

Impact of previously unrecognized benign prostatic hyperplasia on the daily activities of middle-aged and elderly men

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SUMMARY. To assess the importance of benign prostatic hyperplasia on activities of daily living, a cross-sectional survey of 1627 men aged 40–79 years (representing a 65% response rate) registered with two health centres in central Scotland was carried out, using a urinary symptom questionnaire and uroflowmetry to identify men more likely to have benign prostatic hyperplasia. The condition was defined as a prostate gland of more than 20 g in the presence of symptoms of urinary dysfunction and/or a peak flow rate of less than 15 ml s⁻¹, without evidence of malignancy. Transrectal ultrasonography was used to measure the volume (and by inference weight) of prostate glands. A total of 410 men satisfied the criteria for benign prostatic hyperplasia. Overall, 51% of men with benign prostatic hyperplasia reported interference with at least one of a number of selected activities of daily living as a result of urinary dysfunction, compared with 28% of men who did not have this condition. In 17% of men of working age (40–64 years) with benign prostatic hyperplasia, this interference occurred most or all of the time for at least one activity of daily living compared with only 3% of men in the same age group who did not have this condition.

If the criteria of unmet need for treatment of prostatic hyperplasia constitutes interference by urinary dysfunction most or all of the time in at least one activity of daily living, then the findings of this survey suggest that a substantial number of middle aged and elderly men living in the United Kingdom may be in need of assessment and treatment for this condition.

Keywords: prostate diseases; urination disorders; health status; men's health; lifestyle.

Introduction

ALTHOUGH benign prostatic hyperplasia has been the most frequent reason for elderly men undergoing surgery for some time,¹ it is only recently that the high prevalence of the condition in apparently well men has been described.² Little is known about the natural history of benign prostatic hyperplasia

in the community; previous studies have been concerned with case fatality following prostatectomy,³ rates of repeat prostatectomy,⁴ postoperative symptoms and uroflowmetry.⁵ The assessment of quality of life is now recognized as an important component of the natural history of chronic disease.⁶ Fowler and colleagues assessed the quality of life in men with benign prostatic hyperplasia following surgery.⁷ They demonstrated that patients with similar levels of urinary symptoms reported considerable differences in the extent to which they were bothered by their symptoms. They did not, however, relate outcome following prostatectomy to specific activities of daily living which could be affected by urinary dysfunction. The aim of this study was to investigate the impact on activities of daily living among middle-aged and elderly men living in the community, of benign prostatic hyperplasia not previously brought to the attention of health services.

Method

All men aged 40–79 years on 1 January 1990, registered at the health centres serving the populations of Bridge of Allan and Bannockburn in central Scotland were considered for the study. Bridge of Allan is a predominantly middle class (social classes 1–3N) dormitory town with a population of 4500, situated to the north of Stirling. Bannockburn is a town located to the south-east of Stirling, centred on an ex-mining village with a predominantly working class population (social classes 4 and 5) of 8800. Each town is served by a single, purpose built health centre. The health centres were chosen for the survey because the population of men aged 40–79 years registered with them had a similar age distribution to all men in Scotland in this age range. Overall consultation rates for all age groups and both sexes of patients registered at the health centres were similar to those reported in the third national morbidity study.⁸

Review of medical records at the health centres or personal contact revealed that 219 of the 2716 men aged 40–79 years (8.1%) were not eligible to participate in the study because of previous prostatectomy (97 men), urethral or bladder surgery (12), on waiting list for prostatectomy (11), bladder neck contracture or urethral stricture (10), prostate cancer (six), the presence of supraspinal or spinal cord lesions (44), a history of pelvic radiation therapy (five), presence of a colostomy (five) or on ethical grounds, mainly terminal cancer (29). The remaining 2497 men were invited by a personal letter from their general practitioner to see a research nurse in their health centre or receive a home visit — 1627 men (65.2%) agreed to participate in the study.

