PA for pregnant and postpartum women. Future efforts should focus on developing national guidelines and research on identifying facilitators and barriers specific to German midwives promoting PA during and after pregnancy.

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Abbreviations

Abbreviation	Meaning
ANOVA	Analysis of Variance
BfHD	Association of Independent Midwives
BMI	Body Mass Index
BZgA	Federal Centre for Health Education
COM-B	Capability-Opportunity-Motivation Behavioural Change Model
DGE	German Society for Nutrition
DHV	German Midwives Association
GDM	Gestational Diabetes Mellitus
GKV	Public health insurance
HAW	Hamburg University of Applied Sciences
IBM	International Business Machines Corporation
IGES	Institute for Health and Social Research
IVDP	Institute for Health Services Research in Dermatology and Nursing
N/A	Not answered
NICE	National Institute for Health and Care Excellence
PA	Physical Activity
resp.	respectively
SD	Standard Deviation
SGB V	German Social Code No. 5
SPSS	Statistical Package für Social Sciences
UK	United Kindom
UKE	Medical Center Hamburg-Eppendorf
vPE	responsible practice facilities
WHO	World Health Organisation

1. Introduction

For the first time in 2020 the new guideline of the WHO [1] addressed physical activity (PA) recommendations for pregnant and postpartum women. The most recent global estimates at that time [2] showed that one in four adults did not meet the recommendations for aerobic exercise as outlined in previous guideline from 2010 [3].

1.1 Background

At the same time cardiovascular diseases remain the leading cause of death in Europe with approximately 44% of all deaths [4–6]. Furthermore, the global prevalence of diabetes is assumed to increase significantly and can be attributed to the increasing prevalence of obesity and unhealthy behaviours such as physical inactivity [4,7]. In addition, the global prevalence of overweight and obesity has reached a point where approximately one-third of the world's population is now considered overweight or obese. This doubling in prevalence since 1980 highlights the growing concern surrounding weight-related health issues on a global scale [4,8]. Insufficient level of PA is considered a significant risk factor for such diseases [2,9] not just for general population but also for pregnant and postpartum women [10,11].

Pregnancy is a unique and transitional phase in a woman's life, characterized by numerous physiological and physical changes [12]. The time from preconception to lactation should be seen as window of opportunity to embrace a healthy lifestyle [11], as this period is a sensitive phase for the short-, medium- and long-term health of mother and child [12,13]. This is also relevant because women are more likely to be receptive to change their lifestyle and habits for themselves and their children [12]. Although pregnancy and the postpartum period can be challenging for body and mind, most women benefit from becoming or staying physically active during and after pregnancy [14]. Even by adapting or reducing their activity level below current recommendations pregnant and postpartum women can receive further health benefits, such as maintaining a healthy body-mass-index (BMI), reducing the odds of developing preeclampsia or gestational hypertension or excessive gestational weight gain [1,15,16]. Likewise, individuals diagnosed with an absolute contraindication to PA are advised to partake in everyday activities. Complete inactivity (bed rest) is discouraged due to established potential for harm and no discernible evidence of benefit [17].

Systematic reviews provide evidence that PA as part of a healthy lifestyle has positive effects on both on physiological pregnancy and on the prevention of pregnancy-associated diseases [11,15,16,18–21]. Simultaneously, the safety of pregnancy outcomes is maintained, including miscarriage, preterm delivery, and having a baby who is small for gesta-

tional age [22]. At least in the past 50 years, prenatal PA has emerged as a potent preventive measure for diminishing significant pregnancy complications, like depression, preeclampsia, gestational hypertension and gestational weight gain, gestational diabetes mellitus, and macrosomia [11,15,16,19,23,24]. This is of great importance as gestational hypertensive disorders, like e.g., gestational hypertension and preeclampsia, are still significant contributors to maternal morbidity and mortality rates [25]. Together with gestational diabetes mellitus, those diseases are also linked to mothers health and negative outcomes in the offspring, including abnormal fetal growth, fetal growth restriction, preterm birth, perinatal mortality, and long-term metabolic and cardiovascular health issues [12,26–29]. Fortunately, studies have already been able to show that PA, usually in combination with other lifestyle interventions such as dietary changes, can improve the long-term outcome of pregnancy-associated conditions such as gestational diabetes mellitus and gestational hypertension and reduce the prevalence of long-term outcomes such as cardiovascular disease and type 2 diabetes [15,19,30–32].

1.2 Guidelines on PA

Guidelines on PA during and after pregnancy are one type of evidence for health care providers and women. Besides the WHO guideline, 30 countries have developed their own national guidelines for PA during pregnancy [33]. They consistently recommend 150–300 minutes per week of moderate-intensity PA, along with pelvic floor exercises for uncomplicated pregnancies. Some of the guidelines recommend to engage in a minimum of 150 minutes of moderate-intensity PA spread across three or more days each week to obtain clinically significant advantages [1,34–37]. Modifications like avoiding the supine position are recommended. Warning signs are highlighted, and activities posing a risk on mother and/ or baby should be avoided. Limited guidance exists for highly active women, trimester-specific recommendations, or cultural considerations [33]. Just the WHO guideline and three further guidelines [1], included advice for the postpartum period [33]. Nevertheless, the overall data and specific research on the impact of PA as well as recommendations on the reintroduction and level of physical activities after pregnancy are insufficient [38]. Further international studies have shown that guidelines around PA during and after pregnancy have not been adopted by health care providers or by pregnant, and postpartum women [39–44].

1.3 Midwives' Role in Promoting PA

Despite the increasing evidence for the health benefits of being physically activity, several studies reported decreasing activity levels of pregnant and postpartum women during the motherhood transition [44–48]. Several factors seem to play a role for women to reduce or stop to continue PA during pregnancy and not return to it postpartum. Women's general

and birth specific education, socioeconomic status, parity, PA before pregnancy, motivation for PA, information, and recommendations on PA during pregnancy and the postpartum period and counselling by their health care provider could have an impact on actual PA [44]. Although the promotion of PA during and after pregnancy should be a central goal for women and health care providers, both sides report on insufficient advice and counselling [39,40,42,49]. Whereas women wish for evidence-based, consistent information and competency in counselling [39], midwives wish for time for continuing education and practicing counselling especially for individual advice, e.g., how to deal with non-compliance of clients, with recommendations for high performance athletes or women with disabilities [40,49,50]. Both midwives and women can identify motivating factors and barriers for PA. Applying behaviour change theory with the COM-B model [51,52] could help midwives to understand factors influencing women's behaviour and to identify behaviour change techniques to drive lasting behavioural change. The model states that individuals who want to change their behaviour must have the capability, opportunity, and motivation to do so [51,52]. This model could also be applied to midwives' barriers, supporting them to give information and appropriate individual advice on PA and therefore promoting PA. Midwives as potential primary care providers in uncomplicated, physiologic pregnancies and during the postpartum period can close the gap and support the women in staying or becoming active during and after pregnancy [50]. Midwives salutogenic approach and perspective on resources and determinants for individual health promotion make them ideally suited to promote PA as part of primary prevention [53,54]. Midwives offering continuous prenatal care or at least prenatal visits to support with discomfort during pregnancy, have the opportunity and motivation to carry out counselling on topics like PA [49]. In midwifery model of continuity of care, they are usually the first contact for literally all question pregnant and postpartum women have [50]. Within that unique role there is the potential to provide evidence-based information and promote PA as part of healthy lifestyle in the future. Evidence-based practice of midwives is built by research and practical experience and strengthened by professionalisation and academisation [55]. Both national and international midwifery associations state evidence-based practice as one essential part within their ethics [56,57].

1.4 Status in Germany

While every woman is required to have a midwife during childbirth, it's not mandatory for her to receive continuous care from a midwife throughout pregnancy [58]. In Germany, most women seek antenatal care from obstetricians. Some midwives join obstetricians and work interprofessional, sharing prenatal care. A few midwives offer the continuity model of care and full prenatal care [58]. Beside regular prenatal visits midwives also offer additional ser-

vices to alleviate pregnancy discomfort, e.g., by acupuncture. Antenatal care services provided by midwives, are regulated by the German code of social law (SGB V), section 24d [59–61]. Continuous of care by midwives from conception to lactation only became possible with the amendment of the Midwives Act in 1986 [62]. After birth, midwives primarily provide postpartum care, including lactation support, postpartum exercises, and new-born care [58]. At a political level, the national health goal "Health around birth" also describes the central role of midwives. It is stated that the aim of antenatal care is to motivate women to adopt an active and positive lifestyle based on the salutogenic perspective of pregnancy and birth [63]. As data from Germany also indicate that women do not meet recommendations for PA before, during and after pregnancy according to the guidelines [43,64], the importance of exercise programmes and advice was stated. With view on the midwife's ethics [56], that highlight the empowerment of women in health-related issues, this shows their key role in primary prevention and promoting lifestyle interventions in Germany. Their findings are based on a long tradition of practical experience and a more recent national discipline of midwifery science, that is renewing the profession by academisation [55,65]. This includes participation in the process of national guideline development. Although global guidelines exist, a guideline on PA during and after pregnancy is still missing in the German-speaking region [66]. Furthermore, data on midwives' knowledge and recommendations on PA during and after pregnancy, are not available, neither for determinants relating to their knowledge and recommendations of PA.

1.5 Aim and Research Question

Therefore, the aim of our exploratory study is to assess midwives' current state of knowledge about recent guidelines, their recommendations, and attitudes towards PA during and after pregnancy as well as their own practice of PA. Beyond that, socio-demographic and work-related characteristics will be used to identify potential differences between the participating. It is intended to better understand midwives' recommendations on PA and to identify factors that drive change in midwifery counselling on PA.

According to the PI(C)O-framework the following research questions can be stated:

1. Are midwives' recommendations on PA during and after pregnancy consistent with the WHO guideline? Are midwives with certain sociodemographic and work-related characteristics more likely to provide appropriate recommendations?
2. Does midwives' personal practice of PA influence their knowledge about guidelines on PA and recommendations for pregnant and postpartum women?
3. Does midwives' attitude towards PA influence their knowledge about guidelines on PA and recommendations for pregnant and postpartum women?

