ORIGINAL ARTICLE

Medical Students' Gender Awareness

Construction of the Nijmegen Gender Awareness in Medicine Scale (N-GAMS)

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Abstract Gender awareness in medicine consists of two attitudinal components: gender sensitivity and gender-role ideology. In this article, the development of a scale to measure these attitudes in Dutch medical students is described. After a pilot study and a feasibility study, 393 medical students in The Netherlands responded to a preliminary instrument consisting of 82 items (response rate 61.3%). Reliability and validity were established. A gender awareness scale containing a gender sensitivity subscale (14 items), and gender stereotypes towards patients (11 items) as well as towards doctors (7 items) was developed. The instrument may be used for research purposes to evaluate gender awareness raising courses.

Keywords Gender awareness · Scale construction · Medical education

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Introduction

This paper discusses the development of an instrument to measure gender awareness in medical students. Doctors' gender awareness in medicine aims toward better health for men and women and contributes to equity and equality in health (Doyal 2001). The purpose of this study is the development of a reliable and valid scale to measure the affective components of medical students' gender awareness: gender sensitivity and gender-role ideology towards patients and doctors. The integration of gender issues into medical education—as regards knowledge, attitude-forming and the skills to apply these to medical practice—is advocated in all medical disciplines and across the learning continuum from undergraduate through continuing professional development (Manderson 2003; WHO 2006). For instance in The Netherlands in 2002, a national project started to incorporate gender health issues in medical education (Verdonk et al. 2005; 2006). However, there is a lack of sound evaluations of implementation projects as regards gender issues and their sensitizing effects on medical students, partly due to lack of suitable instruments.

First, we discuss gender awareness in medicine and in medical education and we theorize how the widely used concept of patient centeredness in medical education relates to the concept of gender awareness. Second, we examine previous research measuring gender awareness in medicine and find a lack of validated scales to measure gender awareness in medical students, in order to evaluate sensitizing training in gender issues. Third, we discuss the construction of a gender awareness in medicine scale in several phases from the construction of items to the statistic procedures to establish reliability and validity. Fourth, we use the newly developed scale to examine group differences. And finally, we discuss the strengths and limitations of the instrument.

A large body of evidence has shown sex and gender differences in the epidemiology, presentation and course of diseases, as well as in treatment effectiveness and prognosis. Research, for instance from the Nordic countries, also point towards the influence of physicians' gender-specific beliefs and values on health care for male and female patients as well as on the professional choices and preferences of doctors (Foss and Sundby 2003; Risberg et al. 2003). Biological differences between the sexes extend beyond the reproductive to for instance prevalence of auto-immune problems or presentation of coronary heart disease. Psychological gender differences in health and illness exist for example in help-seeking behavior, consequences of and coping with disease, and symptom perception. Socially constructed gender differences also determine whether men and women can realize their health potential as, for example, norms regarding risk-taking differentially affect men and women (Doyal 2001; Lagro-Janssen 1997; Lagro-Janssen and Noordenbos 1997).

A better understanding of the gender-specific determinants of health contributes to gender equality (WHO 1998; Jimenez and Poniatowski 2004). It has been stated that 'any health system which is not gender-sensitive cannot address the needs of either women or men adequately and is therefore an unsatisfactory system' (Commonwealth Secretariat 2002, p. 16). However, as a result of gender-blind medical curricula, health professionals continue to have a biomedical focus (Jimenez and Poniatowski 2004). Gender aware education benefits both men and women and helps to determine which assumptions in gender matters are valid, and which are stereotyped generalizations (Aksornkool 2002) and the implementation of gender health issues in medical education is widely advocated (e.g. Manderson 2003; UN 1999; WHO 2006; Zelek et al. 1997).

Our study is situated in the Dutch context, but medicine and medical education both are international fields and as such strongly influenced by international developments and discussions. Extensive research exposed that women have higher morbidity rates and utilize healthcare more than men in all countries where women have access to health care, including in The Netherlands (Stoverinck et al. 1996). These authors conclude from their study in Dutch primary care that women's higher utilization of health care largely results from screening for (a) diseases of the cervix and breasts and (b) pregnancy and childbirth problems with subsequent hospitalizations. Furthermore, a study in six European countries including in the Netherlands exposed that in general practice women get longer consultations than men because psychosocial issues are more often discussed (Deveugele et al. 2002). As regards medical diagnosis, studies exposed that gender bias in the recognition of coronary heart disease (CHD)—a major public health issue—exists in the Netherlands as well as in other Western countries (Lagro-Janssen 1997). Doctors more often fail to recognize CHD in women and

