

Testosterone replacement therapy – perceptions of recipients and partners

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Background. The androgenic hormones are important determinants of sexual behaviour in men. Testosterone replacement is important treatment for pituitary disease to maintain normal functioning. Although the physical effects of testosterone replacement have been well documented, little is known about the effects on relationships, particularly from the point of view of the sexual partners of men receiving testosterone replacement.

Aims. This paper reports a study exploring the perceptions of testosterone replacement on well-being and sexual functioning.

Methods. Semi-structured interviews were conducted with five men receiving testosterone implants (recipients), their permanent partners, and five recipients without partners. Recipient serum testosterone concentration was measured at 0, 1 and 4 months after testosterone implantation.

Results. The three groups reported similar effects of testosterone on well-being and sexual functioning. Recipient and partner ratings were also similar. Strength was less affected by decreasing testosterone concentration than energy in men with partners, but both strength and energy declined in men without partners. Decreased testosterone levels had a statistically significantly different effect on libido at time zero between men with and without partners ($P < 0.015$) and on ability to sustain an erection, but the ability to achieve an erection persisted over the 6 months in both male groups. Intercourse frequency increased from once per week at time 0 to ≥ 3 per week between 1 and 4 months after implant in men with partners. There were important effects of testosterone deficiency on general and sexual relationships, and these differed between men with partners and those without.

Conclusions. Testosterone has important physical and psychological benefits that may be related to the age at which testosterone replacement commences and the indications for its use. The small sample size may limit the ability to generalize the findings outside the study.

Keywords: testosterone implants, recipients, partners, perceptions, sexuality, nursing

Background

The androgenic hormones are important determinants of sexual behaviour in men (Wilson & Griffiths 1980, Griffin & Wilson 1985). Androgen deficiency can occur as a result of disease processes or be present from childhood. The effects of androgen deficiency differ between individual men. In many cases sexual parameters can be restored by hormone replacement (Salmimies *et al.* 1982, Handelsman *et al.* 1990). Hormonal, psychological and lifestyle factors such as smoking, alcohol, stress, nutritional status, cultural norms, the relationships of individual men and the impact on perceptions of sexuality are important considerations when assessing sexual health and identifying sexual dysfunction.

Testosterone replacement therapy has been used clinically since the 1930s (Conway *et al.* 1988). Over the years a variety of testosterone formulations have been administered orally, by intramuscular injection or implanted subdermally. Testosterone replacement is safe and almost always successful by all methods, but implants are the most effective in maintaining sexual function and have fewer side effects (Conway *et al.* 1988 and Handelsman *et al.* 1990).

The most common indication for testosterone replacement is hypogonadism. This is a relatively common endocrine disorder in males and one in every 200–300 men receives some form of testosterone replacement (Handelsman *et al.* 1990). In addition to being used to restore sexual functioning, testosterone is also used as an anabolic agent to treat anaemia and osteoporosis (Handelsman *et al.* 1990).

Accurate laboratory assays are available to measure plasma testosterone levels and are used to monitor the effectiveness of testosterone replacement therapy. Handelsman *et al.* (1990) described the pharmacokinetics and pharmacodynamics of subcutaneous testosterone implants and showed total and free testosterone concentration peaked at 1 month and was maintained at physiological levels for 4–5 months after 600 mg of testosterone was implanted. However, it is important to consider individual variation in absorption rates and clinical symptoms as well as the testosterone concentration when estimating the time of reimplantation (Burger & Studd 1987, Handelsman *et al.* 1990).

Testosterone therapy aims to restore, or normalize, male secondary sexual characteristics such as beard, body hair and external genitalia; male sexual behaviour such as libido, erections and sexual function, as well as restoring or maintaining masculine characteristics of voice, muscle mass and general well-being (Handelsman *et al.* 1990). Psychological well-being as a result of improvement in masculine self-concept and general well-being are important considerations. Although the physical effects of testosterone replace-

ment have been well documented (Salmimies *et al.* 1982, Conway *et al.* 1988, Handelsman *et al.* 1990), documentation about the effects on relationships is not as readily available, particularly from the point of view of the sexual partners of men receiving testosterone replacement. It is acknowledged that many of the references cited are old, however, they represent early and important work that is still relevant.