2. Material and Methods

2.1 Design

A cross-sectional, quantitative, online questionnaire was conducted with midwives in Germany from May to August 2023. The aim was to explore midwives' knowledge of PA guidelines during pregnancy and postpartum period, and the recommendations they give to the women they care for.

2.2 Process

The questionnaire is based on the "Clinician Prenatal and Postpartum Exercise Questionnaire" developed at the University of Alberta. Consent for use has been obtained from the authors. The questionnaire has been translated professionally, checked for appropriate, specific translation, and adapted to fit the German health care system. Additionally, midwives and health scientists from the University Medical Center Hamburg-Eppendorf (UKE) checked the questionnaire for plausibility. In total, it consists of 38 items, however only the midwives' attitude towards PA, their knowledge about guidelines and recommendations on PA during and after pregnancy was analysed for this thesis.

Sociodemographic questions on gender, age, nationality, highest education, midwifery qualification and professional practice, as well as work-related data such as working hours, work setting, form of employment, area of work, having previous work-related experience on PA and offering courses with PA, as well as midwife's self-assessment of their own PA were added. A positive ethics vote was obtained from the local ethics committee of psychologists at the University Medical Center Hamburg-Eppendorf in April 2023.

For data collection, the questionnaire was transferred to electronic survey tool 'Unipark'. An introductory page was created to provide general information on the project, the presumed completion time and information on data protection. Feasibility of the online questionnaire was carried out by the midwives, who had already supported the questionnaire development and adaption. A survey link and QR code were generated to use for distribution.

2.3 Recruitment

The QR code for the survey was handed along a flyer to participating midwives at the congress of the German Midwives Association (DHV) on 17 May 2023. The link to the questionnaire was distributed by E-Mail to all relevant national and regional midwifery professional associations (e.g., DHV and BFHD), and via social media (e.g., Midwifery Facebook groups, Instagram account and direct messages) using convenience and snowball sampling. Furthermore, E-Mails were sent to all involved in the bachelor's degree programme in midwifery in Hamburg (e.g., professors, academic staff, and responsible practice facilities (vPEs)).

2.4 Variables

According to McParlin et al [42] questions beyond sociodemographic, work-related data and midwives' own PA, considered as part of this thesis, can be clustered into the following domains:

Knowledge on PA

Midwives were asked if they know and can name current guidelines on PA during and after pregnancy and which one, they apply withing their current practice.

Actual behaviour in terms of recommending PA

Participants were asked to identify their advice/ information, they currently offer to women about PA during and after pregnancy, including the duration, frequency, and intensity of PA.

Beliefs of PA

Participants were asked on the importance of PA during and after pregnancy on a Likert-scale from 1 (not at all important) to 5 (very important). Further questions evaluated the midwives' view on their general belief and recommendations on PA during the three trimesters as well as within 8 weeks, 12 weeks and one year postpartum.

The complete questionnaire is provided in the appendix.

2.5 Data processing and statistical analysis

Following the closure of the survey, data of completed questionnaires was downloaded and entered IBM SPSS Statistics for Macintosh, version 29 (IBM Corp., Armonk, N.Y., USA) for further analysis. Identification numbers were given automatically, and data was coded. One participant not associated as midwives was excluded. The final data set includes a total of 360 midwives. Plausibility check was carried out.

Descriptive statistics of the complete data set were calculated for basic sociodemographic and work-related data, and midwife's self-assessment of PA. Participants were grouped by gender, age (10-year intervals starting with ≥ 20 to >60 years of age and as cut off variable with <40 and ≥ 40 years), nationality (German, others), midwifery qualification (currently studying, midwifery exam, University degree in midwifery studies), and professional practice (<5 , $5-10$, >10 , and >20 years). Further midwives were grouped by work setting (inpatient, outpatient, both), form of employment (employed, freelance, both, neither), region of work (urban, suburb/town, rural), work-related experience on PA (yes, no) and offering courses with PA (yes, no). Answers on the current recommendations for PA during and after pregnancy were analysed against the following criteria: duration (30 min), frequency (≥ 5 days/week) and intensity (light and moderate), in alignment with the current recommendations of the WHO on PA [67]. Secondary variables were built for the number of actual correct recommendations on PA (according to data on frequency, duration, and intensity).

Within the data set there were 318 working midwives (including two retired midwives, that were still working), 41 midwifery students and 1 completely retired midwife. All statistics were calculated for the 318 currently working midwives. The student midwives and the fully retired midwives were excluded for analysis. Nominal data was explored with cross tabulation and tested with Chi-square tests. Ordinal and continuous data were analysed depending on the grouping variable with t-Tests (2 groups) or ANOVAs (3 or more groups). The criterion for statistical significance was set at the conventional level of $p < 0.05$ (asymptotic for Chi-square test, two-tailed for t-Test and ANOVA) for all analyses.

3. Results

In total 361 of the 598 questionnaires started, were completed, 361 from midwives and 1 gynaecologist, that was excluded from analysis. Data were analysed for 318 currently working certified midwives. Two retired midwives, that were still working were included. Student midwives (41) and one fully retired midwife, were excluded from analysis for the thesis at hand.

3.1 Descriptive Analysis of Participants

Sociodemographic and Work-related Characteristics

Sociodemographic and work-related information of the sample are reported in Table 1. Most midwives are women (315, 99,1%), of German nationality (303, 95,3%), with a midwifery exam (257, 80,8%), and more than ten years of professional practice (211, 63,5%). Most of participants are working more than 35 hours (188, 58,9%) in outpatient care (199, 62,6%) as freelancers (193, 60,7%). Almost one third of the midwives already has an academic education background (94, 29,6%).

Table 1. Sociodemographic and Work-related Characteristics of the Sample

Variable	Mean (SD)	n (total n=318)	%
Gender			
Female		315	99,1
Male		2	0,6
Diverse		1	0,3
Age (in years)	41,07 (11,50)		
21-29		57	17,9
30-39		99	31,1
40-49		74	23,3
50-59		58	18,2
ab 60		23	7,2
N/A		7	2,2
Nationality			
German		303	95,3
Others		15	4,7
Highest Education			
W/o university degree		224	70,4
Any university degree		94	29,6
Midwifery Qualification			
Midwifery Exam		257	80,8
Degree in Midwifery Studies		61	19,2
Professional practice (in years)			
< 5		62	19,5
5-10		54	17,0
> 10		83	26,1
> 20		119	37,4

Variable	Mean (SD)	n (total n=318)	%
With previous work-related experience of PA		93	29,2
Offering courses with PA [¶]		159	50,0
Working hours (in hours)	35,59 (10,77)		
≤10		6	1,9
>10-20		32	10,0
>20-30		83	26,0
>30-34		10	3,1
≥ 35		188	58,9
Work setting			
Inpatient		35	11,0
Outpatient		199	62,6
Both		69	21,7
Neither		15	4,7
Form of employment			
Employed		34	10,7
Freelance		193	60,7
Both		91	28,6
Region/ area of work			
Urban		116	36,5
Suburb/town		100	31,4
Rural		102	32,1

Note. [¶] Courses with PA offered by midwives were not differentiated, if offer was for pregnant and postpartum women.

Half of the midwives offered courses with PA for pregnant and postpartum women (159, 50,0%). Almost one third (93, 29,2%) had previous work-related experience on PA during and after pregnancy.

The ratio of work setting, and form of employment outlined in **Table 15** shows the variety of working models of the participating midwives. Participants that neither working in- or outpatient or both were e.g., actively teaching or during parental leave (see Appendix, **Table 16**). Participating midwives were equally distributed among urban, suburb and rural areas and of all German states. Four midwives from Austria also took part in the survey (see Appendix, **Table 14**).

Midwives' area and phase of care are reported in Table 2. Within the inpatient care most midwives stated, that they work in the maternity ward (96, 30,2%), within the outpatient care most of them stated to work in prenatal (219, 68,9%) and postpartum care (222, 69,8).

Table 2. Inpatient and Outpatient working Midwives, and Phases of care

Variable	n (total n=318)	%
Inpatient area [¶] , n=104		
Maternity ward	96	30,2
Postpartum ward	31	9,7
Prenatal ward	9	2,8
Outpatient area [¶] , n=236		
Prenatal Care	219	68,9
Postpartum Care	222	69,8
Out of hospital birth care	72	22,6
Other	11	3,5
Phase of care [¶]		
Childbearing period	73	23,0
Pregnancy	298	93,7
Birth	193	60,7
Postpartum period	287	90,3
Lactation	278	87,4

Note. [¶] Multiple answers for area and phase of care were possible. The percentages of each category were related on the whole sample.

Around 90% of the participants support women during pregnancy (298, 93,7%), the postpartum period (287, 90,3%), and lactation (278, 87,4%). Almost two third (193, 60,7%) accompany and support birth at all. Slightly more than one of five stated to work in out of hospital birth care (72, 22,6%).

Some of the midwives engaging in inpatient care, were working in more than one area (27, 26,0%). Most of the midwives working in outpatient area covered two to three different areas (215, 91,1%). There were 68 midwives working in both inpatient and outpatient care with majority covering three or more areas in total (62, 91,3%, see Appendix, **Table 17**). Considering the phases of care, from preconception to lactation, most of the midwives reported to work in three or more areas of care (283, 89,0%, see Appendix, **Table 18**). Data for ratios of midwives working in one or more areas and phases of care are shown in **Table 18** (see data in Appendix).

Knowledge about guidelines on PA

Participating midwives' answers on knowledge of guidelines on recommendations for PA is shown in Table 3. Less than 20% of the participants know any of those guidelines for PA during pregnancy (51; 16%). In terms of guidelines for PA during the postpartum period midwives are even less knowing (19; 6%).