attribute women's complaints more often to psychological causes. More importantly, atypical symptoms of CHD dominate the clinical picture in women whereas typical symptoms occur more often in men. Furthermore, additional diagnostic procedures are not as reliable in women as in men. As regards the workforce, differences and similarities exist between countries. In the Netherlands in 2003, 29% of all physicians were female (Lugtenberg et al. 2005). Like in many Western countries, in The Netherlands the medical profession is rapidly feminizing which fuels the call for parttime work and measures to combine work and care (Meyboom-de Jong et al. 2002). Heiligers and Hingstman (2000) found that 50% of Dutch physicians preferred working parttime and this need was not restricted to female doctors only. Despite this preference, barriers of demanding working hours influence career choices in especially female physicians (Lugtenberg et al. 2005). Although in all industrialized countries women work parttime more often than men, the Netherlands ranks number one on the list (Portegijs et al. 2006). The opposite is the case as regards female leadership in all sectors and professions, including in medicine (Takkenberg et al. 2007). In a qualitative study, de Jong and Lagro-Janssen (2006) conclude that academic female general practitioners in Europe face similar as well as different constraints during their careers and different measures are needed to break the glass ceiling in different countries. In the Netherlands, underestimation of women's leadership skills is especially disquieting. Another issue of concern is sexual harassment of graduate medical students. A recent Dutch study among graduate students showed that none of the male clerks opposed to 20% of female clerks reported an incident of sexual harassment by teachers, students and patients in the year before the study was conducted (van den Muijsenbergh and Lagro-Janssen 2005). Besides the psychological consequences, sexual harassment has potentially negative consequences for personal and professional functioning. Furthermore, the study exposes that despite the fact that female students now make up over 50% of the student force gender stereotypes are well-alive among medical teachers and practitioners in the Netherlands. Since there are many similarities in gender stereotypes across cultures and nations (Glick et al. 2004) as well as similarities in daily medical practice and in medical education, we think that the results from our study stretch beyond the Dutch context and apply to medical students in many Western countries.

Gender Awareness in Medicine

Awareness of sex and gender in health and illness is important for several reasons. First, it is important to close gender gaps in health and to improve the health of men and women. Second, increased awareness is necessary to achieve genuine connections with patients and leads towards an

increase of quality of health care for men and women (Beagan 2000; Doyal et al. 2003). And furthermore, gender awareness is said to have an impact on issues such as the proportion of men and women in medical specialties and on medical culture in general. In medicine, it is important that we carefully identify the similarities and differences—including issues of power—in the health needs of men and women. Ignoring biological explanations for differences between men and women increase health inequities. On the other hand, a narrow focus on biological theories may hamper a better understanding of the implications of social and psychological inequalities for the health of men and women. The World Health Organization defines gender awareness as an 'understanding that there are socially determined differences between women and men based on learned behavior, which affect their ability to access and control resources' (WHO 1998). In medicine, it is difficult to distinguish to what degree a phenomenon is social or biological (Risberg et al. 2003). We argue that both views are relevant and therefore we adopt a broader concept of gender awareness covering awareness of both biological sex differences as well as social gender differences (Hoffman 2000; Phillips 2005; Verdonk et al. 2006). Gender health issues are those issues in which the sex or gender of the patient or health care professional is, or may be, salient (e.g. Nicolette and Jacobs 2000). In health care, former studies on gender awareness operationalized the concept in three subsidiary components: (1) gender-sensitivity, (2) gender-role ideology and (3) knowledge (King et al. 2002; Salgado et al. 2002). The first two attitudinal components are further elaborated in the following sections.

In the literature, gender sensitivity is defined as the 'ability to perceive existing gender differences, issues and inequalities and incorporate these into strategies and actions' (WHO 1998) or as 'the perceptiveness and responsiveness concerning differences in gender roles, responsibilities, challenges and opportunities' (Commonwealth Secretariat 2002). In gender-sensitive health care, emphasis is put on specific characteristics, life events and experiences—health problems as well as determinants and consequences—that belong to one of the genders more than to the other gender. Gender-sensitive health care aims to promote gender equity by taking gender under consideration when relevant. This includes sensitivity to the impact of doctors' gender. Medical education still encourages students to see themselves as socially neutral doctors (Beagan 2000) maintaining the failure to notice the salience of social categories in medicine. Beagan argues that in Canadian medical education, students are intentionally and unintentionally taught that gender and other social identifiers do not—and should not—matter. This assumption forms an obstacle for examining how these identifiers influence the provision of health care. Sex and gender differences are to be taken seriously and understood against

the background of men and women's roles in society. Gender sensitivity means that physicians are sympathetic towards addressing gender issues, while taking care to avoid stereotyped generalizations.

Gender-role ideology represents a health care worker's attitude towards male and female patients and doctors. Gender, ethnicity, age, education, socio-economic status are identifiable social markers and as such likely to form the basis for a stereotype (Smith and Harris Bond 1998). The Stereotype Content Model developed by Fiske et al. (2002) poses that stereotype content responds to systematic principles resulting from interpersonal and intergroup interactions (Fiske et al. 2002). When meeting others, people want to know the other's intent (positive or negative) as well as the other's capability in pursuing goals. Both characteristics correspond to perceptions of warmth and competence, or (dis)like and (dis)respect. The authors state that positive stereotypes do not contradict prejudice but instead are functionally consistent with unflattering stereotypes on the other dimension (Fiske et al. 2002). Therefore, positive stereotypes are not necessarily benign.