Prior to the study the need for testosterone replacement was discussed with men after pituitary surgery or other relevant diagnosis. The discussion concentrated on the physical effects of testosterone and little attention was paid to the effects on sexuality, psychological functioning or relationships. In order to better understand the service needs of men requiring testosterone replacement, men having testosterone implants and their permanent partners were interviewed to explore the physical, psychological and relationship effects of testosterone replacement.

The study

Aims

The aims of the study were to determine:

- perceptions of the effect of testosterone replacement on well-being and sexual functioning, and the duration of testosterone effects in men, their permanent partners and men without partners
- whether partners' perceptions are similar to those of recipients
- whether serum testosterone concentrations are consistent with perceptions of well-being and sexual functioning at three time points: before implant and 1 and 4 months afterwards.

Design

The study design incorporated parallel data collection by means of hormone estimations and semi-structured interviews with the treatment groups and partners. Data were collected in 2001–2002.

Participants

The participants were men attending the endocrine outpatient clinic at an urban hospital in Australia who required testosterone replacement therapy as a consequence of pituitary surgery or genetic disorders.

Clinic lists were available and every tenth patient was invited to participate in the study over a 12-month period.

The first participant was selected randomly. All those receiving testosterone replacement were eligible to be included. Wives/permanent partners were also invited to participate. There was no testosterone washout period prior to the interviews because the study was designed to measure the effect of testosterone implants in the clinical context of repeated implants and any changes to normal routine could have affected the responses.

Implantation procedure

Testosterone pellets were implanted under local anaesthetic into the fat layer of the lower abdominal wall or buttock using a trocar and cannula. The belt area was avoided to minimize discomfort and decrease risk of pellet extrusion from belt friction. The incision was closed with a single 3/0 black silk suture and pressure applied for three to 5 minutes to prevent bleeding. The wound was covered with Tegaderm (3M Medical Surgical Division, St Paul, MN, USA). Most patients removed the dressing and suture themselves after 1 week. They were advised to return to the hospital if any pain, discharge or redness appeared at the site or if the pellets extruded.

Data collection

Serum hormone estimations

Twenty millilitres of blood was obtained by venepuncture from each man prior to the implant to estimate levels of serum testosterone, sex hormone binding globulin (SHBG), follicle stimulating hormone (FSH) and luteinising hormone (LH). Serum testosterone was also measured 1 month after the implant and again 4 months later.

Interview schedule

Self-report data were collected using a structured schedule developed specifically for the study. The schedule was pilot-tested with a representative group of four volunteers from the sampling population to ensure that the questions would be acceptable to, and understood by, study participants. These people were excluded from the main study. A panel of experts consisting of endocrinologists, endocrine nurses and a psychologist established the validity of the clinical endpoints.

The interview schedule consisted of (a) standard demographic data (age, diagnosis, testosterone dose, years in relationship, medications); (b) general questions about testosterone replacement (duration of testosterone therapy, previous implants, sexual functioning); (c) questions about strength, energy, mood and effects on relationships. Questions were based on known actions of testosterone. Ten point

summative rating scales were used to rate responses on a scale of 0–10 where '0' represented inadequate functioning and '10' represented normal functioning.

One researcher administered the interview schedule in private to ensure confidentiality. Testosterone recipients and their partners were interviewed separately at the three interview times (before implant and 1 and 4 months after) to allow sensitive issues to emerge and encourage honest responses. They were interviewed together at the end of the study. The researcher was known to the participants.

For the purpose of the study 'successful intercourse' was defined as the ability to achieve an erection that was sustained long enough for sexual penetration and ejaculation to be achieved. 'Permanent partner' referred to a meaningful ongoing sexual relationship of ≥ 12 months duration prior to and continuing during the study.

