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O R I G I N A L
Research



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A Cross-sectional Analysis of Motivation and Decision Making in Referrals to Lifestyle Interventions by Primary Care General Practitioners: A Call for Guidance

Abstract: Aim. To explore (1) general practitioners' (GPs') motivations to refer to lifestyle interventions and to investigate the association between GPs' own lifestyle behaviors and their referral behavior and (2) patient indicators in the decision-making process of the GPs' referral to lifestyle interventions. Method. A cross-sectional study was conducted among 99 Dutch primary care GPs. Their motivation to refer was assessed by beliefs regarding lifestyle interventions. GPs' referral behaviors were assessed—considering referral and self-reported actual referral—as well as their own lifestyle behaviors (physical activity, dieting, being overweight). Decision making regarding referring patients to lifestyle interventions was assessed by imposed patient indicators, spontaneously suggested decisive patient indicators,

and case-based referring (vignettes). Results. A substantial group of GPs was not motivated for referral to lifestyle

motivation and referral behavior might be improved by providing them with tailored resources about evidence-

 Besides professional estimates, personal experiences with a healthy lifestyle may also influence GPs' referral behavior. 

interventions. GPs' referral behavior was significantly associated with their perceived subjective norm, behavioral control, and their own physical activity and diet. Most important, patient indicators in referral to lifestyle interventions were somatic indicators and patients' motivation for lifestyle interventions. Conclusions. GPs'

based lifestyle interventions, with support from allied health professionals and with official guidelines for a more objective and systematic screening of patients.

Keywords: general practitioners; lifestyle interventions; refer; motivation; decision making

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Background

The prevalence of lifestyle-related chronic diseases is increasing worldwide. Lifestyle-related risk factors such as lack of physical activity, smoking, overnutrition, and alcohol consumption are the causes of a majority of chronic diseases,¹ including diabetes, cardiovascular disease, obesity, and several malignancies.² According to the World Health Organization, the primary health care setting can contribute substantially to counter this global epidemic.³ Lifestyle interventions at general practitioner (GP) practices have shown moderate but significant effects.^{4,5} These programs focus on an improvement of physical activity or diet through consultations with a coach. Importantly, GPs agree that they have a legitimate role to play in referral to lifestyle interventions,⁶ and yet the sobering reality is that GP referrals to lifestyle interventions are not a broadly applied practice so far.⁷

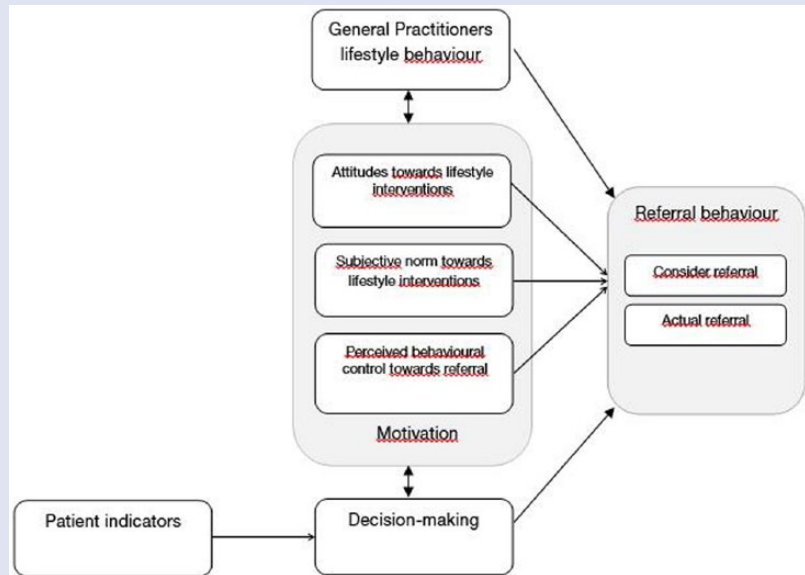
GPs may have legitimate reasons not to embrace referral to lifestyle interventions: besides concerns about the effectiveness of such interventions and program deficiencies, GPs indicated lack of time, lack of confidence in providing advice, low estimated effectiveness of these interventions, lack of skills, and insufficient knowledge as immediate and significant barriers to this referral process.^{8,9} Rubio-Valera et al¹⁰ stated that the main factors affecting the implementation of lifestyle interventions are beliefs, attitudes, and motivations of professionals, which should be changed for a better implementation. Geense et al¹¹ conducted a qualitative study and identified 41 barriers mentioned by GPs. In conclusion, there still is little empirical evidence on factors that influence GPs' referral behavior to lifestyle interventions. The present study explores GPs' motivation and decision making to refer patients for lifestyle programs.