The selection and socialization process of physicians does not completely erase the effects of gender-role ideology and gender stereotypes about men and women play a role in the doctor–patient interaction. For instance in a Dutch study, stereotypes towards male and female alcoholics parellelled general gender role stereotypes with women being stereotyped as more submissive, less independent, less competitive and less aggressive than men (de Jong et al. 1993). These stereotypes interacted with actual differences in interpersonal behavior of male and female alcoholics as well as of the therapists, but no gender related differences in outcome of treatment were reported. According to some Norwegian university hospital doctors and nurses, female patients take up too much of doctors' time by demanding more information than they actually need (Foss and Sundby 2003). Floyd (1997) argues that physicians in general may be overly attentive to complaints that are congruent with gender roles and fail to notice those that are not congruent with gender roles. If that is the case, qualitatively different information is evoked from male and female patients resulting in gender differences in diagnostic and treatment decisions. For instance in occupational health care in The Netherlands it is often assumed that working women have children and are no breadwinners which results in longer sickness absence duration and the underestimation of work-related problems in women (Cuelenaere and Molenaar-Cox 2001; van den Bold and Margry 2004). In a study on differential explanations to illness conducted in the USA, undergraduate university students read a description of gender differences in acute and chronic conditions that placed either women or men at a (nonexistent) health disadvantage (Benrud and Reddy 1998). When the health condition negatively affected women, male and female

participants attributed this primarily to relatively uncontrollable, constitutional factors such as biology and emotions. In contrast, when the same health condition is negatively affected in men, participants of both genders attributed this primarily to relatively controllable, nonconstitutional factors, such as behavior. The researchers argued that these differential explanations might result in gender differences in prevention and treatment (Benrud and Reddy 1998). Not all studies exposed simple gender bias in the way doctors view, diagnose and treat their patients and it is suggested that situational aspects elicit gender bias in health care provision (Street 2002). For instance, examination of American medical students' and residents' agreement with a coronary heart disease (CHD) diagnosis and referral to a cardiologist showed an underdiagnosis and underreferral of women presenting typical CHD symptoms only in the context of stressful life events (Chiaramonte and Friend 2006). Chiaramonte et al. (2006) studied the diagnosis of typical CHD symptoms while—as discussed earlier—women present more often than men with atypical symptoms. Hence, their findings may underestimate gender bias in diagnosis of CHD.

Physician gender differences are found in the way providers communicate verbally and non-verbally with patients, although these differences are small. Gender differences in medical consultations come from sources like for instance gender differences in communicative styles, mutual perceptions and accommodation to each other's behavior during interaction (Street 2002). Based on international literature, Street concludes that women doctors hold more egalitarian attitudes than men and that gender differences in communication styles are partly related to beliefs and values associated with identity and socialization. According to studies conducted in the United States, undergraduate female students in general have more egalitarian attitudes than their male counterparts towards the social and the employment domain (Anderson and Johnson 2003), male college students hold more pro-rape beliefs and less egalitarian views than female students (Szymanski et al. 1993) and female staff in the Veteran Health Administration hold more positive attitudes towards female patients than their male colleagues (Vogt et al. 2001). In the Netherlands, a recent study exposed physician gender differences in discussing partner abuse (LoFoWong et al. 2006). For instance, part of the male family doctors considered denial of sex by spouses an eliciting factor to partners' aggression. Although generally stereotypes of women are not necessarily more negative than stereotypes of men (Glick and Fiske 1996), patient stereotypes are typically more negative for female patients than for male patients (King et al. 2002) and stereotypes may influence gender inequities in health care provision (Floyd 1997; Heesacker et al. 1999). As regards interaction, gender dyads in physician–patient communication play a role. For instance in discussing fatigue, research exposed that Dutch

female family doctors are especially sensitive to female patients resulting in an interaction pattern characterized by intensive exchange of medical and psychosocial information (Meeuwesen et al. 2002). Other contextual factors, situation-specific considerations and cultural differences influence communication as well (van den Brink-Muinen et al. 2002; Street 2002). Most studies cited have not been conducted in the Netherlands. However, the international character of medical knowledge and practice, the cross-cultural similarities in gender stereotyping and the structural segregation in the labor force provide reason to assume that medical practice is similarly affected by gender role ideology in Western contexts. Gender stereotypes have an impact on the physician–patient relationship. In general, evidence exposed that women stereotype less than men and hold more egalitarian attitudes.

Patient Centeredness

In medical education, a lot of attention is paid to developing a patient centered attitude in medical students. Patient centered—or care oriented—physicians are more attuned to psychosocial issues and hold more open, empathic, and democratic attitudes. For decades, the women's health movement has advocated a broader scope of physicians' interest and pointed towards the need for a biopsychosocial model in medicine (Jimenez and Poniatowski 2004). Historically in Europe as well as in the United States, initiatives towards the improvement of women's health care aimed towards better information on birth control and sexuality (Doyal 1995; Lagro-Janssen 2007; Rosser 1994). Simultaneously in different Western countries, second wave feminism expanded this view with a focus on the health impact of unequal power divisions between both genders (Lagro-Janssen 2007). Women's health studies aimed to acquire gender-specific knowledge, incorporate women's own perceptions and observations, and contextualize illness within women's lives. In the 1990s, women's health studies expanded this focus towards gender health issues and hence, the inclusion of men as well as gender relations.

Women health care providers give more information, are more assuring and encouraging, and express more interest in psychosocial aspects of health like emotions, lifestyle and family (Street 2002). Furthermore, evidence has shown that: (1) Dutch female medical students are more patient centered than male students (Batenburg 1997; Verdonk et al. 2007), that; (2) female physicians are more attuned to the psychosocial context than male physicians (Hall and Roter 2002; Meeuwesen et al. 2002), and that; (3) more patient centered and egalitarian behaviors are exhibited by female doctors compared to male doctors (Street 2002; Meeuwesen et al. 2002). Hence, patient centeredness seems related to the concept of gender awareness with higher patient centeredness being positively related to gender sensitivity and negatively related to gender stereotyping.