Ethical considerations

The Human Research Ethics Committee of the hospital approved the study. The study addressed a very sensitive issue in a vulnerable population. It was important, therefore, to ensure that interviews were conducted in private and participants were assured that the information given would be securely stored to maintain privacy and confidentiality.

Potential participants were initially approached and the study was explained by an independent person to reduce the likelihood of coercion, because many potential participants were well known to the researchers. A full explanation of the study was given to potential participants orally and in written form and they were encouraged to ask questions and discuss the study with their families before agreeing to participate. They were informed that they could withdraw from the study at any time without prejudice to their treatment. Recipients and partners were interviewed separately and confidential information was only divulged with their consent. Written, informed consent was obtained from all participants prior to the interviews.

Data analysis

Data were analysed using the Minitab software package and are presented as mean values and SE of the mean. Differences between mean values were determined by Student's *t*-test. Differences in proportions were assessed by Fisher's exact test. The level of probability to achieve statistical significance was estimated to be $P < 0.05$.

Analysis of open interview questions was carried out by hand by two independent people. Each description was read three times to allow the reviewers to become familiar with words,

phrases and images in the text. Significant statements relevant to the study aims were isolated and their meaning organized into themes. Eighty-eight per cent agreement was reached.

Results

Implant recipients

Five married men and five men without partners were interviewed. The men's ages ranged from 22 to 55 years (mean 37.6 years \pm 12.3 SD). Nine had been receiving testosterone implants for various lengths of time prior to the study. All nine had received testosterone injections before having implants. The remaining man had not received any testosterone implants prior to the study but had received other forms of oral and intramuscular testosterone for 3 months before commencing implants. Six were receiving 600 mg, and four had 800 mg of testosterone by implantation at six monthly intervals, i.e. standard doses. There were no infections or pellet extrusions during the study.

The characteristics of the 10 men are shown in Tables 1 and 2. Group A, those in a permanent relationship, had an age range of 32–55 years (mean 45.6 \pm 8.9 SD) and a mean testosterone dose of 750 mg and had been in permanent relationships between 5 and 32 years (mean 15 \pm 9.97). Those in group B, men not in a permanent relationship, were

younger, aged between 22 and 47 years (mean 29.6 \pm 10.1) and had a mean testosterone dose of 650 mg. None of those in group B were in a relationship at the time of the study and only two had relationships of more than 3 months duration before the study. Table 3 shows that mean testosterone levels were higher at all time points in men without partners than those with partners. The SHBG levels for the 10 men ranged between 10 and 37.7 nmol/L (mean 27.9). FSH and LH differed between participants with pituitary disease and those with testicular disease. In those with pituitary disease the FSH range was 0.2–5 mU (mean 1.47) and LH < 0.1–0.9 mU (mean 0.28). In men with testicular disease FSH ranged between 8 and 30 mU (mean 21.66) and LH between 1.2 and 15 mU (mean 9.06).

As well as testosterone replacement, four men were receiving additional hormone replacement for hypopituitarism following pituitary surgery [corticosteroids, thyroxine, desmopressin (DDAVP), bromocriptine] according to standard practice. In addition, one was taking atenolol and amlodipine for hypertension.

Partner attributes

Demographic data were not collected from partners, all of whom were wives. None was taking any medication. One wife declined to participate because she had recently been

Table 1 Attributes of participants in permanent relationships receiving testosterone implants following pituitary disease ($n = 1$) or pituitary surgery ($n = 4$)

Years in relationship (years)	5	10	17	28	32
Previous injections	≥ 5	3	≥ 5	≥ 5	≥ 5
Number of previous implant procedures	3	2	1	3	6
Diagnosis	Klinefelter's syndrome	Acromegaly	Craniopharyngioma hypopituitarism	Hypopituitarism chromophobe adenoma	Hypopituitarism
Age (years)	32	48	42	51	55
Testosterone dose (mg)	800	800	800	600	600
Participant number	1	2	3	4	5

Table 2 Attributes of men not in a permanent relationship who received testosterone replacement to achieve puberty