Table 3. Knowledge about Guidelines for PA

Variable	During pregnancy		After pregnancy	
	n (total n=318)	%	n (total n=318)	%
Knowledge about guidelines for PA	51	16,0	19	6,0
Which can you name?	38	11,9	12	3,8
Which do you use?	24	7,5	10	3,1

Note. Data for knowledge about guidelines on PA are shown as pro rata for yes answers. Data for naming and application of guidelines were gained from free text comments.

From midwives that state to know guidelines for PA during pregnancy just a few can name (38; 11,9%) and apply (24; 7,5%) them. For naming and applying guidelines for PA after pregnancy the number of midwives is even lower (12; 3,8% and 10; 3,1%). Some midwives can name relevant, international guidelines for PA during pregnancy (e.g., Royal, American, and Canadian guidelines; WHO guideline), national recommendations (e.g., DGE, BZgA, 'Healthy Start – Young Family Network'), and guidelines for pregnant women with diseases (hypertensive disorders, obesity, and gestational diabetes). Whereas for the postpartum period only the guideline for obesity is mentioned.

3.2 Midwives' Recommendations on PA during and after pregnancy

Recommendations on PA

For evaluation of the consistency of midwives' recommendations on PA during and after pregnancy with the WHO guideline, values for frequency, duration and intensity were compared to the reference values from the guideline [1]. Data for correct recommendations of each, frequency, duration, and intensity were combined. Midwives' proportionally correct recommendations on each of three dimensions of PA are shown in **Table 4**. Midwives' recommendations on intensity of PA during pregnancy mostly met the references of the WHO. In terms of frequency and duration the values for correct recommendations were lower with 24,2% resp. 38,7%. For PA in the postpartum period all values for midwives correct recommendations were below their corresponding values for each dimension of PA during pregnancy.

Table 4. Midwives' Correct Recommendations for Dimensions of PA (duration, frequency, intensity)

Variable	During pregnancy		After pregnancy	
	n (total n=318)	%	n (total n=318)	%
Correct recommendations for each dimension of PA				
Duration	123	38,7	81	25,5
Frequency	77	24,2	36	11,3
Intensity	304	95,7	196	61,6

Note. Multiple answers for each dimension of PA were possible. Data for frequency, duration, and intensity result from midwives' recommendations of the individual dimensions (see Appendix, **Table 20**, **Table 21**) in comparison with their respective reference values from the guideline (duration >30 min, frequency ≥ 5 days per week).

The number of correct recommendations according to the WHO guideline [1] are presented in Table 5. According to guideline's reference values for PA during and after pregnancy, only 7,5% and 3,1% of the midwives had correct answers for all three dimensions of PA.

Table 5. Midwives' Number of Correct Recommendations on PA

Variable	During pregnancy		After pregnancy	
	n (total n=318)	%	n (total n=318)	%
How many recommendations (frequency, duration, intensity) are correct for PA (according to the WHO guideline)?				
None	4	1,3	5	1,6
One	148	46,5	135	42,5
Two	142	44,7	74	23,3
All three	24	7,5	10	3,1
N/A	-	-	94	29,6

Note. Number of correct recommendations on PA was built out of combination pro rata correct recommendations on frequency, duration, and intensity (with data from **Table 4**).

Overall, partially correct answers for recommendations of PA during pregnancy were higher (two correct: 142; 44,7% and one correct: 148; 46,5%) compared to recommendations for the postpartum period (two correct: 74; 23,3% and one correct: 135; 42,5%). Almost one third (94; 29,6%) of the midwives did not make any recommendations for PA during the postpartum period.

Relationship of sociodemographic and work-related characteristics on recommendations

In order to analyse midwives' sociodemographic and work-related factors in relation to their appropriate recommendations on PA during and after pregnancy correlation analysis was done. Depending on variable type t-Test was performed on sociodemographic and extended work data and ANOVA-test on basic work data. Results are shown as means with SD, t- and p-value in Table 6. Relationship of midwives' work-related characteristics on their recommendations on PA during and after pregnancy can be found. Different factors affected midwives' number of appropriate recommendations on PA in pregnancy and the postpartum period.

Table 6. Relationship of Sociodemographic and Work-related Characteristics on Midwives' Recommendations

Variable	No. of correct recommendations for PA during pregnancy (n=318)				No. of correct recommendations for PA after pregnancy (n=224)			
	Mean	SD	t	p	Mean	SD	t	p
Socio demographic								
Age			1,117	0,265			1,075	0,283
< 40 years	1,54	0,654			1,36	0,612		
≥ 40 years	1,63	0,636			1,45	0,618		
Highest education			1,325	0,186			0,385	0,700
W/o university degree	1,62	0,653			1,39	0,601		
Any university degree	1,51	0,635			1,42	0,649		
Midwifery qualification			0,712	0,477			0,577	0,565
Midwifery Exam	1,60	0,661			1,41	0,613		
University degree in Midwifery Studies	1,53	0,593			1,35	0,613		
Professional practice			1,504	0,134			2,187	0,030*
≤ 20 years	1,54	0,641			1,33	0,605		
> 20 years	1,66	0,657			1,51	0,611		
			F	p			F	p
Work, basic								
Work setting			0,529	0,663			2,257	0,083
Inpatient	1,49	0,612			1,20	0,577		
Outpatient	1,58	0,630			1,47	0,596		
Both	1,65	0,703			1,28	0,662		
Neither	1,60	0,737			1,45	0,522		
Form of employment			0,229	0,796			3,393	0,035*
Employed	1,53	0,662			1,22	0,600		
Freelance	1,58	0,625			1,48	0,609		
Both	1,62	0,696			1,29	0,602		
Region/ area of work			0,221	0,802			0,132	0,877
Urban (big city)	1,59	0,659			1,38	0,582		
Suburb (small town)	1,55	0,672			1,38	0,637		
Rural	1,61	0,616			1,43	0,627		
			T	p			T	p
Work, extended								
Work-related experience of PA			2,611	0,009*			1,222	0,223
Yes	1,73	0,724			1,47	0,557		
No	1,52	0,605			1,36	0,635		
Course-offer with PA			0,173	0,863			0,109	0,913
Yes	1,59	0,658			1,4	0,561		
No	1,58	0,640			1,39	0,662		

Note. t-Test (t- and p value) and ANOVA-test (F- and p-value) were performed. Cut-off variable for age and professional practice were shown in Appendix, **Table 14**. Significant p-values ($p < 0,05$) are marked with an asterisk.

Midwives with previous work-related experiences of PA ($1,73 \pm 0,724$; $p = 0,009$) are more likely to provide appropriate recommendations on PA during pregnancy than those without

experience (1,52±0,605). In contrast more than 20 years of professional practice correlated to a higher number of midwives correct recommendations on PA in the postpartum period (1,51±0,611 resp. 1,33±0,605; p=0,030). Midwives that work as freelance (1,48±0,609; p=0,035) are more likely to give more correct recommendations on PA after pregnancy compared midwives working employed only (1,22±0,600) or at least both, employed and freelance (1,29±0,602).

3.3 Midwives' Personal Practice on PA and its Influence

Personal PA

Midwives' personal level of PA was evaluated by applying questions to the four dimensions of PA (frequency, duration, intensity, and type). Answers are outlined in Table 7. Most of the midwives were physical active one to four times a week (247, 77,6%), for at least 30 to 60 minutes per session (177, 55,7%) at moderate intensity (222, 69,8%). A lot of the midwives were engaged in aerobic PA (206, 64,8%), as well as yoga and other PA (e.g., ball sports, bicycling, boulder and climbing, CrossFit, dancing, hiking, horse riding, Pilates, Qi Gong, running, walking, weight training).

Table 7. Self-assessment of Midwives' Personal PA

Variable	n (total n=318)	%
Frequency PA (in days per week)		
Never	13	4,1
1-2	140	44,0
3-4	107	33,6
≥ 5	58	18,2
Frequency PA, correct +	58	18,2
Duration PA [¶] (in minutes)		
0-30	83	26,1
30-60	177	55,7
60-90	66	20,8
> 90	8	2,5
Duration PA, correct +	235	73,9
Intensity PA [¶]		
Light	82	25,8
Moderate	222	69,8
Intense	77	24,2
Intensity PA, correct +	272	85,5
Art of PA [¶]		
Aerobic	206	64,8
Resistance training	52	16,4
Yoga	125	39,3
Other	144	45,3

Note. [¶] Multiple answers for duration, intensity and type of PA were possible. The percentages of each category were related on the whole sample. + The number of correct answers were evaluated by applying the WHO recommendations [1]. Answers were considered as incorrect when midwives have selected all answers.

Influence on Knowledge and Recommendations

For evaluating the influence of midwives' personal practice of PA on their knowledge about guidelines and their number of appropriate recommendations on PA correlation analysis was carried out. Cross tabulation and Chi-square-test were performed for midwives' personal practice of PA (frequency and duration) on knowledge. Results are outlined in Table 8. Midwives' personal PA seemed to affect their knowledge about guidelines on PA in pregnancy and the postpartum period.

Table 8. Relationship of Midwives' Personal Practice of PA on their Knowledge about Guidelines

Variable	Know guidelines for PA during pregnancy (n=318)				Know guidelines for PA after pregnancy (n=318)			
	n	%	X	p	n	%	X	p
Own PA								
Frequency			9,280	0,002*			0,884	0,347
correct	17	29,3			5	8,6		
incorrect	34	13,1			14	5,4		
Duration			4,823	0,028*			4,549	0,033*
correct	44	18,7			18	7,7		
incorrect	7	8,4			1	1,2		

Note. Knowledge about guidelines was correlated to midwives' self-assessed PA as their frequency and duration according to the WHO guidelines (duration >30 min, frequency ≥ 5 days per week) [1]. Significant p-values (p<0,05) are marked with an asterisk.