GPs' Motivation to Refer to Lifestyle Interventions

First, to map causes of the referral behavior of GPs, we applied the theory

Figure 1.

Factors influencing referral to lifestyle interventions based on the theory of planned behavior (Ajzen¹²).



of planned behavior (TPB).¹² This model predicts the occurrence of specific behaviors, provided that they are intentional. The TPB is the most frequently operationalized social cognitive perspective on behavior, which makes the data from the present study comparable with that from many other studies on different and similar behaviors. The TPB suggests that 3 variables will predict the intention (or motivation) to perform a behavior. In the present context, the motivation to refer is based on the following: attitudes, reflecting the degree to which the GP has a favorable or unfavorable evaluation of lifestyle interventions; social norms, reflecting the GP's perceived social pressures to perform or not perform referral behaviors; and perceived behavioral control, revealing the GP's perceived ease or difficulty in performing referral behaviors. Besides professional estimates, personal experiences with a healthy lifestyle may also influence GPs' referral behavior.

The GP behavior under study is conceptualized here as "referral

behavior," consisting of 2 distinct actions: considering referral, that is, making an estimation of whether a follow-up service is desired given the unique situation of the individual patient, and actual referral, that is, asking the patient if he/she wants to be referred to a specific intervention and taking care of the referral (Figure 1).

Two other studies about referral behavior to lifestyle interventions among GPs, using the TPB, showed that GPs' implementation of lifestyle interventions was indeed influenced by their attitudes, social norms, and control beliefs.^{13,14} However, no statement was made about GPs' motivation to refer to lifestyle interventions, and both GP samples were small. In addition, the present study went one step further by also investigating whether there is an association between GPs' own lifestyle and their referral behavior toward lifestyle interventions. We found little research on this topic, although one study proved that GPs' experiences with managing their own weight influenced their approach to referral.¹⁴ Additionally, the study by Baarveld and Versteegh¹⁵ provided data on the association between GPs' interest in

sports and their sports prevention-oriented services.

Patient Indicators in Referring Patients to Lifestyle Interventions

To map causes of the referral behavior of GPs, we also assessed their professional decision making, in which they (should) make use of patient indicators to decide about the appropriateness and effectiveness of a lifestyle intervention (Figure 1). Although there is a need for more support in referring to lifestyle treatments in GP practices,¹⁶ no formal guidelines have yet been defined.¹⁷ Little is known about patient indicators in referring patients to lifestyle interventions. Britt et al¹⁸ concluded that decisions on lifestyle referral leave room for individual GP judgments, which makes the decision-making process largely dependent on GP preferences and expertise of lifestyle. So there is a need to obtain insight into the decision-making process of GPs for a better referral.

Aim

The first aim of this study was to explore GPs' motivation to refer to lifestyle interventions and to determine whether there is an association between GPs' own lifestyle behaviors and their referral behaviors. The second aim was to explore patient indicators used by GPs in the decision-making process of referral to lifestyle interventions. To this end, we conducted a cross-sectional study among GPs using a survey.

Method

Recruitment

Dutch GPs were recruited by letter from May to October 2012. The Dutch Institute for Health Services Research (NIVEL) provided mail addresses of 800 randomly selected GPs and sample data on gender, age, type of practice (solo, duo, health center), employment status (practice owner, locum GP, in employment), and years of practice. Letters were sent out to all 800 GPs. A reminder was sent after a month. In the

same period, regional GPs were recruited via advertisements in a newsletter from University Medical Center Groningen ("Verwijzerscontact"—Wenckebach Institute). In both the letter and the advertisement, GPs were invited to join the study on GPs' beliefs regarding lifestyle interventions and their referral behavior to lifestyle interventions.

Procedure

GPs were asked to complete a single digital survey on a website that informed them about the purpose and procedure of the study before they filled out the survey. It was also communicated that anonymity and confidentiality were guaranteed. Finishing and sending the survey electronically was considered as consent to use the respondents' data in this study. The survey took about 20 minutes to complete.

Measurements

GPs' personal characteristics were classified according to the NIVEL-provided data mentioned above (see the section Recruitment). They were asked to indicate on a 5-point Likert scale to what extent they agreed on 19 lifestyle intervention-related beliefs: 1 = *strongly disagree*; 2 = *disagree*; 3 = *neutral*; 4 = *agree*; 5 = *strongly agree*. Beliefs were operationalized using the validated TPB application to health professional behavior¹⁹ and the experience of the research team using the TPB in questionnaire development. This part of the questionnaire contained beliefs toward lifestyle interventions, social support when referring to lifestyle interventions, and GPs' self-efficacy expectations with regard to referring to lifestyle interventions. Referral behavior was assessed with 2 questions: "In all the patients I see, I consider (briefly) whether they are eligible for a lifestyle intervention" (considering referral) and "In the past year, I have regularly referred patients to a lifestyle intervention" (actual referral). Furthermore, GPs were asked whether they had the possibility to refer a patient to lifestyle interventions (yes/no) in the vicinity.