Previous relationship	No	No	Yes	No	Yes
In current relationship	No	No	No	No	No
Previous injections	3	0	≥ 5	≥ 5	0
Number of previous implant procedures	0	6	4	2	3
Diagnosis	Pituitary macroadenoma	Klinefelter's syndrome	Hypogonadotrophic hypogonad	Kallmann's syndrome	Mixed germ cell tumour radiotherapy orchidectomy
Age (years)	47	24	30	22	25
Testosterone (mg)	600	600	600	800	600
Participant number	1	2	3	4	5

Table 3 Mean and standard error of the mean (SEM) of the serum testosterone and perceptions of the responses to testosterone, measured using a 10 point Likert scale where 10 represented maximum function, in the three study groups at 0, 1 and 4 months following subcutaneous testosterone implant

Group	Serum testosterone		Strength		Energy		Libido		Erections		Intercourse	
	Mean	SEM	Mean	SEM	Mean	SEM	Mean	SEM	Mean	SEM	Mean	SEM
0 Recipients with partners	10.78	5.42	6.00	1.47	3.00	1.15	1.25	0.25	5.75	1.80	4.75	1.32
0 Partners			5.50	1.44	3.25	1.03	1.75	0.48	5.75	1.80	5.00	1.47
0 Recipients without partners	13.32	4.32	4.67	0.56	4.17	0.60	3.83	0.60	5.33	1.23	5.75	1.02
1 Recipients with partners	17.80	1.55	6.75	1.03	6.00	0.71	6.00	1.29	5.00	1.83	7.25	1.11
1 Partners			6.50	0.87	5.75	0.63	5.50	1.50	6.75	1.65	6.25	0.85
1 Recipients without partners	24.12	4.28	7.50	0.76	7.50	0.72	5.67	0.76	7.67	0.84	7.75	0.39
4 Recipients with partners	9.63	3.76	7.50	1.26	6.75	0.85	7.75	0.48	7.00	1.29	6.75	1.97
4 Partners			6.75	1.25	6.25	1.11	6.50	1.32	7.25	1.55	6.75	2.02
4 Recipients without partners	17.56	4.52	6.00	1.03	6.17	0.87	5.67	0.80	7.00	1.03	6.33	1.03

diagnosed with diabetes and had difficulty accepting the diagnosis.

Rating of testosterone effects

Men reported the beneficial effects of testosterone to be equally related to their feelings of well-being, energy levels and sexual functioning. There was no significant difference between the ratings of recipients and partners ($P > 0.05$, Fisher's Exact Test). There were negligible differences between men with and without partners on each symptom at each time stage (zero, 1 and 4 months, $P > 0.05$). The greatest change was noticed between 0 and 1 month by all men. Participant 3, in group A, consistently rated all parameters lower than all other men. His low ratings were similar to his wife's ratings and were consistent with his medical physical assessment.

All recipients and their partners agreed that there was a gradual decline from 4 to 6 months in sexual functioning, energy levels and mood that reflected declining testosterone concentrations. One man reported that his symptoms fluctuated rather than declined steadily. In all cases function rating was consistent with testosterone concentrations.

There was a difference between the perceptions of men in relationships and those not in relationships with regard to mood change. Men with partners tended to report a decline in mood, e.g. 'feel flat', 'don't care', 'less affectionate', 'down', that was consistent with the decline in testosterone levels. Two partners reported that their husbands were 'temperamental' and 'less tolerant' when their testosterone level was low. Men without partners tended to focus on the improvement in mood as testosterone level increased, saying, for example, that they felt 'more confident', 'more talkative', 'can concentrate better', 'feel more macho and aggressive'.

Both groups reported a decline in concentration and ability to think clearly and remember as testosterone concentration fell.

Eight of the 10 men had received testosterone injections prior to commencing implants. All agreed that injections were more painful than implants. They preferred the faster onset of action of testosterone injections but felt that implants were more convenient, and gave a more settled pattern and a predictable gradual decline in all physical and mental parameters.