The survey population had a larger proportion of men in higher social classes than Scotland as a whole (41% versus 28% in social classes 1 and 2), together with higher proportions of men who lived in their own homes, had access to a home telephone and owned cars than reported for the population of either Scotland or England in the 1981 census. The mean age of respondents and non-respondents was significantly different (55.5 years and 53.7 years, respectively; two sample *t* test, *t* = 8.96, *P* < 0.001). A review of medical records found that respondents had a significantly higher consultation rate with their general practitioner over the previous year than non-respondents

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(mean of 3.2 versus 2.1 contacts; Wilcoxon rank sum test, $P < 0.01$). Respondents also had a significantly higher mean number of hospital admissions during the previous five years (0.5 versus 0.3 admissions; Wilcoxon rank-sum test, $P < 0.01$).

Respondents completed a self-administered urinary symptom questionnaire based on the questionnaire devised by Fowler and colleagues which recorded the presence of nocturia, hesitancy, urgency, straining, intermittency, dribbling, incomplete bladder emptying and weak urinary stream force during the previous month, on a discrete scale of zero (no symptoms present) to six (always present).⁷ At the same time, the men were invited to complete a lifestyle questionnaire (closed questions) enquiring about how bothersome they had found the urinary symptoms in the past month on a scale of zero (not bothersome at all) to six (extremely bothersome). The men were asked whether they had consulted their general practitioner during the previous year about bothersome symptoms, whether urinary dysfunction had interfered with activities of daily living, and about any perceived changes in urinary symptoms over the past year and how this related to selected activities of daily living. The questions about activities of daily living were constructed from discussions with patients with benign prostatic hyperplasia during the pre-testing phase of the questionnaire validation process.⁹ Information on psychological well being, worries and sexual satisfaction was also obtained and will be reported separately. Of the 1627 respondents 1385 (85.1%) completed at least part of the lifestyle questionnaire. The peak urinary flow rate was recorded for each man seen at the health centre or on a home visit using a Urolyn 1000[®] uroflowmeter (Dantec), provided he voided at least 150 ml. No therapeutic stimulus to voiding was used.

Prostatic diagnostic workup

Men were invited by the research nurse to attend Stirling Royal Infirmary for a prostatic diagnostic workup if they had a score on the urinary symptom questionnaire of 11 or more or a peak urinary flow rate of less than 15 ml s⁻¹ or both. Men who failed to void at least 150 ml on three separate occasions were also invited to attend. Details of the prostatic workup carried out during the hospital attendance, which included transrectal ultrasonography for assessment of the volume (and by inference weight) of the men's prostate gland have been described elsewhere.² Virtually all ultrasound examinations of the prostate were carried out by one observer (GC); a high level of intra-observer agreement in measuring prostate volume had previously been established (Collins GN, *et al.*, personal communication). Of the 561 men who satisfied the criteria for the prostatic workup 492 (87.7%) attended Stirling Royal Infirmary. Of the 561 men, 363 had a peak urinary flow rate of less than 15 ml s⁻¹ (86.8% attended), 122 had a symptom score of 11 or more (94.3% attended), 52 satisfied both criteria (92.3% attended) and 24 failed to void at least 150 ml of urine on three separate occasions (58.3% attended). Of the 492 men who attended, 10 did not have transrectal ultrasonography — one man refused, two had anal stenosis and seven could not tolerate the procedure. Seventeen of the 482 men who had ultrasonography were found to have prostate cancer, either through biopsy or following prostatectomy and they were excluded from the study.

On the basis of autopsy studies which collated weights of normal prostate glands without evidence of hyperplasia,¹⁰ benign prostatic hyperplasia was defined as a prostate gland of more than 20 g in the presence of symptoms of urinary dysfunction (a symptom score of 11 or more and/or a peak urinary flow rate of less than 15 ml s⁻¹, or failure to void 150 ml on three separate occasions), with no known history or radiological or histological evidence of prostatic malignancy. Of the men referred to Stirling Royal Infirmary 410 satisfied these criteria — 255 were referred

with a reduced peak urinary flow rate, 101 had a symptom score of 11 or more, 42 had both a high symptom score and a reduced urinary flow rate, and the remaining 12 men failed to void 150 ml of urine on three separate occasions.