GPs' own lifestyle was, first, measured by a self-report on their physical activity level (1 = *very active*; 2 = *active*; 3 = *fairly active*; 4 = *inactive*; 5 = *very inactive*), time spent on physical activity (1 = <1 h/wk; 2 = 1-2 h/wk; 3 = 2.5-5 h/wk; 4 = >5 h/wk), and the personal importance of physical activity (1 = *very important*; 2 = *important*; 3 = *fairly important*; 4 = *unimportant*; 5 = *very unimportant*). Second, GPs' own lifestyle was measured by a self-report on how healthy their diet was (1 = *very healthy*; 2 = *healthy*; 3 = *fairly healthy*; 4 = *unhealthy*; 5 = *very unhealthy*), the importance of a healthy diet (1 = *very important*; 2 = *important*; 3 = *fairly important*; 4 = *unimportant*; 5 = *very unimportant*), BMI, height, weight, and their opinion about their weight (1 = *underweight*; 2 = *healthy weight*; 3 = *overweight*; 4 = *seriously overweight*; 5 = *don't know*). Finally, GPs were asked whether they smoked daily (yes/no).

To increase insight into the professional decision making concerning lifestyle interventions, 3 different assessments were done. First, GPs were presented with 9 patient indicators to indicate whether these were important to them in referring to lifestyle interventions and which quality of the indicator was most eligible for a lifestyle intervention. The 9 assessed potential patient indicators were gender, language, ethnicity, age, educational level, motivation, medical suitability, physical activity behavior, and diet.

The second method to explore decision making used 8 patient cases (described by 57 words each) that differed on age, educational level, and presence of complaints, in the various combinations (2 × 2 × 2 = 8): In 4 cases, a patient from a lower age group (age <55 years) was presented and in 4 cases, a higher age group (age >70 years); in 4 cases, the level of education was low and in 4 cases high; and in 4 cases, the patient had complaints and in 4 cases none. In all presented cases, the patients were inactive, defined as <30 minutes of moderate physical activity each day. Also, in all cases, BMI was normal

Table 1.

Sociodemographics of Participating GPs Compared With Sample Data.

	Participating GPs (n = 99)		A Selected Sample (n = 800)	
	Percentage	Mean/Median	Percentage	Mean/Median
Gender (%)				
- Male	39		56	
- Female	61		44	
Age (years)		50/52		49/50
Type of practice				
- Solo practice	22		25	
- Duo practice	22		39	
- Health center	33		36	
- Missing	23			
Working status (%)				
- Practice owner	35		87	
- Locum GP	2		—	
- In employment	65		13	
Years of practice		20/21		20/20

Abbreviation: GP, general practitioner.

because earlier research already revealed that BMI was used by GPs for treatment decisions.²⁰ Below, we present a case example:

A patient comes to your practice. The patient is 39 years old, highly educated and has a healthy weight (BMI <25). He has an inactive lifestyle, defined as <30 minutes of moderate physical activity each day. The patient has a demand for care in which a medical intervention or specialist referral is not immediately indicated. There is a possible relation between the patients' complaints and his/her inactive lifestyle; you do not preclude this connection.

For each case, GPs were asked (1) to what extent they considered referring this patient to a lifestyle intervention, (2) if they found the patient eligible for

a lifestyle intervention, and (3) if they actually would refer the patient to a lifestyle intervention. All 3 questions could be answered on a 5-point Likert-scale (1 = *very certainly not*; 2 = *certainly not*; 3 = *neutral*; 4 = *certainly do*; 5 = *very certainly do*). To analyze these data, 3 dichotomous variables were coded: age (high/low), education (high/low), and complaints (yes/no). Using within-subject analysis of variance (repeated measures; $P < .05$), the differences were analyzed between the 2 levels of the 3 indicators for each of the 3 above-mentioned measures of referral.

The third method to explore the decision-making process comprised 2 open questions on indicators to refer and not to refer: "What is an indication for you to refer a patient to a lifestyle intervention?" and "When would you

not refer a patient to a lifestyle intervention?"

Results

Characteristics of GPs

A total of 134 GPs started to fill out the survey. Records of 28 GPs were omitted from analyses because they only logged on to the survey without filling out answers, and 7 GPs only filled out the personal characteristics section. This resulted in a sample of 99 GPs (Table 1).