An instrument—the Gender Awareness Inventory–Veterans Affairs (GAI–VA) to measure gender awareness of professionals working with female patients was developed in the United States (Salgado et al. 2002). The GAI–VA was specifically developed for women veterans newly entering a health care system originally devoted to men and was not validated for other health care settings. Hence, several items in the GAI–VA did not apply to our population of medical students like for instance items about women's access to health care. Furthermore, the GAI–VA does not contain attitudinal statements about gender role ideology towards male and female physicians or gender role ideology towards male patients. Therefore, we needed a new scale to assess gender awareness in graduate and undergraduate medical students and evaluate sensitizing effects of medical education. Thereby, we built on and expanded the GAI–VA's subsidiary components.

Gender awareness includes gender sensitivity – meaning that physicians are sympathetic towards addressing gender issues – while taking care to avoid stereotyped generalizations (gender role ideology). For instance, doctors' stereotyped view on female sexual availability as well as on male sexual aggressivenes is consistent with overlooking partner abuse (LoFoWong et al. 2006). Salgado et al. (2002) found that both components correlated highly and significantly as measured with the GAI–VA. Furthermore, evidence exposed that generally women stereotype less than men and hold more egalitarian attitudes towards female patients (e.g. Vogt et al. 2001) and that female physicians are more attuned to the psychosocial context than male physicians (e.g. Meeuwesen et al. 2002). The concepts of patient centeredness and gender awareness are related in their biopsychosocial focus on medicine as well as egalitarian attitudes towards patients (e.g. Lagro-Janssen 2007). We assumed that patient centeredness might be a necessary—but possibly not sufficient—prerequisite for gender awareness.

Items were written and accommodated based on the literature, expert group discussion, a small pilot study, and student feedback. Content validity was achieved by including a broad sample of items representing central concepts. Furthermore, we conducted a principal component analysis to establish content validity (ten Berge and Siero 1994). Next, we explored reliability of the scales. In the final subscales, items were chosen based on loadings on the PCA, reliability scores on the initial scales and item content. Finally, we tested three hypotheses. First, we hypothesized that gender sensitivity and gender role ideology are negatively correlated, revealing that sympathetic attitudes towards the impact of gender in medical practice are related to less gender stereotyping. Second, we assumed that student gender played a role in gender awareness with female students being more gender aware. And third, we hypothesized that patient centeredness relates to gender awareness. A patient centeredness scale was added to establish convergent validity of the gender aware-

ness scale. All hypotheses are tested for men and women separately.

Method

The Nijmegen Gender Awareness in Medicine Scale (N-GAMS) instrument was constructed in several steps. First, an initial gender awareness questionnaire was offered to third-year students in an elective course. Furthermore, to establish feasibility a newly constructed questionnaire was offered to students who had organized themselves in a group with a specific interest in elaborating gender health issues in more depth. Second, a sample of 393 students responded to an item pool to establish reliability and validity of the scale. In the following sections, the first step is shortly addressed because of its importance for listing the items. The second step concerns psychometric aspects of the scale and is described extensively.

Step 1: Listing the Items

In the first step, 22 third-year medical students of the elective Gender, Sexuality and Ethnicity responded in September 2003 to an initial gender awareness questionnaire at entrance as well as at the end of the course 4 weeks later. Statements covered domains like domestic violence or the effect of mothers versus fathers' alcohol abuse on their children. Results indicated more positive attitudes in students (Verdonk and Lagro-Janssen 2005). However, psychometric characteristics of the items to construct a reliable scale were insufficient.

In the second step, new items were written based on the initial questionnaire, the model behind the GAI–VA (King et al. 2002; Salgado et al. 2002) and literature about gender bias in health care and the Stereotype Content Model (e.g. Fiske et al. 2002). The following rules of thumb were used. First, the number of items about male and female patients and male and female physicians had to be balanced, and both positive and negative stereotypes should be included (Fiske et al. 2002). Second, we incorporated statements based on the Stereotype Content Model and mentioning warmth and competence of male and female patients as well as doctors. Third, statements incorporating gender dyads—including (fe)male doctors as well as (fe)male patients—were listed (e.g. Meeuwesen et al. 2002). Fourth, specific gender role issues like partner abuse and care taking for children had to be incorporated (e.g. LoFoWong et al. 2006). And finally, medicine's claim on neutrality reproduces gender bias in health care (e.g. Lagro-Janssen 2007). Hence, doctors' generally held belief that gender does not and should not matter in health care must be included in the gender sensitivity subscale.

The gender sensitivity subscale (GS) consisted of attitudinal statements about gender concerns in health care (e.g.

"addressing differences between men and women creates inequity in health care"). As regards gender-role ideology towards patients (GRI-patient), items contained stereotypes about communication and patients' attitudes towards illness and health (e.g. 'female patients complain about their health because they need more attention than male patients'). The gender-role ideology doctor subscale (GRI-doctor) contained questions about male and female doctors (e.g. male physicians are more efficient than female physicians). It proved difficult to state items in reverse especially for the gender role ideology items because stereotypes seemed to lose their meaning when reversed. Nevertheless, we incorporated gender sensitivity items as well as gender role ideology items in reverse. Responses on all subscales varied on a Likert-scale from 1 (totally disagree) to 5 (totally agree). We discussed items within the author group as well as with two experts from within the Department of Women's Studies in Medicine and revised them according to their feedback.