Correlation was found for midwives' self-assessed personal PA, collected as their frequency and duration of PA, and knowledge about guidelines on PA. Midwives are more likely to know guidelines on PA during pregnancy, when their PA met the recommendations for frequency (29,3% resp. 13,1%; p=0,002) and for duration (18,7% resp. 8,4%; p=0,028) according to the WHO guideline [1]. Midwives that meet at least the recommendation for duration of the WHO guideline are more likely to know guidelines on PA for the postpartum period (7,7% resp. 1,2%; p=0,033).

The t-Test was carried out for analysis of influence of midwives' personal practice on number of appropriate recommendations. Results are reported in **Table 9**. Midwives' personal PA also seemed to affect their number of appropriate recommendations on PA in pregnancy and the postpartum period.

Table 9. Relationship of Midwives' Personal Practice of PA on their Recommendations

Variable	No. of correct recommendations for PA during pregnancy (n=318)				No. of correct recommendations for PA after pregnancy (n=224)			
	Mean	SD	t	p	Mean	SD	t	p
Own PA								
Frequency			3,671	<0,001*			4,336	<0,001*
correct	1,86	0,687			1,77	0,742		
incorrect	1,52	0,624			1,32	0,553		
Duration			2,290	0,023*			1,927	0,055
correct	1,63	0,668			1,44	0,636		
incorrect	1,45	0,569			1,26	0,518		

Note. Number of appropriate recommendations were correlated to midwives' self-assessed PA as their frequency and duration according to the WHO guidelines (duration >30 min, frequency ≥ 5 days per week) [1]. Significant p-values (p<0,05) are marked with an asterisk.

Relationship was found between midwives' personal PA in terms of both, frequency, and duration on the number of correct recommendations on PA during pregnancy. That means, midwives that met the WHO guideline recommendations on frequency (1,89±0,687 resp. 1,52±0,624; p<0,001) and duration (1,63±0,688 resp. 0,145±0,569; p=0,023) of PA were more likely to have a higher rate of correct recommendations on PA during pregnancy. The frequency of midwives' own PA correlated to number of correct recommendations on PA after pregnancy. That means midwives with five or more days of being physical active (according to the WHO guideline) were more likely to have more correct recommendations for PA after pregnancy (1,77±0,742 resp. 1,32±0,533; p<0,001).

3.4 Midwives' Attitude towards PA and its Influence

Attitude towards PA

Midwives had to reflect on their attitude towards PA during and after pregnancy. Their answers are reported in **Table 10**. More than 80% of the midwives agreed on the importance of PA during pregnancy. Contrasting importance of PA during pregnancy, midwives were less likely to state importance of PA during the postpartum period.

Table 10. Midwives' Attitude towards PA, Part 1

Question	During pregnancy		After pregnancy	
	n (total n=318)	%	n (total n=318)	%
On a scale from 1-5 how would you rate the importance of exercise?				
1	8	2,5	5	1,6
2	8	2,5	60	18,9
3	18	5,7	91	28,6
4	115	36,2	118	37,1
5	169	53,1	44	13,8

Question	During pregnancy		After pregnancy	
	n (total n=318)	%	n (total n=318)	%
Do you believe/recommend that healthy women should exercise:				
In the first trimester?	258	81,1		
In the second trimester?	287	90,3		
In the third trimester?	280	88,1		
Do you believe/recommend that healthy women should exercise:				
Before 8 weeks postpartum?			86	27,0
Between 8-12 weeks postpartum?			217	68,2
Between 12 weeks to 1 year postpartum?			296	93,1

Note. A five-point Likert scale was applied with the following options, from 1 for very unimportant to 5 for very important. Additional data for attitude towards PA within the trimesters and at certain time points during the postpartum period are shown as pro rata for yes answers.

On a Likert scale from one to five midwives answered that PA during pregnancy is important (155, 36,2%) or very important (169, 53,1%). This also can be seen in the recommendations of PA during the three trimesters, that ranged from 81,1% to 90,3%. However, only half of the midwives said PA after pregnancy is important (4 and 5 on Likert scale, 162, 50,9%). Within the first eight weeks postpartum only 27% would recommend PA, until twelve weeks and one-year postpartum recommendations increases to 68,2% and 93,1%. Within free text comments reasons of not making general recommendations about PA in early postpartum period were described. A lot of individualized advice on PA were given instead, taking birth mode, possible injuries, number of pregnancies, individual healing timelines, and further into account.

Means and standard deviation from above answers (see Table 10) based on the five-point Likert scale are outlined in Table 11. Means were determined by one-sample t-Test, to show tendency of midwives' attitude towards PA during and after pregnancy. Means for both importance of PA in pregnancy (4,35±0,892; p<0,001) and the postpartum period (3,43±0,998; p<0,001) are significantly higher than the Likert scale mean (mean value 3).

Table 11. Midwives' Attitude towards PA, Part 2

Variable	During pregnancy				After pregnancy			
	Mean	SD	t	p Value	Mean	SD	t	p Value
Attitude towards PA								
How would you rate the importance of exercise:	4,35	0,892	26,968	<0,001*	3,43	0,998	7,641	<0,001*

Note. A five-point Likert scale was applied with the following options, from 1 for very unimportant to 5 for very important. One-sample t-Test was performed. Significant p-values (p<0,05) are marked with an asterisk.

Influence on Knowledge and Recommendations

For evaluating the influence of midwives' attitude towards PA on their knowledge about guidelines and their number of appropriate recommendations on PA correlation analysis

was carried out. Cross tabulation and Chi-square-test were performed for midwives' attitude towards PA on knowledge. Results are shown in **Table 12**.

Table 12. Relationship of Midwives' Attitude towards PA on their Knowledge about Guidelines

Variable	Know guidelines for PA during pregnancy (n=318)				Know guidelines for PA after pregnancy (n=318)			
	N	%	X	p	N	%	X	p
Attitude towards PA								
Importance of PA			3,056	0,548			1,452	0,835
1	1	12,0			0	0,0		
2	1	12,0			3	5,0		
3	1	5,6			4	4,4		
4	16	13,9			9	7,6		
5	32	18,9			3	6,8		

Note. Knowledge about guidelines was correlated to midwives' attitude towards PA, measured as importance of PA on a five-point Likert scale with the following options, from 1 for very unimportant to 5 for very important. Significant p-values ($p < 0,05$) are marked with an asterisk.

Midwives' attitude towards PA did not affect their knowledge about guidelines.

Correlation of midwives' attitude towards PA and the number of correct recommendations for PA according to the WHO guidelines [1], were analysed by ANOVA-test, outlined in Table 13. Post-Hoc-Test with Bonferroni correction was performed.

Table 13. Relationship of Midwives' Attitude towards PA on their Recommendations

Variable	No. of correct recommendations for PA during pregnancy (n=318)				No. of correct recommendations for PA after pregnancy (n=224)			
	Mean	SD	F	p	Mean	SD	F	p
Attitude towards PA								
Importance of PA			5,562	<0,001*			2,337	0,056
1	2,13	0,641			1	0,000		
2	1,25	0,463			1,21	0,528		
3	1,33	0,485			1,55	0,705		
4	1,44	0,595			1,35	0,588		
5	1,70	0,671			1,47	0,557		

Note. Number of appropriate recommendations were correlated to midwives' attitude towards PA, measured as importance of PA on a five-point Likert scale with the following options, from 1 for very unimportant to 5 for very important. Significant p-values ($p < 0,05$) are marked with an asterisk.

Relationship between the belief of the importance of PA during pregnancy and number of recommendations for PA during pregnancy was seen. Midwives that stated that PA is very unimportant (1: $2,13 \pm 0,641$; $p < 0,001$) were more likely to have higher numbers of correct recommendations on PA during pregnancy compared to those that found PA more important (3: $1,33 \pm 0,485$ and 4: $1,44 \pm 0,595$). Further midwives that found PA very important (5: $1,70$; $0,671$) are more likely to have more appropriate recommendations to those that said PA is important (4: $1,44 \pm 0,595$).

4. Discussion

The aim of the current study was to examine midwives' recommendations on PA during and after pregnancy and their knowledge about guidelines, alongside with their sociodemographic and work-related characteristics, their personal PA and attitude towards PA. Further interest was to investigate possible determinants influencing midwives' knowledge and appropriate recommendations on PA during and after pregnancy.

Evaluating midwives' current recommendations on and their knowledge about guidelines on PA during and after pregnancy provide first insights of midwives' facilitators and barriers when counselling and promoting PA for pregnant and postpartum women. Further, implications on educational and occupational level can be made to support midwives in their role as primary health care providers.

In long-term midwives should be empowered giving correct, evidence-based, individualized advice on PA during and after pregnancy.

4.1 Characteristics of Participants

Due to the limited number of studies on midwifery in Germany, the first step is to compare the sociodemographic and work-related data of the participating midwives with data from other studies.

Sociodemographics and Work

Sociodemographic data of the participating midwives aligned with data of midwives of other studies and reports from Germany [68–74]. Although midwives' were said to leave job early with an average length of employment at around seven years [72,73,75], number of midwives with more than 20 years of professional practice seemed surprisingly high within the study. Presumably midwives who have been in the profession for a long time, have an interest to support their colleagues by taking part in surveys, that could lead to self-selection bias. The aim was to recruit midwives of various work models. In line with data provided by German midwifery association and other reports [68,69,72,73], the sample showed characteristics of predominantly outpatient, independent working midwives with a typical variety of working models, across all areas and phases of care as outlined in Table 15, Table 17, and Table 18 (see in Appendix). For midwives it is common to cover more than one area and phase of care [58]. Prenatal care is provided by most of the participating midwives as shown in Table 2. In comparison to data from reports, proportion is high [69] and could be a result of not differentiating continuous prenatal care and non-regular appointments to help with pregnancy discomfort. The subsample of midwives working in family planning could be of particular interest for prospective analysis as it represents the continuing development of

the profession to serve women with the continuous model of care even more comprehensive. Recruited participants are equally working in big cities, suburb, and rural areas, that is again representative compared to other midwifery studies [71]. Despite the goal to reach a broad spectrum of midwives, small size of subsamples could lead to sampling bias (see data in Appendix, Table 15).