General strength and energy

Men made a distinction between strength and energy. Those with partners reported that their strength was not affected to any degree, but their energy levels declined with the decrease in testosterone concentration (Table 3). They reported feeling 'tired and drained', 'tiring easily' and finding it difficult to complete tasks as testosterone levels decreased. Partners' independent perceptions were consistent with these self-reported effects. In contrast, men without partners showed significant effects of decreased testosterone levels on both strength and energy (Table 3).

Sexual functioning

Men in relationships, and their partners, reported that libido was lowest at time zero (approximately 6 months after the previous implant) and increased significantly between 1 and 4 months. In contrast, those without partners reported that their libido was higher at baseline (zero). There was more between-subject variation and the response to the next implant was not as marked in this group. A *t*-test showed that the difference between the groups at time zero was statistically significant ($P = 0.010$, $df = 8$, $n = 4$ & 6 , $t = 3.326$).

Ability to achieve erection was not affected by testosterone level as much as were libido and successful intercourse. All men agreed that it was possible to have an erection when testosterone level was low but that it was difficult, if not impossible, to sustain the erection. The four men who had partners and had undergone surgery for pituitary disease felt that their erections were not as good as they had been before surgery. There was no significant difference in ratings between recipients and partners on these parameters ($P = 0.339$, $df = 11$, $n = 12$, $t = 1.0$).

Likewise, rating of successful intercourse and frequency of intercourse per week were similar between recipients and partners. Both reported that intercourse frequency increased from less than twice per week at zero, to three or more times per week between 4 and 6 months after the implant. Participant 3 was unable to achieve successful intercourse at any time during the study. The group without partners did not rate this parameter.

Effects on relationships

Most recipients and partners reported that there had been changes in their relationships since testosterone replacement. Men reported decreased libido and arousal and less frequent sex. Their partners reported loneliness, lack of affection and that they felt 'unwanted sexually'. Lack of affection, e.g. cuddling or holding hands, was of greater concern to partners than frequency of intercourse:

There is not the usual warmth and loving there. I have to build a new relationship now – he's not the same person who was there when we met.

Men without partners reported that testosterone lack and being different from their peers before puberty had inhibited their ability to form relationships during childhood and with women when they became adults. All reported effects on their concept of 'being a man', evident in comments such as 'not very sexy – never really been a man'; 'not human before the implants, a real wimp and different from my friends'; 'felt very young, not more than 16 and I just did not grow up'; and 'wonder if I will ever please a woman'. Despite these comments, testosterone implants were seen as having a positive effect on self-image because they enabled the physical features of male adulthood to develop.

Discussion

Participants in this study were a diverse group of men with different indications for testosterone replacement and different testosterone doses that may have had some effect on the results. Individual testosterone doses reflect the amount

needed to maintain normal physiological functioning and are based on biochemical and clinical parameters. The most common dose is 600 mg every 6 months. Some men were not biochemically testosterone-deficient at the beginning of the study despite reporting decreased energy, well-being and sexual activity. This finding highlights the importance of considering clinical response and individual need as well as biochemical results when assessing treatment effectiveness. Self-reported ratings by men receiving testosterone could be a useful adjunct to other assessments of hormone status. Even if the testosterone level is within the normal range, this does not mean that it is 'normal' for that individual. Our findings highlight the reliance that patients place on their symptoms as an indication of the need for another implant. Although not a part of this study, experience over a period of years indicates that men believe that they require increased doses of testosterone over time based on their symptom response.

There was a significant difference between the ages of men with partners and those without that may have influenced responses, but the data do not indicate what this effect might be. The gradual decline in sexual functioning, strength and energy with decreasing testosterone levels has been reported previously (Conway *et al.* 1988, Handelsman *et al.* 1990). Normal and satisfactory sexual activity while receiving intramuscular androgen replacement has also been documented (Cunningham *et al.* 1990). Partners were not included in any of these studies and the clinical parameters were also based on self-report data. Our findings were similar to those of these other studies. In addition, we confirmed individual men's self-reported effects of testosterone replacement in separate interviews with their partners. We anticipated greater differences between recipient and partner ratings, considering that they were interviewed separately and the confidentiality of their responses was guaranteed. The similarity supports the validity of the results and adds credibility to the use of self-rating scales as a measure of treatment effectiveness.