Results

The prevalence rate for benign prostatic hyperplasia in men aged 40–79 years was 255 per 1000 men in the community (410/1610) (95% confidence interval (CI) 233 to 276). The prevalence in men aged 40–64 years was 202 per 1000 (95% CI 179 to 224) and in men aged 65–79 years, 428 (95% CI 378 to 478). Thus, benign prostatic hyperplasia was present in one in every five men of working age and two in every five men over the age of retirement. This does not take into account the 69 men who were seen in the community and satisfied the criteria for the prostatic workup but did not attend and thus these prevalence rates may be underestimates.

Urinary symptoms

Of the 1610 men participating in the study 168 had a urinary symptom score of 11 or more (10.4%), but only 4.2% had a symptom score greater than 15. The percentage of men with urinary symptom scores of 11 or more rose from 4.2% in the 519 men aged 40–49 years, to 9.2%, 15.2% and 20.8% in men aged 50–59 years ($n = 501$), 60–69 years ($n = 407$) and 70–79 years ($n = 183$), respectively. The percentage of men suffering individual symptoms varied from 11.3% of men who reported straining when urinating during the past month, to 48.4% of men who reported a feeling of urgency (Table 1). The symptoms which most men found bothersome were dribbling and urgency. Calculation of Spearman correlation coefficients revealed only weak associations between the level of bothersomeness reported for any of the urinary symptoms and either age or prostatic weight in the 410 men with benign prostatic hyperplasia. The strongest association between peak urinary flow rate and bothersomeness of urinary symptoms in these men was a negative correlation with intermittency while urinating (Spearman rank correlation coefficient = -0.21 , $P < 0.001$). Only a small percentage of men had consulted a doctor about their bothersome urinary symptoms during the previous year (Table 1).

Extent of bothersome symptoms

Table 2 presents the proportions of men reporting their urinary symptoms to be bothersome, according to whether or not they satisfied the criteria of benign prostatic hyperplasia. A higher percentage of men who had benign prostatic hyperplasia reported all symptoms as bothersome during the past month than men who did not have this condition. Nocturia twice or more, hesitancy, straining, intermittency, and weak stream force were all reported as bothersome by approximately three times the percentage of men who had benign prostatic hyperplasia compared with those who did not. Overall, 77.2% of 356 men with benign prostatic hyperplasia reported at least one bothersome urinary symptom compared with 47.2% of 978 men who did not have the condition. This relative difference increased as the number of urinary symptoms reported to be bothersome increased — 44.7% of 356 men with benign prostatic hyperplasia reported at least four urinary symptoms to be bothersome, compared with 15.6% of 978 men without the condition.

Activities of daily living

Table 3 summarizes the extent to which urinary symptoms interfered with selected activities of daily living. In all aspects of daily routine which were examined, the percentage of men reporting interference was higher among men with benign pro-

Table 1. Percentage of men reporting presence of urinary symptoms during the past month, finding symptoms bothersome in past month and consulting a doctor during the past year about symptoms found bothersome.

Symptom	% of men		
	Reporting symptom (<i>n</i> = 1610)	Finding symptom bothersome (total no. answering question)	Finding symptom bothersome who consulted a doctor (total no. answering question)
Nocturia twice or more	33.5	19.0 (1344)	9.4 (255)
Hesitancy	14.2	16.3 (1334)	4.1 (217)
Urgency	48.4	28.3 (1326)	4.5 (375)
Straining	11.3	12.8 (1340)	4.1 (171)
Intermittency	28.0	20.4 (1345)	4.7 (275)
Dribbling	45.4	30.7 (1338)	6.3 (411)
Incomplete bladder emptying	22.5	16.6 (1337)	6.8 (222)
Weak stream force	30.1	19.6 (1333)	4.2 (261)

n = number of men participating in study.