A number of students who followed the elective course over the past years created a student working group for Gender Specific Health Care to further elaborate gender health issues and advocate the uptake of gender issues in medical education. Hence to establish intelligibility and feasibility, a questionnaire of 89 items (24 GS-items, 40 GRI-patient items and 25 GRI-doctor items) was sent to this student group. After their feedback, seven items were removed for instance those phrased awkwardly or a confusing item in which we specifically addressed hospital patients instead of patients in general.

Step 2: Reliability and Validity

We aimed to establish reliability and validity of the accommodated version of the scale—taking students' comments into account—now consisting of 82 gender sensitivity and gender role ideology attitude items (24 GS-items, 36 GRI-patient items, 22 GRI-doctor items). Indicators for gender awareness are explored by conducting a principal component analysis (PCA) and we examined the effects of rotating different numbers of factors. Next, we explored the reliability of the scales. Choices for items in the final subscales were based on component loadings, item-total correlations of the initial scales and item content. And finally, we tested three hypotheses. First, we expected that GS and GRI are negatively correlated, revealing that sympathetic attitudes towards the impact of gender in medical practice are related to less gender stereotyping. Secondly, we assumed that student gender played a role in gender awareness with female students being more gender aware. And thirdly, patient centeredness was studied with the Ideal Physician Scale (Batenburg 1997). To validate the gender awareness scale, both scales were combined in the inventory that we sent to first- and sixth-year students. Hence, we hypothesized that a positive correlation exists between scores on the Ideal Physician Scale and GS and a negative correlation between the Ideal Physician Scale and both GRI subscales.

Methods, Participants and Procedure

In the Radboud University Nijmegen Medical Centre, health sciences' students and medical students follow the same courses in their first year. We sent out our instrument, containing the 82-item GS and GRI items, in two shifts. First, 99 1st-year health sciences' students (response rate 43.5%) and 47 fourth and fifth-year students who had followed the elective course Gender, Sexuality and Ethnicity course in 2002 or 2003 (response rate 31%) received the inventory by the end of June 2004. A reminder was sent during the summer holiday break. Secondly, inventories were handed out to 329 first-year medical students at first lectures (response rate 65.3%) and to 178 sixth-year medical students (response rate 60.7%). These two age groups also received the Ideal Physician Scale. No reminders were sent. The overall response rate across all samples was 61.3% ($n=393$; mean age=21 years). The predominantly white Dutch student population as well as the student sex distribution in the Radboud University Nijmegen Medical Centre is reflected in the respondents (280 women, 113 men; 353 of the students were born in The Netherlands).

Analyses

A Principal Component Analyses was performed on all items to establish content validity (ten Berge and Siero 1994). An analysis based on correlations between variables seeks to discover if the observed variables can be explained largely or entirely in terms of a smaller number of variables called components. After recode of reversed items, a principal component analysis was conducted and rotated. Since we stated that the subsidiary components of the gender awareness model are intertwined we used an Oblimin (oblique) rotation. Several extractions were tested. Items with low loadings (<0.3) on either one of the components were identified and discarded later.

Next, various characteristics were computed for the subscales. To establish reliability, items with a corrected item-total correlation lower than .3 were identified. Skewing tends to reduce the reliability of the test and skewness indicates violations of the assumption of normality that underlies other tests such as t tests and correlation coefficients. However paradoxically, a distribution with a asymmetric tail reflects higher gender awareness in students and this is a desirable outcome; ultimately, we aim for as much gender awareness in students as possible. Besides, the identification of radicals provided by a single item may be throwing away important discrimination power (Ray 1985). Proof of the

Table 1 Correlations gender awareness subscales and patient centeredness for male students.

	GRI-patient (N=111)	GRI-doctor (N=111)	Ideal physician (N=102)
GS	−.05	.02	.23*
	.29	.41	.01
GRI-patient		.58*	−.14
		.00	.08
GRI-doctor			−.06
			.27

*$p<.01$ (one-tailed)

value of skewed items is offered by their high correlations with the total score on the scale. Items with a low item-total correlation and low factor-loadings were removed and no consequential departures of normality were identified. Bivariate correlations are conducted between the finale subscales. Attention was paid to reduce redundancy and to optimizing reliability and content validity. Pearson product-moment correlations and multivariate analyses of variance (MANOVA) were computed to index associations between the two affective aspects of gender awareness as well as to test our hypotheses.

Results

Scale Components and Data Reduction

Without extraction 21 components were identified with eigenvalues>1 which is one fourth of the original variables (82 items). Usually, this is one third (ten Berge and Siero 1994). Next, several extractions (two, three, four and five) were examined as regards eigenvalues (>2) and component content. Exploration and interpretation of several models indicated that we had to choose between two or three components. First, two factors were extracted with eigenvalues of 15.4 and 5.9 and rotated. Since we expected a correlation between the subsidiary components of the gender awareness model we used an Oblimin (oblique) rotation. Most items of the GS-subscale loaded >.3 on component 2 and items of both GRI-subscales loaded >.3 on component 1 supporting a differentiation between these two components. Especially, the gender role ideology items that did not load sufficiently on their own factor were items that had to be scored in reverse. Obviously, gender stereotypes could not be reversed in our scale to avoid response sets, for example stating that men are whiners or that female doctors are more efficient than male doctors. To establish whether a three-factor solution—with eigenvalues for the first component 15.4 for the second component 5.9