Knowledge

Despite their awareness of the importance of PA for pregnant and postpartum women midwives and other health care providers seem to lack in sufficient knowledge on guidelines and appropriate recommendations for providing and promoting PA during and after pregnancy [40,41,76,77]. Although 30 international guidelines for PA during and after pregnancy [33], including the WHO guideline [1], are established, this does not transfer into knowledge of this guidelines. Of all the midwives who participated, only 16% stated to know guidelines for PA during pregnancy. One of ten midwives could name guidelines, of which just a few correctly identified relevant ones for PA during pregnancy. In terms of guidelines for PA during the postpartum period midwives are even less knowing (19; 6%). For the postpartum period strong evidence is still missing around guidelines and recommendations, that based on the existing data of the decline in PA in the postpartum period and during lactation, gives rise to research. Even in the UK with the NICE guidelines and their proven, evidence-based practice for health care providers and patients resp. clients, Hopkins et al. could show that most midwives are not aware of these guidelines neither of the recommendations for PA during and after pregnancy derived from them [41]. As knowledge does not directly transfer into appropriate counselling practice and is just one domain for implementation of PA guidelines according to McParlin et al. [42] a closer look should go on midwives' recommendations on PA for pregnant and postpartum women.

4.2 Midwives' Recommendations on PA during and after pregnancy

International guidelines and national recommendations on PA during and after pregnancy provide almost equal advice on frequency, duration, and intensity of PA for pregnant and postpartum women [1,21,33,66,78]. These guidelines further agree on its predominantly positive effects on health of mother and child, even in long-term perspective.

Although midwives were aware of the importance of PA for pregnant and postpartum women, a significant portion of participating midwives showed an overall lack of knowledge about relevant guidelines and gave inappropriate recommendations according to the WHO guideline [1]. Most of them were able to give correct recommendations for intensity of PA but less for duration and frequency. However, both are crucial dimensions of PA in terms of creating an appropriate stimulus for maintaining or improving behaviour. From the perspective of COM-B model of behavioural change especially frequency creates opportunity, one

aspect of influencing change in behaviour. Looking at all three dimensions of PA midwives' recommendations on PA during and after pregnancy are mostly partially correct according to the WHO guideline [1]. Considering, that the majority of the midwives stated to work in prenatal and postpartum care we have a disparity of women longing for evidence-based and individual advice and midwives' that are not able to meet their clients' needs. Leading to the question of midwives' characteristics that improve their recommendations according to the WHO guideline [1]. Interestingly, different factors may improve midwives' recommendations on PA for pregnant and postpartum women. On one hand midwives' previous work-related experience on PA raised the mean number of correct recommendations on PA during pregnancy. On the other hand, professional practice and outpatient work setting raised means for correct recommendations after pregnancy. Interestingly, sociodemographic, and work-related factors that seemed to improve number of correct recommendations did not improve means of values for knowledge about guidelines (see data in Appendix, **Table 22**). Further analysis shed light on midwives' personal practice on PA and attitude towards PA and their potential impact on knowledge and number of correct recommendations. Besides personal PA midwives' attitude towards PA during and after pregnancy was evaluated and analysed for its effect on midwives' knowledge about guidelines and recommendations on PA.

4.3 Midwives Personal Practice and its Influence

Personal PA

Evaluation of midwives' personal PA could show that compared to the WHO guideline [1] for PA, only two out of ten midwives were active within the recommended frequency. However, almost three quarters fulfil the recommendations in terms of duration and more than 80% in terms of intensity. Taken together all three dimensions of PA, only one of ten midwives fully met recommendations on PA. The results indicate that most midwives did not meet recommended level of PA. That is congruent with the data on PA in the general population [79–81]. Health behaviour of midwives has rarely been the subject of any research to date [82,83]. One recent study from Kohler et al. looks at the health of freelance midwives, who self-report their health status but there was no evaluation of personal PA as a resource of health [70]. Another recent study recorded the health behaviour of midwifery students [84]. Preliminary results on activity level are available at least for the student collective and show that one third of the student midwives already lack insufficient health promotion PA. Midwives' physically demanding work could presumably contribute to their physical inactivity during leisure time [82,83] and has to be subject of further studies, because especially PA in leisure time, is considered as one predictor of longevity [85]. Beyond that, referred to COM-B model [51,52] for behaviour change, midwives' personal PA offers the

opportunity to learn about PA on the level of experience than the knowledge and create capability and motivation. Further correlation analysis provides information on influence of midwives personal PA according to the WHO guideline on knowledge and recommendations.

Influence on Knowledge and Recommendations

Correlation analysis could show an impact of midwives' personal PA (correct frequency or duration) on knowledge and on number of appropriate recommendations on PA during pregnancy. For the postpartum period either correct amount of duration or frequency had an impact on knowledge resp. recommendation. Overall trend for influence of midwives' personal PA on knowledge and recommendations leads to the assumption, that practical experiences shape the process of acquiring knowledge and skills for transferring knowledge into appropriate recommendations.

4.4 Midwives Attitude towards PA and Influence on Knowledge and Recommendation

Attitude towards PA

Few studies have shown midwives' positive attitude towards PA during and after pregnancy and the believe on its health promoting effects for mother and baby [40,42,76]. The results of the study confirm already existing data. More than 80% of the midwives agreed on the importance of PA during pregnancy. However, only half of the midwives said PA after pregnancy is important with an increasing consent for importance of PA after eight weeks resp. 12 weeks postpartum as shown in Table 10. Midwives as primary health care providers that focus on salutogenic principles [53,54] and approach primary prevention are mostly aware of the health benefits resulting from regular PA [77,86]. The discrepancy between midwives' perspective on the importance of PA during pregnancy and the postpartum period could be explained by the type of question within the study, that was not differentiated enough with providing only three time points during the postpartum period with the first eight weeks being considered as time for rest and healing. That could lead to measurement bias.

Influence on Knowledge and Recommendations

Although midwives' attitude toward PA was positive, less knowledge and even less appropriate recommendations on PA during and after pregnancy could be determined. Correlation analysis should evaluate potential influence of positive attitude towards PA on midwives' knowledge about guidelines and their number of correct recommendations. The only correlation was found for midwives' attitude towards PA during pregnancy and their appropriate recommendations on PA but not for their knowledge about guidelines. Interestingly, midwives' that stated PA as very unimportant during pregnancy had means suggesting the

most appropriate recommendations on PA during pregnancy. Getting a closer look on midwives, that stated PA during pregnancy was not important at all, but recommended on average two correct recommendations on PA during pregnancy, showed that age and professional practice of this subsample was above average. Although for sociodemographic characteristics such as age and professional experience, a direct effect on appropriate recommendations for PA during pregnancy could not be shown, results indicate a more complex and multidimensional interplay of midwives' characteristics. Further regression analysis could provide insights into the underlying causes.

4.5 Implications for practice

Taking together results of descriptive and correlation analysis of the tested variables and associated questions pattern of competence development in terms of knowledge about guidelines and recommendations on PA during and after pregnancy remains complex. In order to suggest implications for improvement of midwifery practice in terms of knowing guidelines and applying recommendations on PA during and after pregnancy, specific social, educational and work-related factors must be taken into account as part of the structuring and implementing process [42,49,87].

The “eMpower” project aims to identify ideas for developing professional and continuing education programs as well as tools and guidelines, that support midwives in providing appropriate prenatal and postpartum consultation services, in future.

Based on the first results of this study, supporting midwives' personal PA could impact their knowledge about guidelines and correct recommendations on PA. Supporting healthy routines for midwives could be part of professional and educational training as well as part of occupational health in the workplace. Another dimension could be added by talking about the working conditions and possible healthcare policy solutions. Studies have already shown influence of physically demanding work, shift changes and excessive workload on leisure time physical activity [82,83]. According to COM-B Model to change behaviour, hereby capability is created on different organisational levels for engaging with ones' personal PA.

Besides midwives' personal PA, sociodemographic and work-related characteristics suggest different types of acquiring skills. Prenatal care by midwives only became established in the 1980s and is commonly shared with or completely done by gynaecologist. Presumably skills for appropriate counselling on PA during pregnancy were more driven by previous work-related experiences that could create opportunity on develop competencies, based on motivation. Whereas long tradition of postpartum care by midwives presumably created opportunity for learning appropriate counselling on PA in the postpartum period in another way, that is more driven by practical experience.

Taking the structural differences into account and the recent structure of prenatal care, another way to strengthen midwife's role as primary health care provider and become obvious. It is currently not possible to provide a counselling session for lifestyle interventions such as PA in addition to the general assessment at the start of pregnancy and to invoice this separately. The only possible way is to account this as 'Assistance with pregnancy complaints. Regarding the principles of salutogenesis and primary prevention this approach does not seem to be appropriate, neither for midwives nor gynaecologists. By law, both currently have no possibility to officially claim such counselling.

Development of competencies has even more aspects than those highlighted above. Therefore, investigations need to be carried out on more aspects and complex interrelationships impacting midwives' knowledge about guidelines and recommendations on PA during and after pregnancy. According to COM-B Model to change behaviour capability, opportunity, and motivation all together are needed. Thus, future professional and continuing education should address all three components of learning to create sustainable behavioural change, not just for midwives but also for pregnant and postpartum women. Beyond that, intervention studies on both PA during and after pregnancy are rare. Even less research and information are currently available on specific training programmes. In combination with the missing national guideline on PA during and after pregnancy there is no body of evidence health care providers can rely on. Therefore, prospective research activities should focus on both guideline development and intervention studies, to create different types of evidence for all kinds of health care providers, working with pregnant and postpartum women.