GPs' Motivation to Refer to Lifestyle Interventions

GPs' beliefs regarding lifestyle interventions were explored, first, by computing the percentages of GPs who endorsed beliefs regarding lifestyle interventions and the relation between

lifestyle intervention–related beliefs and GPs' referral behaviors. Second, to determine the relative strength of GPs' beliefs as predictors of referral, multiple linear regression analyses were conducted (using the Entry and Stepwise methods) regressing the intervention-related beliefs on “considering referral” and “actual referral.” Furthermore, the relation between GPs' own lifestyle and referral behaviors was computed.

Belief Endorsement. The endorsement of beliefs about lifestyle interventions and referrals varied among GPs (Table 2). Whereas about 60% to 80% of GPs were positive about lifestyle interventions, 20% to 40% of GPs were neutral or negative about lifestyle interventions. Thus, a little more than half of the GPs can be regarded as being (somewhat) motivated, based on their attitudes, social norms, and perceived behavioral control. But the remaining GPs can be regarded as not motivated. About 60% perceived difficulties referring patients to lifestyle interventions, and only 28% considered briefly in all patient contacts whether their patients were eligible for such interventions. Whereas 81% of GPs indicated that they had the possibility to refer, 52% had regularly referred patients to a lifestyle intervention in the past year. The multiple linear regression analysis with the Entry method showed that in the end model, 3 beliefs were still significantly related to considering referral: “A lifestyle intervention leads to more sustained lifestyle changes” ($\beta = 0.228$; $P = .032$); “In my direct environment changing lifestyle receives a lot of attention” ($\beta = 0.248$; $P = .032$); “I do not want to disrupt my relationship with a patient by starting to talk about lifestyle changes” ($\beta = -0.208$; $P = .047$). Actual referral was significantly related to 2 beliefs: “I am not able to refer my patients to a lifestyle program” ($\beta = -0.32$; $P = .003$); “In my direct environment changing lifestyle receives a lot of attention” ($\beta = -0.36$; $P = .001$). With the Stepwise method, the same beliefs turned out as significantly related to considering referral and actual referral (Table 3).

Beliefs Related to Referral Behavior. It was tested whether the behaviors “considering referral” and “actual referral” were related (Pearson correlation, $P < .05$) to the 19 lifestyle intervention–related beliefs (Table 2). A lower probability to consider referral and actual referral was significantly ($P < .01$) related to a lower ability of GPs to refer ($r = -0.23$ and -0.45 , respectively). Talking more with colleagues about lifestyle interventions was significantly ($P < .01$) related to considering referral and actual referral ($r = 0.28$ and 0.36 , respectively), and higher attention to lifestyle interventions by GPs' peer groups ($r = 0.42$ and 0.55 , respectively) was also significantly ($P < .01$) related to considering referral and actual referral. In addition, considering referral in all patient contacts was related to more actual referrals ($r = 0.37$).

GPs' Own Lifestyle Related to Referral Behaviors. It was tested whether 5 GP beliefs regarding their own lifestyle were related (Pearson correlation, $P < .05$) to considering referral and actually referring (Table 4). A higher probability in actually referring was significantly related to GPs' self-report of physical activity ($r = 0.21$; $P < .05$), to how important GPs' found their own physical activity level ($r = 0.33$; $P < .01$), and to how important they found having a healthy diet themselves ($r = 0.23$; $P < .05$). GPs' own lifestyle factors were not significantly related to considering referral of patients to lifestyle interventions.

Patient Indicators in Referring Patients to Lifestyle Interventions

Three methods to explore patient indicators in GPs' referral behavior concerning lifestyle interventions were applied: rating imposed patient indicators, case-based referring, and assembling spontaneously suggested decisive patient indicators.

In the first method, GPs were asked to indicate the importance of 9 presented patient indicators in their referral behavior and to indicate the most eligible group for a lifestyle intervention.

Lifestyle interventions were thought to be most eligible for natives (98%) and strongly motivated patients (88%). Level of physical activity (85%) and diet (79%) were also important (Table 5).

In the second method, GPs were presented with 8 patient cases that varied in age, educational level, and presence of physical complaints. For older patients (age >70 years) and patients with physical complaints, GPs were inclined significantly more often to consider referral, to consider the patient as more eligible, and to actually refer the patient more often. With respect to educational level, lower-educated patients were referred significantly more often to a lifestyle intervention than higher-educated patients (Table 6).

In the third method, spontaneously suggested decisive patient indicators for referral were assessed using an open coding indexing technique (Table 7).