and for the third component 3.8—might explain more variance, we extracted three factors. Results showed 18% explained variance on the first component, 7% explained variance on the second component and 5% on the third component. The three-factor rotated (oblique) solution exposes that gender role ideology towards patients may conceptually be distinguished from gender role ideology towards doctors, although the two-factor solution showed that component 1 and 2 share common ground. The items stated in reverse again did not load as we expected. Items with specific purposeful content for instance about domestic violence did not correlate sufficiently with either of the components. Bivariate correlations between the subscales are conducted for men and women separately and presented in Tables 1 (men) and 2 (women). Results show that both GRI-patient and GRI-doctor subscales are highly and significantly correlated although the correlation between both GRI-subscales was slightly lower for women ($r=0.53$, $p<.000$ than for men $r=.58$, $p<.000$). Again, this suggests evidence for a common underlying aspect 'gender stereotypes in the doctor–patient relationship'. For factor loadings on the three-factor solution, means and standard deviations of the final subscales' items see Table 3.

Reliability

For reliability analysis, items that were scored in reverse were recoded. Reliability scores of the scales—including all 82 items—measured by Cronbach's α were for the GS-scale $\alpha=.80$ (24 items), the GRI-patient scale $\alpha=.86$ (36 items) and for the GRI-doctor scale $\alpha=.73$ (22 items). To compose the final scales, items with low factor loadings and low corrected item-total correlations ($<.3$) were discarded. Next, items containing statements about gender dyads that included both patient as well as doctor gender roles were removed since we had chosen—based on the PCA—to distinguish gender role ideology towards patients from gender role ideology towards doctors. Furthermore, items

Table 2 Correlations gender awareness subscales and patient centeredness for female students.

	GRI-patient (N=274)	GRI-doctor (N=274)	Ideal physician (N=223)
GS	−.11*	.04	.19**
	.03	.26	.00
GRI-patient		.53**	−.11*
		.00	.04
GRI-doctor			−.09
			.08

*$p<.05$ (one-tailed)
**$p<.01$ (one-tailed)

Table 3 Comparison of male and female medical students on single items.

	Male (*n*=113), mean (SD)	Female (*n*=279), mean (SD)	*F* (1, 373)
Gender sensitivity Do you think that			
Addressing differences between men and women creates inequity in health care (.47)	3.6 (1.05)	3.7 (.91)	.67
Physicians' knowledge of gender differences in illness and health increases quality of care (.40)	3.96 (.81)	4.05 (.67)	1.75
Physicians should only address biological differences between men and women (.43), R*	3.65 (1.05)	3.55 (1.00)	.64
In non-sex-specific health disorders the sex/gender of the patient is irrelevant (.54), R	3.30 (1.05)	3.42 (1.00)	1.03
A physician should confine as much as possible to medical aspects of health complaints of men and women (.50), R	3.09 (.93)	3.31 (.82)	4.14*
Physicians do not need to know what happens in the lives of men and women to be able to deliver medical care (.43), R	3.86 (.73)	3.97 (.66)	2.27
Differences between male and female physicians are too small to be relevant (.47), R	3.38 (.96)	3.28 (.92)	.69
Especially because men and women are different, physicians should treat everybody the same (.45), R	3.59 (.82)	3.64 (.76)	.27
Physicians who address gender differences are not dealing with the important issues (.62), R	3.78 (.83)	3.84 (.67)	.60
In communicating with patients it does not matter to a physician whether the patients are men or women (.54), R	3.47 (1.04)	3.46 (.94)	.01
In communicating with patients it does not matter whether the physician is a man or a woman (.48), R	3.13 (1.10)	3.14 (1.02)	.01
Differences between male and female patients are so small that physicians can hardly take them into account (.60), R	3.82 (.70)	3.78 (.61)	57
For effective treatment, physicians should address gender differences in etiology and consequences of disease (.41)	3.65 (.85)	3.79 (.63)	1.9
It is not necessary to consider gender differences in presentation of complaints (.53), R	3.83 (.76)	3.83 (.67)	.00
Gender role ideology towards patients Do you think that			
Male patients better understand the approach of physicians than female patients (.45)	2.39 (.81)	1.89 (.66)	37.26***
Female patients compared to male patients have unreasonable expectations of physicians (.62)	2.84 (.89)	2.31 (.83)	32.51***
Women more frequently than men want to discuss problems with physicians that do not belong in the consultation room (.64)	3.12 (.86)	2.84 (.90)	8.27**
Women expect too much emotional support from physicians (.61)	2.94 (.81)	2.78 (.83)	3.22*
Male patients are less demanding than female patients (.61)	2.86 (.82)	2.40 (.79)	25.69***
Women are larger consumers of health care than is actually needed (.63)	2.98 (.80)	2.62 (.79)	17.09***
Men do not go to a physician for harmless health problems (.69)	3.32 (.86)	3.12 (.90)	3.58*
Medically unexplained symptoms develop in women because they lament too much about their health (.63)	2.98 (.86)	2.62 (.76)	16.29***
Female patients complain about their health because they need more attention than male patients (.51)	2.85 (.78)	2.34 (.78)	32.57***
It is easier to find causes of health complaints in men because men communicate in a direct way (.41)	2.85 (.88)	2.52 (.84)	10.87***
Men appeal to health care more often with problems they should have prevented (.30)	2.96 (.75)	2.72 (.79)	7.07**
Gender role ideology towards doctors Do you think that			
Male physicians put too much emphasis on technical aspects of medicine compared to female physicians (.40)	3.31 (.82)	2.95 (.91)	13.54***
Female physicians extend their consultations too much compared to male physicians (.59)	2.73 (.82)	2.49 (.79)	6.51**
Male physicians are more efficient than female physicians (.57)	2.67 (.78)	2.29 (.75)	18.01***
Female physicians are more empathic than male physicians (.47)	3.15 (.78)	3.03 (.79)	1.93