4.6 Limitations

While the outlined study aims to assess midwives' knowledge, recommendations, and attitudes towards PA during and after pregnancy, as well as their own practice of PA, it is important to acknowledge certain limitations. Firstly, the study design being exploratory in nature may limit generalizability of findings to a broader population of midwives. Further there is the potential for measurement bias due to the use of an unvalidated questionnaire, which may lead to inaccurate results and compromise the validity of the findings. There was also a potential influence of self-selection bias, as participants who are particularly interested in the topic may be more likely to volunteer for the survey, leading to a sample that may not accurately represent the broader population. Additionally, relying on self-reported data from midwives may introduce response bias and potential inaccuracies in reporting their knowledge and practice of PA. Moreover, the study's cross-sectional design prevents establishing causality between midwives' personal practice or attitude towards PA and their knowledge about guidelines and recommendations for pregnant and postpartum women.

Lastly, while efforts will be made to identify potential differences based on sociodemographic and work-related characteristics, other confounding factors that influence midwives' recommendations on PA may not be fully accounted for. Another limitation of this thesis is the potential impact on the validity and reliability of the findings due to the use of a questionnaire that was not previously validated for assessing midwives' knowledge, recommendations, and attitudes towards physical activity during and after pregnancy. Despite all these limitations, this exploratory study provides valuable insights into midwifery counselling practices regarding PA during and after pregnancy while aiming to identify factors driving change in this area.

5. Conclusion

This study explored midwives' recommendations on physical activity (PA) during and after pregnancy, alongside their knowledge about guidelines, their sociodemographic and work-related characteristics, personal PA, and attitudes towards PA.

Midwives' knowledge about guidelines on PA during and after pregnancy appeared insufficient likewise their recommendations on PA for pregnant and postpartum women. The study also found that supporting midwives' personal PA could impact their knowledge about guidelines and recommendations on PA.

The results of the study suggest that there are complex factors influencing midwives' knowledge about guidelines and recommendations on physical activity (PA) during and after pregnancy.

Factors such as social, educational, and work-related factors need to be considered when developing and implementing strategies to improve midwifery counselling practice on PA during and after pregnancy.

This could be addressed through professional training, educational programs, and occupational health initiatives. However, structural barriers could prevent midwives from carrying out their role as primary healthcare providers in counselling on PA as one part of lifestyle interventions. Further efforts should strengthen national evidence by developing national guidelines. Research should identify facilitators and barriers of German midwives promoting PA during and after pregnancy.

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Appendix

Complete Questionnaire

Fragebogen

1 Standardseite

eMpower - Recommendations for exercise by Midwives during and after pregnancy:

Online-Befragung von Hebammen zum Thema „Empfehlungen von Hebammen zur körperlichen Aktivität in der Schwangerschaft und im Wochenbett“

Liebe:r Teilnehmer:in,

mein Name ist Valeen Kölling und ich bin Studierende der **Hebammenwissenschaft** an der Medizinischen Fakultät (Universitätsklinikum Hamburg-Eppendorf) und der Hochschule für Angewandte Wissenschaft (HAW) in Hamburg. Im Rahmen meiner **Bachelorthesis** soll der nachfolgende Fragebogen erfassen, **welche Empfehlungen Hebammen zur körperlichen Aktivität geben** und prüfen, inwiefern sich Ansätze zur Verbesserung bieten. Langfristig möchte ich dazu beitragen, dass Hebammen als zentrale Akteur:innen in der Gesundheitsförderung und Prävention gestärkt werden und somit einen wichtigen Beitrag zur Verbesserung der Gesundheitsversorgung von Schwangeren und Müttern leisten.

Wichtige Hinweise für das Ausfüllen des Fragebogens:

- Die Teilnahme an dieser Befragung ist **freiwillig und anonym**.
- Bitte geben Sie im Fragebogen jeweils an, was auf Sie **persönlich** zutrifft.
- Für das Ausfüllen des Fragebogens benötigen Sie etwa **10-15 Minuten**.

- **Unter allen Teilnehmer:innen werden 20 BestChoice-Gutscheine im Wert von 20€ verlost.** Hierfür werden Sie im Anschluss an die Umfrage nach Ihrer E-Mail-Adresse gefragt. Ihre E-Mail-Adresse sowie die in der Umfrage getätigten Angaben werden in verschiedenen Datensätzen gespeichert und können einander somit nicht zugeordnet werden. Wenn Sie an dem Gewinnspiel nicht teilnehmen möchten, können Sie die Umfrage nach Vervollständigung ohne Angabe Ihrer E-Mail-Adresse schließen.

Es gelten die **Bestimmungen des Bundesdatenschutzgesetzes und der EU-Datenschutz-Grundverordnung (DS-GVO)**.

Mit einem Klick auf "Weiter" nehmen Sie an dieser Umfrage teil und erklären, dass Sie diesen Bedingungen sowie der Verarbeitung Ihrer persönlichen Daten zustimmen.

2 Soziodemografische Daten

Welches Geschlecht haben Sie?

- Weiblich
 Männlich
 Divers

Bitte nennen Sie den Monat und das Jahr Ihrer Geburt.

Bitte geben Ihren Geburtsmonat als Zahl an (z.B. Juni = 6) und das Jahr in 4 Stellen (z.B. 1987 od. 2001).

Monat Jahr

Haben Sie die deutsche Staatsangehörigkeit?

- Ja
 Nein

Wie viele Beschäftigungsverhältnisse als Angestellter üben Sie aus?

- Eins
 Zwei
 Mehr als zwei
 Nicht angestellt

Sind Sie (zusätzlich) selbstständig oder freiberuflich tätig?

- Ja
 Nein

Wie viele Stunden arbeiten Sie normalerweise pro Woche?

Bitte geben Sie Ihre Arbeitsstunden insgesamt an.

3 Allgemeine Informationen zur gegenwärtigen Praxis

In welchem Beruf sind Sie tätig bzw. lassen Sie sich ausbilden?

Eine Mehrfachauswahl ist möglich.

- Hebamme
- Frauenärzt:in
- Hausärzt:in
- Gesundheits- und (Kinder-)Krankenpfleger:in
- Sonstige (bitte angeben):

Was ist Ihr höchster Bildungsabschluss?

Eine Mehrfachauswahl ist möglich.

Wenn Sie bereits eine Berufsausbildung oder ein Studium absolviert haben, nennen Sie bitte im Freitext die genaue Bezeichnung Ihres Abschlusses.

- Abitur / Fachabitur
- Berufsausbildung
- Bachelor
- Master
- Magister
- Diplom
- Promotion
- Andere:
- Bei mehreren Berufen, ordnen Sie bitte zu:

Ich arbeite derzeit...

- stationär
- ambulant
- stationär und ambulant
- weder stationär, noch ambulant (bitte angeben):

4 Allgemeine Informationen zur gegenwärtigen Praxis 2

In welchem/n Versorgungsbereich/en arbeiten Sie?

Eine Mehrfachauswahl ist möglich.

- Kreißsaal
- Wochenbettstation
- Pränatal-Station
- Anderer stationärer Versorgungsbereich:
- ambulante Betreuung von Schwangeren
- ambulante Betreuung von Frauen und Kindern post partum
- außerklinische Geburtshilfe (Geburtshaus, Hausgeburten)
- Anderer ambulanter Versorgungsbereich:

In welcher Phase betreuen Sie Frauen rund um die Geburt

Eine Mehrfachauswahl ist möglich.

- Kinderwunsch
- Schwangerschaft
- Geburt
- Wochenbett
- Stillzeit

Wie lange sind Sie schon in Ihrem Beruf tätig?

- noch in Berufsausbildung/Studium
- unter 5 Jahre
- 5 bis 10 Jahre
- über 10 Jahre
- über 20 Jahre

Wo praktizieren Sie hauptsächlich?

- Baden-Württemberg
- Bayern
- Berlin
- Brandenburg
- Bremen
- Hamburg
- Hessen
- Mecklenburg-Vorpommern
- Niedersachsen
- Nordrhein-Westfalen
- Rheinland-Pfalz
- Saarland
- Sachsen
- Sachsen-Anhalt
- Schleswig-Holstein
- Thüringen
- Österreich
- Schweiz

Wie würden Sie Ihr Arbeitsumfeld/-ort beschreiben?

- Großstadt
- Vorstadt/ Kleinstadt
- Ländliche Region

Haben Sie berufsspezifische Vorerfahrungen in Bezug auf körperliche Aktivität?

- Ja, und zwar
- Nein

Bieten Sie selbst Kurse mit sportlicher Betätigung in der Schwangerschaft oder im Wochenbett an?

Dazu zählen auch Geburtsvorbereitung, Rückbildung, Yoga, etc.

- Ja, und zwar
- Nein

Wie häufig betätigen Sie sich körperlich/ sportlich innerhalb einer Woche?

- Nie
- 1 bis 2
- 3 bis 4
- 5 bis 6
- Täglich

Welche Intensität haben die sportlichen Betätigungen, die Sie ausüben?

Bitte kreuzen Sie alles Zutreffende an.

- Leicht (körperliche Aktivitäten, die nicht zu Schweißproduktion oder Kurzatmigkeit führen, z.B. langsames Gehen)
- Moderat (körperliche Aktivitäten, die intensiv genug sind, um die Herzfrequenz zu erhöhen; eine Person kann sprechen, aber nicht singen)
- Intensiv (körperliche Aktivitäten, die intensiv genug sind, um die Herzfrequenz erheblich zu erhöhen; eine Person kann nicht mehr als ein paar Worte sagen, ohne bewusst Luft holen zu müssen)

Wie lange betätigen Sie sich durchschnittlich körperlich/ sportlich pro (Trainings-)einheit?

- 0 bis 30 Minuten
- 30 bis 60 Minuten
- 60 bis 90 Minuten
- über 90 Minuten

Welche Art von körperlicher Aktivität/ sportlicher Betätigung üben Sie selbst aus?

Bitte kreuzen Sie alles Zutreffende an.

- Ausdauersport (z.B. Walking, Schwimmen)
- Widerstandstraining (z.B. Gewichte heben)
- Yoga
- Sonstige (bitte angeben):

5 KA während der Schwangerschaft

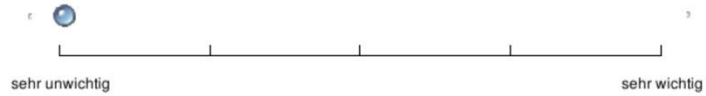
Körperliche Aktivität in der Schwangerschaft

Wie wichtig ist Ihrer Meinung nach...

körperliche Aktivität während der Schwangerschaft?