Discussion

GPs' Motivation to Refer to Lifestyle Interventions

Although the majority of GPs were motivated for lifestyle interventions, in a substantial group of GPs within our sample, perceptions on lifestyle interventions and referring to lifestyle interventions were not positive. GPs' referral behavior seemed significantly related to their perceived subjective norm and perceived behavioral control toward referral to lifestyle interventions. This may partly explain why not even one-third of them briefly considered each patient for referral to lifestyle interventions during patient contacts, and barely half of the GPs referred patients to lifestyle interventions regularly. Our results are consistent with the outcomes of Ampt et al¹³ and Kim et al,²¹ who showed that attitudes, social norms, and control beliefs were key elements in GPs' referral behavior. We demonstrated that specific social norms and attitude beliefs were predictors of considering referral (18% to 29% of the variance), and specific social norm and self-efficacy beliefs predicted actual referral (31% to 37% of the variance). These outcomes

Table 2.Relation Between GPs' Lifestyle Intervention-Related Beliefs and Their Referral Behavior Toward Lifestyle Interventions.^a

Lifestyle Intervention-Related Beliefs	Percentage Agree	Percentage Neutral	Percentage Don't Agree	M	Consider Referral	Actual Referral
Primary care should not have to deal with lifestyle influences	9	5	85	4	-0.12	-0.13
A lifestyle intervention will ensure that care consumption costs decrease	55	29	15	2	0.13	0.06
A lifestyle intervention will ensure that healthier behaviors can be better maintained	76	16	7	2	0.22*	0.11
A lifestyle intervention yields more than it costs	68	26	5	2	-0.06	0.04
A lifestyle intervention costs a patient more energy than it produces	8	18	73	4	-0.04	-0.12
A lifestyle intervention will eventually cost more money than it yields	13	30	56	4	-0.04	-0.04
It is not the responsibility of a general practitioner to have patients adopt a healthier lifestyle	20	27	52	4	-0.23*	-0.08
One lifestyle is made better durably by adopting a lifestyle intervention	47	37	14	3	34**	0.16
I find it easy to refer patients to a lifestyle intervention	18	21	60	4	0.12	0.27**
I'm not sure if I make the topic of lifestyle known with my patient	12	9	78	4	-0.19	-0.17
I am supported by my immediate colleagues in my actions to promote lifestyle interventions	61	31	7	2	0.22*	0.21*
I am not able to refer my patients to a lifestyle program	8	15	76	4	-0.23*	-0.45**
I frequently discuss lifestyle influencing with colleagues	48	26	24	3	28**	36**
In my direct environment, lifestyle influencing receives a lot of attention	53	26	20	2	0.42**	0.55**
I do not want to disrupt my relationship with a patient by starting to talk about lifestyle improvements	0	9	90	4	-0.14	0.08
I have no time to busy myself with the lifestyle of my patients	13	14	72	4	-0.10	-0.18
In all the patients that I see, I consider (briefly) whether they are eligible for a lifestyle intervention	28	20	52	4	—	0.37**
In the past year, I have regularly referred patients to a lifestyle intervention	52	19	28	2	0.37**	—

Abbreviation: GP, general practitioner.

* $P < .05$ (2-tailed); ** $P < .01$ (2-tailed). [AQ: 2][AQ: 3]

Table 3.Stepwise Multilevel Analysis Regressed on GPs' Beliefs as Predictors of Referral.^a

Model for Considering Referral		β	R^2
1	In my direct environment, lifestyle influencing receives a lot of attention	0.424**	0.180
2	In my direct environment, lifestyle influencing receives a lot of attention	0.364**	0.244
	One lifestyle is made better durably by adopting a lifestyle intervention	0.261*	
3	In my direct environment, lifestyle influencing receives a lot of attention	0.367**	0.286
	One lifestyle is made better durably by adopting a lifestyle intervention	0.292*	
	I do not want to disrupt my relationship with a patient by starting to talk about lifestyle improvements	-0.206*	
Model actual referral			
1	In my direct environment, lifestyle influencing receives a lot of attention	0.554**	0.307
2	In my direct environment, lifestyle influencing receives a lot of attention	0.453**	0.373
	I am not able to refer my patients to a lifestyle program	-0.299**	

Abbreviation: GP, general practitioner.

* $P < .05$; ** $P < .01$.**Table 4.**Relation Between GPs' Own Lifestyle Beliefs and Their Referral Behavior Toward Lifestyle Interventions.^a

GP's Lifestyle Factors	Consider Referral	Actual Referral
How do you evaluate your own physical activity?	0.05	0.21*
How important is physical activity to you?	0.18	0.33**
How do you evaluate your own diet?	0.03	0.07
How important is a healthy diet to you?	0.05	0.23*
How do you evaluate your own weight?	-0.06	-0.03

Abbreviation: GP, general practitioner.

* $P < .05$ (2-tailed); ** $P < .01$ (2-tailed).

are comparable with the results of a review (including 185 studies) showing that the TPB variables accounted for 27% of the variance in behavior.²² This suggests that our measurements reflect the state of the art.