static hyperplasia than among those without. Approximately one in three men with benign prostatic hyperplasia reported limiting their intake of fluid before going to bed or before travelling, or avoiding places which may not have a toilet at least some of the time. The impact of benign prostatic hyperplasia on other aspects of daily living was lower, but still resulted in one in every eight men limiting outdoor sporting activities and one in every seven men restricting visits to the cinema, theatre or church, at least some of the time. Overall, 50.6% of 314 men with benign prostatic hyperplasia reported interference some of the time with at least one activity compared with 28.2% of 934 men without the condition. This relative difference widened as interference with a larger number of activities was considered — limitations in at least four activities were reported by 19.7% of 314 men with benign prostatic hyperplasia compared with 6.7% of 934 men without the condition. Approximately one in six men with benign prostatic hyperplasia reported that urinary dysfunction interfered with their daily routine most or all of the time (15.6% of 314). An even more striking finding was that nearly one in every five men (17.5% of 189) of working age (40–64 years) with benign prostatic hyperplasia indicated that urinary dysfunction interfered with at least one of the selected activities of daily living most or all of the time, compared with 3.1% of the 778 men in this age group who did not have the condition.

The men were also asked about changes in their urinary function over the past year, as it affected them at work, at leisure around the home and in leisure activities away from the home. Among men of working age (40–64 years), 20.0% of the 190 with benign prostatic hyperplasia reported a worsening in their work situation owing to urinary dysfunction compared with only

3.1% of the 776 men of working age who did not have the condition. A higher percentage of men of working age with benign prostatic hyperplasia also reported a worsening in their leisure activities, both around the house and away from home (15.6% of 211 and 14.8% of 210, respectively), compared with the men of retirement age with benign prostatic hyperplasia (10.1% of 148 and 8.2% of 147, respectively).

Discussion

Previous community surveys have estimated the prevalence of prostatism through urinary dysfunction assessed by questionnaire, uroflowmetry and clinical assessment.^{11,12} The use of transrectal ultrasonography in a community survey to obtain an objective measurement of the volume, and by inference the weight, of the prostate gland, has enabled more information to be obtained about the natural history of benign prostatic hyperplasia. The criteria selected to define benign prostatic hyperplasia clearly affect the prevalence of the condition which has been found in this survey. In the absence of any previously agreed definition or even universally applied clinical guidelines of what constitutes benign prostatic hyperplasia arbitrary criteria have been used to identify cases. The criteria used are based on a combination of information derived from autopsy studies which showed that the mean weights of normal prostate glands did not rise above 20 g with increasing age in men where there was no evidence of hyperplasia;¹⁰ the findings of Jensen and colleagues that men undergoing prostatectomy for benign prostatic hyperplasia with a pre-operative peak urinary flow rate of greater than 15 ml s⁻¹ had a significantly lower subjective postoperative success rate than patients with a lower flow rate;¹³ and the observa-

Table 2. Percentage of men finding symptoms bothersome in past month by whether or not they had benign prostatic hyperplasia (BPH); mean rating of bothersomeness on scale of zero to six.

Symptom	BPH present		BPH absent	
	% of men finding symptom bothersome (<i>n</i>)	Mean rating of bothersomeness ^a (SD)	% of men finding symptom bothersome (<i>n</i>)	Mean rating of bothersomeness ^a (SD)
Nocturia twice or more	36.8 (356)	2.2 (1.4)	12.6 (988)	1.7 (1.1)
Hesitancy	31.7 (356)	1.8 (1.0)	10.6 (978)	1.4 (0.9)
Urgency	42.5 (353)	2.4 (1.5)	23.1 (973)	1.7 (1.2)
Straining	26.6 (353)	1.9 (0.9)	7.8 (987)	1.4 (0.9)
Intermittency	40.5 (358)	2.0 (1.2)	13.2 (987)	1.3 (0.7)
Dribbling	46.4 (358)	2.2 (1.4)	25.0 (980)	1.6 (1.1)
Incomplete bladder emptying	31.7 (356)	2.1 (1.3)	11.1 (981)	1.5 (1.1)
Weak stream force	40.2 (348)	1.7 (1.1)	12.3 (985)	1.4 (0.9)

n = total number answering question. SD = standard deviation. ^aRange = 1–6.