Ihre Rolle bei der Vermittlung von Informationen über körperliche Aktivität für Frauen in der Schwangerschaft?



Wie oft werden Sie nach Informationen oder um Ratschläge zu körperlicher Aktivität in der Schwangerschaft gebeten?

- Niemals
- Selten
- Gelegentlich
- Oft

Wie oft informieren Sie Frauen in der Schwangerschaft im Rahmen Ihrer beruflichen Tätigkeit über körperliche Aktivität?

- Nie
- Selten
- Gelegentlich
- Manchmal
- Häufig
- Nur auf Nachfrage
- Nur im Falle eines medizinischen Problems

6 KA während der Schwangerschaft 2

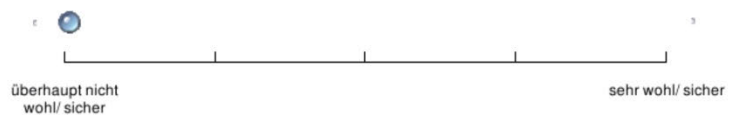
Wie informieren Sie Frauen in der Schwangerschaft über körperliche Aktivität?

Eine Mehrfachauswahl ist möglich.

- Mündlich
- Flyer/Broschüre
- Verweis auf Website
- Hinweis auf Kursangebote der Schwangerschaftsgymnastik
- Andere (bitte erläutern):

Wie wohl/ sicher fühlen Sie sich dabei...

Frauen in der Schwangerschaft über körperliche Aktivität zu informieren?



Was würde Ihnen dabei helfen, sich wohler / sicherer zu fühlen, Schwangere über körperliche Aktivität zu informieren?

Waren Empfehlungen zu körperlicher Aktivität während der Schwangerschaft ein Lernziel in Ihrer beruflichen Ausbildung?

Eine Mehrfachauswahl ist möglich.

- Ja, während meiner Ausbildung
- Ja, während meines Studiums
- Ja, während meiner beruflichen Tätigkeit

- Ja, im Rahmen einer Weiterbildung/Fortbildung
 Nein
 Sonstige (bitte erläutern):

Hatten Sie während Ihrer Berufsausbildung/Studium Kurse, welche die Empfehlungen von Übungen beinhalteten?

- Ja
 Nein

Glauben bzw. empfehlen Sie, dass sich gesunde Frauen während der Schwangerschaft sportlich betätigen sollten?

Im ersten Schwangerschaftsdrittel

- Ja
 Nein
 Das kommt darauf an (bitte erklären Sie):

Im zweiten Schwangerschaftsdrittel?

- Ja
 Nein
 Das kommt darauf an (bitte erklären Sie):

Im dritten Schwangerschaftsdrittel?

- Ja
 Nein
 Das kommt darauf an (bitte erklären Sie):

Wie häufig würden Sie gesunden Frauen in der Schwangerschaft empfehlen, sich wöchentlich sportlich zu betätigen?

Bitte kreuzen Sie alles Zutreffende an.

- Nie
 1 bis 2
 3 bis 4
 5 bis 6
 Täglich

Welche Intensität der sportlichen Betätigung würden Sie gesunden Frauen in der Schwangerschaft empfehlen?

Bitte kreuzen Sie alles Zutreffende an.

- Leicht (körperliche Aktivitäten, die nicht zu Schweißproduktion oder Kurzatmigkeit führen, z.B. langsames Gehen)
 Moderat (körperliche Aktivitäten, die intensiv genug sind, um die Herzfrequenz zu erhöhen; eine Person kann sprechen, aber nicht singen)
 Intensiv (körperliche Aktivitäten, die intensiv genug sind, um die Herzfrequenz erheblich zu erhöhen; eine Person kann nicht mehr als ein paar Worte sagen, ohne bewusst Luft holen zu müssen)

Welche Dauer der sportlichen Betätigung würden Sie gesunden Frauen in der Schwangerschaft pro körperlicher Aktivität empfehlen?

Bitte kreuzen Sie alles Zutreffende an.

- 0 bis 10 Minuten
 10 bis 20 Minuten
 20 bis 30 Minuten
 über 30 Minuten

Welche Art von körperlicher Aktivität würden Sie gesunden Frauen in der Schwangerschaft empfehlen?

Bitte kreuzen Sie alles Zutreffende an.

- Ausdauersport (z.B. Walking, Schwimmen)
 Widerstandstraining (z.B. Gewichte heben)
 Yoga
 Beckenbodentraining
 Sonstige (bitte angeben):

Gibt es sportliche Betätigungen, welche Frauen während der Schwangerschaft vermeiden, die Sie jedoch empfehlen würden?

Empfehlen Sie, dass Frauen mit einer persönlichen oder familiären Vorgeschichte von Präeklampsie während der Schwangerschaft Sport treiben sollten?

Hinweis: Dies gilt nicht für Frauen, bei denen eine Präeklampsie diagnostiziert wurde.

- Ja
- Nein

Ich empfehle Frauen mit der Diagnose Präeklampsie folgendes:

- Ihr Level an körperlicher Aktivität zu erhöhen.
- Ihr Level an körperlicher Aktivität beizubehalten.
- Ihre Berufstätigkeit zu unterbrechen, aber keine andere Einschränkung ihrer Aktivität vorzunehmen.
- Ihre körperliche Aktivität einzuschränken (aber keine Betruhe einzuhalten).
- Betruhe einzuhalten.

Sind Ihnen Richtlinien/Leitlinien zu Empfehlungen für körperliche Aktivität während der Schwangerschaft bekannt?

- Ja
- Nein

Wenn ja, welche Richtlinien/Leitlinien kennen Sie?

Wenn ja, welche Richtlinien/Leitlinien wenden Sie an?

Sind Ihnen Instrumente zum Erheben der körperlichen Aktivität bekannt?

- Ja
- Nein

Wenn ja, welche Instrumente zum Erheben der körperlichen Aktivität kennen Sie?

Wenn ja, welche Instrumente zum Erheben der körperlichen Aktivität wenden Sie an?

7 KA während Wochenbett/Stillzeit

Körperliche Aktivität während der Stillzeit

Wie definieren Sie das Wochenbett?

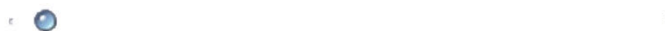
- Die ersten 6 Wochen nach der Geburt
- Die ersten 8 Wochen nach der Geburt
- Die ersten 12 Wochen nach der Geburt
- Das erste Jahr nach der Geburt
- Jederzeit nach der Geburt
- Andere (bitte erläutern Sie):

Wie wichtig ist Ihrer Meinung nach...

körperliche Aktivität im Wochenbett?



Ihre Rolle bei der Vermittlung von Informationen über körperliche Aktivität für Wöchnerinnen?





Wie oft werden Sie nach Informationen oder um Ratschläge zu körperlicher Aktivität bzw. sportlicher Betätigung nach der Geburt gebeten?

- Niemals
- Selten
- Gelegentlich
- Oft

Informieren Sie Wöchnerinnen im Rahmen Ihrer beruflichen Tätigkeit über körperliche Aktivität bzw. sportliche Betätigung?

- Nie
- Selten
- Gelegentlich
- Manchmal
- Häufig
- Nur auf Nachfrage
- Nur im Falle eines medizinischen Problems

8 KA während Wochenbett/Stillzeit 1.2

Wie informieren Sie Wöchnerinnen über körperliche Aktivität?

Eine Mehrfachauswahl ist möglich.

- Mündlich
- Flyer/Broschüre
- Verweis auf Website
- Hinweis auf Rückbildungskurse
- Andere (bitte erläutern):

Wie wohl/ sicher fühlen Sie sich dabei...

Wöchnerinnen über körperliche Aktivität bzw. sportliche Betätigung zu informieren?



Was würde Ihnen dabei helfen, sich wohler / sicherer zu fühlen, Wöchnerinnen über körperliche Aktivität bzw. sportliche Betätigung zu informieren?

Waren Empfehlungen zu körperlicher Aktivität bzw. sportlichen Betätigung für Wöchnerinnen ein Lernziel in Ihrer beruflichen Ausbildung?

- Ja, während meiner Ausbildung
- Ja, während meines Studiums
- Ja, während meiner beruflichen Tätigkeit
- Ja, im Rahmen einer Weiterbildung/Fortbildung
- Nein
- Sonstige (bitte erläutern):

Glauben bzw. empfehlen Sie, dass sich gesunde Frauen **innerhalb der ersten 8 Wochen nach der Geburt** sportlich betätigen sollten?

- Ja
- Nein
- Das kommt darauf an (bitte erklären Sie):

9 KA während Wochenbett/Stillzeit 2

Wenn ja, welche Art von Sport würden Sie **innerhalb der ersten 8 Wochen nach der Geburt** empfehlen?

Eine Mehrfachnennung ist möglich.

- Ausdauersport (z.B. Walking, Schwimmen)
- Widerstandstraining
- Yoga
- Rückbildungsübungen
- Sonstige (bitte erläutern):

Glauben bzw. empfehlen Sie, dass sich gesunde Frauen **zwischen 8-12 Wochen nach der Geburt** sportlich betätigen sollten?

- Ja
- Nein

Das kommt darauf an (bitte erklären Sie):

10 KA während Wochenbett/Stillzeit 3

Wenn ja, welche Art von Sport würden Sie **zwischen 8-12 Wochen nach der Geburt** empfehlen?

Eine Mehrfachnennung ist möglich.

- Ausdauersport (z.B. Walking, Schwimmen)
- Widerstandstraining
- Yoga
- Rückbildungsübungen
- Sonstige (bitte erläutern):

Glauben bzw. empfehlen Sie, dass sich gesunde Frauen **zwischen 12 Wochen bis 1 Jahr nach der Geburt** sportlich betätigen sollten?