Although the TPB is one of the most common theories in investigations of the relationship between cognition and behavior, our operationalization of the

TPB can be considered as limited. To improve our model of referral behavior, first, the conceptualization of the TPB could be improved by a more detailed analysis according to the 2-component model of the TPB.²³⁻²⁶ In this version of the TPB, a distinction is made between instrumental and affective attitudes²⁷; 2 components of perceived social pressure, injunctive and descriptive norms²⁷; and 2

dimensions of perceived behavioral control, self-efficacy and controllability.²³ Second, a goal perspective on the referral behavior could be used to further understand it: GPs can set considering and actual referring as professional goals and engage in self-regulation strategies to safeguard these goals when goal barriers are encountered. With more insight into GPs' self-regulation regarding

Table 5.

Percentage of GPs Who Find an Indicator Important In Referrals and Most Eligible Groups for Referral to Lifestyle Interventions.

Indicator for Referral	Percentage Important	Most Eligible Group	Percentage Important
Gender	2	No difference	50
		Men	50
Language	43	Native speakers	100
Ethnicity	99	Natives	98
Age	35	Younger than 65 years	69
Educational level	30	Lower educated	62
Motivation	98	Strongly motivated	88
Medical fitness	71	Medically suitable	84
Physical activity level	85	Inactive in the past	48
Diet	79	Unhealthy eating habits in the past	65

Abbreviation: GP, general practitioner.

Table 6.

Percentage of GPs Referring a Patient to a Lifestyle Intervention, With a Low/High Age, Low/High Educational Level, and Presence/Absence of Complaints.

	Age		Education		Complaints	
	Low	High	Low	High	Yes	No
Consider referral	2.745	2.975 ^a	2.760	2.760	3.126	2.593 ^a
Patient eligible	3.157	3.283 ^a	3.210	3.230	3.381	3.058 ^a
Referred	2.573	2.795 ^a	2.745	2.624 ^a	2.907	2.462 ^a

Abbreviation: GP, general practitioner.

^aP < .05.

referral, based on control theories,^{28,29} we may further improve their knowledge and skills to cope with barriers to referral.

Additionally, we showed that GPs' referral behavior was associated with GPs' perceived importance of their self-reported physical activity behavior and dietary habits. It may be that GPs use personal perceptions about their own health also as the basis for referring patients for lifestyle interventions or not.

In addition, GPs' own values and health behaviors may influence patients through their perceived social norms and through modeling.³⁰ Little is known yet about the influence of personal variables of GPs on their professional functioning.

For a better referral in practice, up-to-date information about evidence-based interventions should be available, which may lead to a more positive attitude in GPs. Strategies should be developed to increase the transfer and

uptake of health-related lifestyle information for GPs who may not have the tools or resources to do this independently. Therefore, tailored web resources should be applied, through a forum, for professional guidance and the availability of state-of-the-art PA information. In Canada, such a resource has been used with success, where GPs make use of the Physical Activity Line.³¹ To perceive effective social support, more attention should be given to

Table 7.

Patient Indicators to Refer or Not to Refer to a Lifestyle Intervention (Percentage GPs Mentioned).

Indicators to refer	
Physical disorders (eg, overweight, DM, COPD, heart failure)	90
Health risk	66
Patient is motivated for a lifestyle change	27
Patient needs counseling in a changing lifestyle	11
Lifestyle intervention is facilitated	9
Psychosocial complaints	6
Indicators not to refer	
Patient is not motivated for a lifestyle change	79
Physical disorders (eg, heart failure, infectious disease, osteoarthritis, anorexia, limited mobility)	12
No health risk	10
No appropriate lifestyle intervention is facilitated	11
Psychosocial/cognitive disorders	4
Patient does not fit in a lifestyle intervention (eg, age, ethnicity)	4

Abbreviation: GP, general practitioner; DM, diabetes mellitus; COPD, chronic obstructive pulmonary disease.

lifestyle interventions by national professional associations for GPs.

Providing a formal procedure for referring may influence positively GPs' perceived behavioral control. The study by Persson et al³² already indicated that, in lifestyle matters, doctors indicated a need for cooperation with other health care staff because of a lack of procedure and guidelines. For more effective lifestyle management, we recommend a greater integration of allied health care professionals with GPs in clinical practice, as in the Physical Activity Line.³¹

Patient Indicators in Referring Patients to Lifestyle Interventions

Most decisive patient indicators for referral to lifestyle interventions turned out to be somatic risk factors, which agrees with the study of Lawlor et al,³³

where almost all GPs only focused on complaints to initiate follow-up services. Apparently, GPs use health risks from somatic guidelines for chronic diseases, which suits curing well but may be less relevant for prevention.