Table 3 (continued)

	Male (n=113), mean (SD)	Female (n=279), mean (SD)	F (1, 373)
Female physicians needlessly take into account how a patient experiences disease (.55)	3.08 (.86)	3.11 (.90)	.08
Male physicians are better able to deal with the work than female physicians (.47)	2.75 (.89)	2.19 (.79)	36.91***
Female physicians are too emotionally involved with their patients (.55)	2.93 (.84)	2.68 (.78)	6.60**

Response varies from 1=totally disagree to 5=totally agree. Factor loadings in parentheses behind the items
R Scored in reverse
*p<.05 (one-tailed)
**p<.01 (one-tailed)
***p<.001 (one-tailed)

that were redundant because of their content were also removed.

Internal consistency reliability estimate for the remaining 14-item measure of GS-scale was α=.80 (n=385). Internal consistency reliability estimate for the remaining 11-item GRI-patient subscale was α=.85 (n=382) and of the remaining 7-item measure of the GRI-doctor subscale α=.80 (n=383).

Validity

Content validity was substantiated by three components and next, we looked at construct validity. This was established by testing three hypotheses. First, we assumed scores on GS and GRI to be negatively correlated, revealing that sympathetic attitudes towards the impact of gender in medical practice are related to less gender stereotyping. One significant—but very low—correlation was found between GS and the GRI-patient subscale for female students only (Table 2). In general, findings support the hypothesis that the components contribute uniquely to the construct of gender awareness. However, they also reveal that students may be sympathetic towards specific needs and requirements for male and female patients, and yet hold negative gender stereotypes. The hypothesis that gender role ideology and gender sensitivity are correlated was not supported by these results.

Second, we hypothesized that student gender played a role in gender awareness with female students being more gender aware. To compare male and female students, multivariate analysis of variance (MANOVA) was used on single items (Table 3) as well as on average subscale scores (Table 4). Hypotheses are tested one-tailed. As regards single items, assumptions of homogeneity of variance are violated which was not the case for subscale means. MANOVA is quite robust against violations of this assumption when groups' sample sizes are equal which is not the case in our sample (110 male students, 265 female students). Nevertheless, results show that male and female students differ significantly in gender awareness when all items are tested (F(32,

342)=3.452, p<.001) and for subscale means (F(3, 381)= 13.851, p<.001). Subsequent univariate tests are conducted (Tables 3 and 4). Male and female students differ significantly and largely in their attitudes towards patients, as well as towards doctors with male students holding stronger gender stereotypes. We cannot state clearly that female students are more gender aware because male and female students are equally sensitive to gender concerns (GS). Our second hypothesis is therefore only partly confirmed.

Third, we hypothesized that gender awareness as a concept is related to patient centeredness in medical students. We expected a positive correlation of GS with patient centeredness and negative correlations of measures on the GRI-subscales with patient centeredness. Analyses are only conducted on results of our shift of first-year (n=217) and sixth-year medical students (n=117), as they had received both the gender awareness scale and the Ideal Physician Scale. Results showed that female and male students' patient centered attitudes correlated significantly (Tables 1 and 2) and very low with the GS scale and that female students' patient centered attitudes correlated significantly and negatively with the GRI-patient subscale (Table 2). Patient centeredness did not correlate significantly with gender role ideology towards doctors. Significant but low correlations between patient centeredness and gender awareness emerge from our

Table 4 Gender differences in GS, GRI-P and GRI-D.

Effect	Male students, mean (SD)	Female students (M, SD)	F(1, 383)
GS	3.6 (.45)	3.6 (.44)	.649
GRI-P	2.9 (.50)	2.56 (.50)	40.583*
GRI-D	2.94 (.55)	2.68 (.55)	18.805*

Response varies from 1=totally disagree to 5=totally agree
GS Gender sensitivity, *GRI-P* gender role ideology towards patients, *GRI-D* gender role ideology towards doctors
*p<.001 (one-tailed)

data. Our hypothesis is therefore only partly supported. We conclude that patient centeredness and gender awareness are related but are different concepts.

Discussion

Our study provides evidence for three different components of gender awareness interpreted as gender sensitivity, gender role ideology towards patients and gender role ideology towards doctors. The gender sensitivity scale and both gender role ideology subscales show sufficient reliability.

No strong correlation was found between gender sensitivity and gender role ideology. Students may feel sympathetic towards specific requirements and needs of male and female patients, and yet agree with negative gender stereotypes. The high and strong correlation between both gender-role ideology subscales and the support for two components suggest common ground for gender stereotypes towards physicians and patients. Interestingly, extracting three components indicated a distinction between both subscales. Although gender is a communal aspect, gender stereotypes inform patient stereotypes and doctor stereotypes differently. This is consistent with Risberg and colleagues who found that medical teachers perceive patient gender as of more importance in health care than physician gender (Risberg et al. 2003).

Male students hold stronger gender stereotypes than female students, which is consistent with other research findings (e.g. Salgado et al. 2002). The difference between the genders regarding gender role ideology may best be described as 'outspokenness'. Female students state more clearly that they disagree with patient gender stereotypes. Male students answers are more neutral, and their answers fall into the category 'agree nor disagree.'