- Ja
- Nein

Das kommt darauf an (bitte erklären Sie):

11 KA während Wochenbett/Stillzeit 4

Wenn ja, welche Art von Sport würden Sie **zwischen 12 Wochen bis 1 Jahr nach der Geburt** empfehlen?

Eine Mehrfachnennung ist möglich.

- Ausdauersport (z.B. Walking, Schwimmen)
- Widerstandstraining
- Yoga
- Rückbildungsübungen
- Sonstige (bitte erläutern):

Gibt es etwas, das Sie hinzufügen möchten?

Gibt es sportliche Betätigungen, welche Wöchnerinnen vermeiden, die Sie jedoch empfehlen würden?

Wie häufig würden Sie Wöchnerinnen empfehlen, sich wöchentlich sportlich zu betätigen?

Bitte kreuzen Sie alles Zutreffende an.

- Nie
- 1 bis 2
- 3 bis 4
- 5 bis 6
- Täglich
- Ich empfehle nach der Geburt keine bestimmte Häufigkeit des Trainings.

12 KA während Wochenbett/Stillzeit 5

Welche Dauer der sportlichen Betätigung würden Sie gesunden Frauen im Wochenbett und der Stillzeit pro körperlicher Aktivität empfehlen?

Bitte kreuzen Sie alles Zutreffende an.

- 0 bis 10 Minuten
- 10 bis 20 Minuten
- 20 bis 30 Minuten
- über 30 Minuten

Welche Intensität der sportlichen Betätigung würden Sie gesunden Frauen im Wochenbett und der Stillzeit empfehlen?

Bitte kreuzen Sie alles Zutreffende an.

- Leicht (körperliche Aktivitäten, die nicht zu Schweißproduktion oder Kurzatmigkeit führen, z.B. langsames Gehen)
- Moderat (körperliche Aktivitäten, die intensiv genug sind, um die Herzfrequenz zu erhöhen; eine Person kann sprechen, aber nicht singen)
- Intensiv (körperliche Aktivitäten, die intensiv genug sind, um die Herzfrequenz erheblich zu erhöhen; eine Person kann nicht mehr als ein paar Worte sagen, ohne bewusst Luft holen zu müssen)

Sind Ihnen Richtlinien/Leitlinien zu Empfehlungen für körperliche Aktivität im Wochenbett und der Stillzeit bekannt?

- Ja
- Nein

Wenn ja, welche Richtlinien/Leitlinien kennen Sie?

Wenn ja, welche Richtlinien/Leitlinien wenden Sie an?

13 Endseite

Wir danken Ihnen ganz herzlich für Ihre Zeit und Teilnahme an der Umfrage. Um zum Gewinnspiel zu gelangen, klicken Sie bitte **HIER!** Sollten Sie nicht am Gewinnspiel interessiert sein, können Sie die Umfrage nun schließen.

Supplementary Descriptive Data of Certified Midwives

Sociodemographic and Work-related Data

Table 14. Supplementary Sociodemographic and Work-related Characteristics of the Sample

Variable	n (total n=318)	%
Age (in years);		
< 40	158	49,7
≥ 40	155	48,7
State		
Baden-Wuerttemberg	53	16,7
Bavaria	41	12,9
Berlin	17	5,3
Brandenburg	7	2,2
Bremen	1	0,3
Hamburg	27	8,5
Hesse	33	10,4
Mecklenburg-Western Pomerania	2	0,6
Lower Saxony	27	8,5
North Rhine-Westphalia	53	16,7
Rhineland-Palatinate	8	2,5
Saarland	9	2,8
Saxony	8	2,5
Saxony-Anhalt	6	1,9
Schleswig-Holstein	15	4,7
Thuringia	7	2,2
Austria	4	1,3

Table 15. Work Setting and Form of Employment of Midwives

Form of employment/ Work setting	Employed, n (%)	Freelance, n (%)	Both, n (%)
Inpatient, n=35	26 (74,3)	2 (5,7)	7 (20,0)
Outpatient, n=199	6 (3,0)	167 (83,9)	26 (13,1)
Both, n=69	0 (0,0)	15 (21,7)	54 (78,3)
Neither n=15 [¶]	2 (13,3)	9 (60,0)	4 (26,7)

Table 16. Midwives Work Setting Group Neither[¶]

Group Neither	n (total n=15)	%
Parental leave	4	1,3
Retired	1	0,3
Active in teaching	3	0,9
Other mini job	1	0,3
N/A	6	1,9

Table 17. Ratios of Inpatient and Outpatient Areas of Midwives

Number of areas of care	Inpatient care, n ^{II} =104			Outpatient care, n ^{II} =236			Inpatient and outpatient care, n ^{II} =68		
	n	% ^{II}	%	n	% ^{II}	%	n	% ^{II}	%
1	77	74	24,2	19	8,1	6	-	-	-
2	22	21,2	6,9	148	62,7	46,5	6	8,8	1,9
3	5	4,8	1,6	67	28,4	21,1	39	57,4	12,3
4	-	-	-	2	0,8	0,6	18	26,5	5,7
5	-	-	-	-	-	-	4	5,9	1,3
6	-	-	-	-	-	-	1	1,5	0,3

Table 18. Number of Phases of Care of Midwives

Number of phases of care	n (total n=318)	%
1	16	5
2	19	6
3	109	34,3
4	122	38,4
5	52	16,4

Personal PA

Table 19. Personal PA, Type of Sports performed by Midwives

Type of sports	n (total n=318)	%
Bouldering	3	0,9
Bicycling	25	7,9
Fitness Training, diverse styles	16	5,0
Dancing, diverse styles	9	2,8
Gymnastics	3	0,9
Climbing	5	1,6
Strength Training	4	1,3
Running	6	1,9
Pilates	16	5,0
Qi Gong and Tai Chi	4	1,3
Horse Riding	9	2,8
Pelvic Floor Rehab Training	5	1,6
Swimming	2	0,6
Walking	5	1,6
Hiking	5	1,6
Other, divers	18	5,7
N/A	183	57,5

Recommendations on PA

Table 20. Midwives' Recommendations on PA during Pregnancy

Variable	n (total n=318)	%
Frequency PA (in days per week)		
Never	0	0,0
1-2	127	39,9
3-4	148	46,5
≥ 5	113	35,5
Frequency PA, correct +	77	24,2
Duration PA [¶] (in minutes)		
0-10	17	5,3
10-20	51	16
20-30	224	70,4
> 30	141	44,3
Duration PA, correct +	123	38,7
Intensity PA [¶]		
Light	167	52,5
Moderate	276	86,8
Intense	14	4,4
Intensity PA, correct +	304	95,6

Note. [¶] Multiple answers for frequency, duration and intensity were possible. The percentages of each category were related on the whole sample. + The number of correct answers were evaluated by applying the WHO recommendations [1]. Answers were considered as incorrect when midwives have selected all answers.

Table 21. Midwives' Recommendations on PA after Pregnancy

Variable	n (total n=318)	%
Frequency PA (in days per week)		
Never	9	2,8
1-2	115	36,2
3-4	97	30,5
≥ 5	45	14,2
No recommendations	85	26,7
Frequency PA, correct +	36	11,3
Duration PA [¶] (in minutes) (total n=224)		
0-10	36	11,3
10-20	77	24,2
20-30	116	36,5
> 30	81	25,5
Duration PA, correct +	81	25,5
Intensity PA [¶]		
Light	134	42,1
Moderate	175	55
Intense	28	8,8
Intensity PA, correct +	196	61,6

Note. † Multiple answers for frequency, duration and intensity were possible. The percentages of each category were related on the whole sample. + The number of correct answers were evaluated by applying the WHO recommendations [1]. Answers were considered as incorrect when midwives have selected all answers.

Relationship of sociodemographic and work-related characteristics on knowledge

Table 22. Relationship of Sociodemographic and Work-related Characteristics on Midwives' Recommendations

Variable	Know guidelines for PA during pregnancy				Know guidelines for PA after pregnancy			
	n	%	X	p	n	%	X	p
Socio demographic								
Age			2,614	0,106			2,246	0,134
< 40 years	20	12,7			6	3,8		
≥ 40 years	30	19,4			12	7,7		
Highest education			0,001	0,980			1,840	0,175
W/o university degree	36	16,1			16	7,1		
Any university degree	15	16,0			3	3,2		
Midwifery qualification			1,289	0,256			2,608	0,106
Midwifery Exam	44	17,2			18	7,0		
University degree in Midwifery Studies	7	11,3			1	1,6		
Professional practice			3,489	0,062			3,617	0,057
≤ 20 years	26	13,1			8	4,0		
> 20 years	25	21,0			11	9,2		
Work, basic								
Work setting			3,522	0,318			2,985	0,394
Inpatient	3	8,6			2	5,7		
Outpatient	35	17,6			15	7,5		
Both	9	13,0			2	2,9		
Neither	4	26,7			0	0,0		
Form of employment			0,951	0,621			3,421	0,181
Employed	5	14,7			2	5,9		
Freelance	34	17,6			15	7,8		
Both	12	13,2			2	2,2		
Region/ area of work			0,101	0,951			0,936	0,626
Urban (big city)	18	15,5			6	5,2		
Suburb (small town)	17	17,0			5	5,0		
Rural	16	15,7			8	7,8		
Work, extended								
Work-related experience of PA			1,883	0,170			1,615	0,204
Yes	19	20,4			8	8,6		
No	32	14,2			11	4,9		
Course-offer with PA			0,023	0,879			2,743	0,098
Yes	25	15,7			13	8,2		
No	26	16,4			6	3,8		

Note. Cross tabulation and Chi-square test were performed. Cut-off variable for age and professional practice were shown in Appendix, Table 14. Significant p-values (p<0,05) are marked with an asterisk.

Affidavit

I hereby confirm, Valeen Kölling ,

born on 24.06.19189 in Berlin , that I have written this Bachelor's thesis with the title

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