The perception of patient's motivation to work on lifestyle changes was another important factor in their decision whether to refer or not. Using the present methodology, unmotivated patients were not referred to lifestyle interventions by the majority of GPs, in line with the study by Kim et al.¹⁴ However, there are no shared guidelines for GPs in primary care to estimate patients' motivation, and most GPs are not trained to assess this motivation. Moreover, when low motivation is used as a contraindication for referral to a lifestyle intervention,

this means that large groups of people may be discarded.

Sociodemographic factors, such as age, educational level, and ethnicity, were also used by GPs in the referral process. When explicitly asked about age, GPs indicate a preference to refer younger patients to lifestyle interventions, but when age was embedded in patient cases, older patients were referred more often. This result illustrates the complexity of assessing the decision-making process to approach what happens in practice. Moreover, the reasons why GPs use sociodemographics in their decisions concerning lifestyle interventions remain unknown. All in all, this decision-making process needs more study.

To make a proper assessment, based on more than just somatic indicators, there should be an improvement in assessment of patients' motivation as well as in the use of shared decision making for referral to lifestyle interventions. A tool should be provided to (1) identify the patient's motivation, (2) provide information about eligible interventions for apparently nonmotivated people, (3) indicate which patients are eligible for referral, and (4) provide information about eligible programs for specific groups in the vicinity (eg, age groups, ethnicity groups). In line with the study by Rubio-Valera et al,¹⁰ the skills required (ie, assessment of motivation and communication skills) should be trained in the education of health professionals, in which a transition is needed from a biomedical to a biopsychosocial model of care. This might also reinforce the professionals' self-confidence to engage in shared decision making regarding lifestyle, and it could help GPs decrease their subjective influences in the practice of their profession.

Limitations

This study had some relevant limitations. The identification of considering referral and actually referring relied on self-reported single questions. The validity of measuring

both behaviors using single-item measures might be questioned. Also, the order in which Likert scales were used may have influenced GPs' responses: the answer order was reversed in some questions. Furthermore, the sample of GPs may not be representative of the total population of Dutch GPs. From the invited GPs, only 12.4% provided data, and relatively many female GPs responded; also, the sample differed on gender, type of practice, and working status. Previous UK research has suggested that female doctors may be more involved in preventive general practice,³⁴ which might have influenced our results.

Although we have to be careful with generalizations based on this particular sample, this study does provide insight into GPs' motivation and decision making in referral to lifestyle interventions within primary care. The variance seen among GPs in motivation to refer to lifestyle interventions and the associations that were found between referral behavior and decision making might still be of value for the general population of GPs. At the least, this study was able to address some important issues among GPs that may inspire further research and guideline development concerning preventive practices.

Conclusion

To conclude, a substantial group of GPs was not motivated for referral to lifestyle interventions. Their motivation and referral behavior might be improved by providing them with information about evidence-based lifestyle interventions, with social support from professional organizations and with official guidelines for a more objective and systematic screening of patients.

Authors' Note

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writing, and publishing the report. The authors declare that there is no conflict of interest. **AJLM**