Table 3. Percentage of men reporting that urinary symptoms had interfered with activities of daily living during the past month by whether or not they had benign prostatic hyperplasia (BPH).

	% of men (total no. answering question)			
	Daily living affected at least some of the time		Daily living affected most or all of the time	
	BPH present	BPH absent	BPH present	BPH absent
Limits fluids before travel	29.9 (345)	13.4 (974)	7.5 (345)	1.4 (974)
Limits fluids before bedtime	34.7 (349)	18.4 (978)	10.3 (349)	1.5 (978)
Cannot drive for two hours	21.0 (334)	8.0 (966)	5.7 (334)	0.9 (966)
Not getting enough sleep at night	27.1 (339)	10.3 (969)	7.4 (339)	2.3 (969)
Limits going to places without toilets	32.4 (340)	13.2 (969)	7.9 (340)	1.0 (969)
Limits playing outdoor sports	12.8 (328)	6.2 (954)	2.7 (328)	0 (954)
Limits going to cinema, theatre, church etc.	15.1 (338)	6.7 (964)	3.3 (338)	0.5 (964)

tion of Fowler and colleagues that the improvement in quality of life following prostatectomy for benign prostatic hyperplasia was greater in men with severe symptoms (a score of 13 or higher on their symptom questionnaire) than in men with less severe symptoms.⁷

The major impact of benign prostatic hyperplasia on activities of daily living likely to be influenced by urinary dysfunction has not been reported previously. Half of all men with benign prostatic hyperplasia in this study reported interference with at least one activity. An even more striking finding was that nearly one in five men of working age with benign prostatic hyperplasia (17%) reported that urinary dysfunction interfered with at least one of their daily living activities most or all of the time. This degree of interference was experienced by virtually none of the men in this age group without benign prostatic hyperplasia (3%). Such limitations may have a considerable impact on the working practices and performance of the affected men. These men, and other members of their family, may also be suffering a reduction in their quality of life in other respects, for example, by having to avoid places without toilets, by not enjoying the freedom to choose from a range of outdoor sports, and not being able to visit the cinema or theatre.

The high prevalence of urinary symptoms in this population has previously been reported.² Extending the size of the population confirms these findings and has allowed estimates of the presence of urinary symptoms and the extent to which they are found to be bothersome. Not only did more than three quarters of all men (77%) with benign prostatic hyperplasia report at least one symptom to be bothersome, but nearly half (45%) reported at least four urinary symptoms as being bothersome during the past month. For all urinary symptoms studied the percentage of men finding symptoms bothersome was higher among men with benign prostatic hyperplasia than without. Despite this, a low proportion of all men affected by specific bothersome urinary symptoms had consulted their general practitioner about these symptoms during the previous year. A Danish study has reported on the failure to consult a doctor among all men aged 60–79 years with voiding difficulties.¹⁴ The study presented here has demonstrated an even higher proportion of men not consulting their doctor. This could be because bothersome urinary symptoms are perceived by men to be part of the normal ageing process. In addition, the stigma associated with urinary symptoms such as dribbling and urgency may be the reason why men do not raise the issue of bothersome symptoms with their doctor. The findings could also reflect the stoicism of the Scots who may be prepared to accept a high level of interference with activities of everyday living from urinary dysfunction. Finally, apprehension about requiring surgical intervention to alleviate the symptoms may contribute to the failure of men to consult their doctor. Further investigation of these possible influences on non-consultation is required before any programme of health education can be considered which would encourage a higher proportion of men with bothersome urinary symptoms to come forward for attention at an earlier stage in the natural history of benign prostatic hyperplasia.

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