Patient centeredness in students is significantly correlated to less gender stereotyping and to higher gender sensitivity. However, correlations are low which suggests that patient centeredness is a necessary but insufficient prerequisite for gender awareness. Female students in general have shown to be more patient centered than male students (Verdonk et al. 2007).

Important findings from this study represent the good psychometric qualities of the attitudinal scales of the Nijmegen Gender Awareness in Medicine Scale (N-GAMS). To establish validity, an adequate number of items were tested and the intelligibility and feasibility of the scale was pilot tested. Item analysis procedures, reliability studies, and validity analysis by means of principal components analysis, correlation coefficients, and tests demonstrating differences between differential groups were conducted. It should be emphasized though that our results apply to the Dutch version of the scale. Our study offers initial support for a

gender awareness model embracing the two attitudinal aspects gender sensitivity and gender-role ideology as suggested by King et al. (2002) and Salgado et al. (2002). Nevertheless, our results are not totally in line with their findings as these authors found a correlation of .53 between gender sensitivity and gender-role ideology. Although we used the same concepts, we operationalized both affective components differently. In the Gender Awareness Inventory–Veterans Affairs (GAI–VA), gender sensitivity is directed towards gender-specific services for women of the US veteran population, which traditionally consists of men. In the current study, items were constructed to measure whether medical students' are sensitive to the impact of gender in medical practice and are sympathetic towards gender concerns. Gender-role ideology has also been differently operationalized in the current study because we extended the scale with stereotypes toward male patients as well as with a subscale consisting of gender stereotypes toward male and female physicians.

Gender awareness is a necessary prerequisite for gender-specific health care and scores on the N-GAMS do offer an insight in students' attitudes. The instrument may be used for research purposes to evaluate graduate courses or postgraduate and specialist trainings. Moreover, it may offer a baseline assessment to those who are implementing a gender perspective in medical education as well as an evaluative assessment after the integration of gender in medical curricula.

The following issues concerning construct validity need further investigation since some of our predictions did not work. We did not provide evidence for a correlation between gender sensitivity and both gender role ideology subscales and gender differences were not apparent on all subscales. We operationalized gender sensitivity as students' attitudes towards gender concerns in health care thereby leaving structural inequalities implicit. However, gender sensitivity is not just the ability to perceive and consider differences, but incorporates the ability to perceive inequalities as well (WHO 1998; Risberg et al. 2003). Egalitarian attitudes, accepting that men and women are equal, as well as benevolent sexism: the belief that women deserve special treatment, may both underlie a higher score on the gender sensitivity subscale in the N-GAMS. Future research has to identify whether the gender sensitivity subscale taps egalitarian attitudes. As regards group differences, a possible explanation is that we did not form the right hypotheses. For instance, a main effect for age instead of for gender may exist in gender sensitivity or a gender-age interaction effect may exist. Further studies have to point out whether this is the case. Furthermore, medical students' differences between pre- and posttest after a gender awareness raising course may support the construct validity of the N-GAMS. The N-GAMS needs further validation with confirmatory factor analysis. Some authors

evaluate Principal Component Analysis less suitable for scale construction although it is widely used (Preacher and MacCallum 2003). And finally, our subjects-to-items ratio was at borderline level (4.8) to conduct a factor analysis, which is preferred on a large sample.

Concerning gender role ideology, the following issues need further elaboration. First, there may be a possible kernel of truth in stereotypes, which makes them hard to distinguish from an accurate perception of reality, even if that reality is the result of stereotypes. For instance, Bylund and Makoul (2002) exposed that in consultations, female physicians tend to communicate higher degrees of empathy by smiling, nodding or eye contact. However, patients expect and receive more understanding and empathy from female than from male doctors (Bylund and Makoul 2002; Arouni and Rich 2003) and physician gender preferences occur more often and are stronger in women (e.g. Kerssens et al. 1997). Ridgeway and Correll (2004) state that gender operates as an implicit present background identity—like a ghost—in social relational contexts in which people hold reciprocal expectations about gender stereotypes of the other actors. In short, gender dyads and gendered expectations are inseparable and play a role. Medical students' expectations about gender stereotypes of patients toward doctors may be measured in the future. Third, a three factor solution provided evidence for the statement that gender role ideology is directed towards specific domains and subgroups, which is consistent with other research findings (e.g. Fiske et al. 1999; Anderson and Johnson 2003; Cuddy et al. 2004). Besides, it is consistent with Risberg's findings that physicians find gender more important in contact with patients than with students, colleagues and staff (Risberg et al. 2003). Gender stereotypes toward specific roles of men and women patients or doctors may also have an impact on health and health care. Gender is not about fixed categories but subject to change and negotiation (Risberg et al. 2003). In the future, items measuring other attitudes towards other minority or stereotyped (sub)groups, such as migrants, disabled or poor people, or items concerning gender inequalities and gender stereotypes in other domains such as in workplace issues or care taking may be incorporated.

It is widely held that gender is constructed, 'doing gender', in daily interaction (West and Zimmerman 1987). In analogy to 'doing gender', gender awareness is not just something that future doctors *are*, it is something that they do. The main contribution of this study is that the N-GAMS offers a quantitative contribution to measuring and creating gender awareness as a means towards social change. In medical education, gender awareness can and must be done.

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