References

- Mathers CD, Vos ET, Stevenson CE, Begg SJ. The Australian burden of disease study: measuring the loss of health from diseases, injuries and risk factors. *Med J Aust.* 2000;172:592-596.
- Eyre H, Kahn R, Robertson RM, et al. Preventing cancer, cardiovascular disease, and diabetes: a common agenda for the American Cancer Society, the American Diabetes Association, and the American Heart Association. *CA Cancer J Clin.* 2004;54:190-207.
- Branca F, Nikogosian H, Lobstein T. *The Challenge of Obesity in the WHO European Region and the Strategies for Response: Summary.* Geneva, Switzerland: World Health Organization; 2007.
- Warburton D, Charlesworth S, Ivey A, Nettlefold L, Bredin S. A systematic review of the evidence for Canada's Physical Activity Guidelines for Adults. *Int J Behav Nutr Phys Act.* 2010;7:39.
- Ashenden R, Silagy C, Weller D. A systematic review of the effectiveness of promoting lifestyle change in general practice. *Fam Pract.* 1997;14:160-176.
- Jacobson DM, Strohecker L, Compton MT, Katz DL. Physical activity counseling in the adult primary care setting: position statement of the American College of Preventive Medicine. *Am J Prev Med.* 2005;29:158-162.
- Peterson JA. Get moving! Physical activity counseling in primary care. *J Am Acad Nurse Pract.* 2007;19:349-357.
- Barte JC, ter Bogt NC, Beltman FW, van der Meer K, Bemelmans WJ. Process evaluation of a lifestyle intervention in primary care: implementation issues and the participants' satisfaction of the GOAL study. *Health Educ Behav.* 2012;39:564-573.
- Hebert ET, Caughy MO, Shuval K. Primary care providers' perceptions of physical activity counselling in a clinical setting: a systematic review. *Br J Sports Med.* 2012;46:625-631.
- Rubio-Valera M, Pons-Vigués M, Martínez-Andrés M, Moreno-Peral P, Berenguera A, Fernández A. Barriers and facilitators for the implementation of primary prevention and health promotion activities in primary care: a synthesis through meta-ethnography. *PLoS One.* 2014;9:e89554.
- Geense WW, van de Glind, Irene M, Visscher TL, van Achterberg T. Barriers, facilitators and attitudes influencing health promotion activities in general practice: an explorative pilot study. *BMC Fam Pract.* 2013;14:20.
- Ajzen I. The theory of planned behavior. *Organ Behav Hum Decis Process.* 1991;50:179-211.
- Ampt AJ, Amoroso C, Harris MF, McKenzie SH, Rose VK, Taggart JR. Attitudes, norms and controls influencing lifestyle risk factor management in general practice. *BMC Fam Pract.* 2009;10:59.
- Kim KK, Yeong L, Caterson ID, Harris MF. Analysis of factors influencing general practitioners' decision to refer obese patients in Australia: a qualitative study. *BMC Fam Pract.* 2015;16:45.
- Baarveld F, Versteegh S. Preventie van sportgerelateerde problemen: Een taak voor de huisarts? *Tijdschr Gezondheidswetenschappen.* 2004;82:285-289.
- Grol R, Grimshaw J. From best evidence to best practice: effective implementation of change in patients' care. *Lancet.* 2003;362:1225-1230.
- Kirkegaard P, Risør MB, Edwards A, Junge AG, Thomsen JL. Speaking of risk, managing uncertainty: decision-making about cholesterol-reducing treatment in general practice. *Qual Prim Care.* 2012;20:245-252.
- Britt H, Miller GC, Charles J, et al. *General Practice Activity in Australia 2007-08.* Canberra, Australia: Australian Institute of Health and Welfare; 2008.
- Francis JJ, Eccles MP, Johnston M, et al. *Constructing Questionnaires Based on the Theory of Planned Behaviour: A Manual for Health Services Researchers.* Newcastle upon Tyne, UK: Centre for Health Services Research, University of Newcastle upon Tyne; 2004.
- Kushner RF, Ryan DH. Assessment and lifestyle management of patients with obesity: clinical recommendations from systematic reviews. *JAMA.* 2014;312:943-952.
- Kim KK, Yeong L, Caterson ID, Harris MF. Analysis of factors influencing general practitioners' decision to refer obese patients in Australia: a qualitative study. *BMC Fam Pract.* 2015;16:45.
- Armitage CJ, Conner M. Efficacy of the theory of planned behaviour: a meta-analytic review. *Br J Soc Psychol.* 2001;40:471-499.
- Ajzen I. Perceived behavioral control, self-efficacy, locus of control, and the theory of planned behavior. *J Appl Soc Psychol.* 2002;32:665-683.

24. Rhodes RE, Blanchard CM, Matheson DH. A multicomponent model of the theory of planned behaviour. *Br J Health Psychol*. 2006;11:119-137.
25. Elliott MA, Ainsworth K. Predicting university undergraduates' binge-drinking behavior: a comparative test of the one- and two-component theories of planned behavior. *Addict Behav*. 2012;37:92-101.
26. Rhodes R, Courneya K. Differentiating motivation and control in the theory of planned behavior. *Psychol Health Med*. 2004;9:205-215.
27. Fishbein M, Ajzen I. *Predicting and Changing Behavior: The Reasoned Action Approach*. Abingdon, UK: Taylor & Francis; 2011.
28. Bandura A. Social cognitive theory of self-regulation. *Organ Behav Hum Decis Process*. 1991;50:248-287.
29. Carver CS, Scheier MF. *Attention and Self-regulation: A Control-Theory Approach to Human Behavior*. Berlin, Germany: Springer Science & Business Media; 2012.
30. Bandura A. *Social Foundations of Thought and Action: A Social Cognitive Theory*. Upper Saddle River, NJ: Prentice Hall; 1986.
31. Bredin SS, Warburton DE. Physical activity line: effective knowledge translation of evidence-based best practice in the real-world setting. *Can Fam Physician*. 2013;59:967-968.
32. Persson G, Brorsson A, Ekvall Hansson E, Troein M, Strandberg EL. Physical activity on prescription (PAP) from the general practitioner's perspective: a qualitative study. *BMC Fam Pract*. 2013;14:128.
33. Lawlor DA, Keen S, Neal RD. Can general practitioners influence the nation's health through a population approach to provision of lifestyle advice? *Br J Gen Pract*. 2000;50:455-459.
34. Calnan M, Williams S. Coronary heart disease prevention: the role of the general practitioner. *Fam Pract*. 1993;10:137-151.