The reported effects on physical parameters of men who received testosterone replacement in adulthood and those who required testosterone replacement to achieve puberty were similar. However, body image and the psychological aspects were different. It is important to note that processes under hormonal control are rarely regulated by just one hormone, and factors such as heredity, cultural norms, environment, nutrition and disease processes, as well as sex hormones, affect growth and psychological development in prepubertal boys (Vanderschueren-Lodewey 1994). It is not clear to what extent these factors were operating in our participants.

Lack of confidence and difficulties in establishing relationships by testosterone-deficient boys have been reported in

other studies. For example, Money and Clopper (1975) recorded decreased dating in seven postpubertal males who developed hypopituitarism after childhood surgery. They suggested that males requiring testosterone replacement from the time of puberty lack the ability to form relationships and to 'fall in love'. They further proposed that bonding and mating might be affected by destruction of the pituitary/hypothalamic hormonal pathways. Although this is an old study, its findings are still relevant in view of the limited information in the area.

Clopper *et al.* (1993) suggested that hypogonadal men exhibit low frequencies of psychosexual behaviour that persist after testosterone replacement. Our results support these findings. None of our participants without permanent partners were in a relationship during the 2 years of the study and only two had previous relationships, both of short duration. Since completion of the study, one non-partnered man has married, but his psychosexual responses to the same interview questions have not changed. None of the other non-partnered men have formed relationships.

It is not surprising that the non-partnered group did not report successful intercourse during the study since none had partners; however, all were able to masturbate. Masturbation could have been used as a measure of 'success' for the non-partnered group. However, this did not conform to the definition of sexual intercourse used in the study. If the interview schedule were to be used as a clinical tool, masturbation would need to be included. It is interesting that these men's baseline libido levels appeared to be less affected by the testosterone concentration than they were in men with partners. Sex hormones are only one of the factors that affect libido, which was not affected by changes in testosterone concentration in our study as much as other factors were. However, lowered mood and lack of energy can also contribute to diminished libido. The individual nature of libido and the human sexual response may account for the differences in ratings of this parameter between men, their partners, and men without partners.

Sexual performance was self-reported, and it is possible that participants may have been tempted to over-report the sexual parameters. However, their partners in separate interviews supported their ratings. Couples appeared to be in supportive relationships of at least 5 years duration, and it is not known if pituitary surgery and diagnostic procedures and their associated stress strengthened bonds. Interestingly, two partners and one man independently contacted the researcher for counselling after the study. The wives made contact because of feelings of rejection and lack of warmth in the relationship that they attributed to hormonal changes in their partners following pituitary surgery. The man reported

difficulty accepting the disease, was angry and frustrated and felt that he was 'colder' and 'less affectionate' since surgery. Anecdotal evidence suggests that there is a perception that the primary effect of male sex hormone replacement is on sexual functioning – ejaculation, libido and erection. Our findings suggest that effects on energy, mood and relationships are equally important, particularly as erection did not appear to be significantly affected by testosterone levels. Certainly, warmth and caring in relationships were very important for partners in our study.

Participant 3 and his partner reported the greatest effect of the primary disease and its sequelae on sexual function and wellbeing. This man had a very large craniopharyngioma that could not be surgically removed. Previous studies have reported significant dysfunction as a result of large tumour size and a high incidence of sexual dysfunction in patients with large tumours (76%) (Lundberg & Wide 1978). His sexual functioning was not improved and only marginal improvement occurred in the other parameters despite large doses of testosterone. He showed a marked decrease in energy and mental functioning as his testosterone levels fell.

All men, with the exception of participant 3 and his partner, reported some sexual activity despite low testosterone levels. Self-reported ejaculation and erections despite low testosterone concentration have been reported previously (Salmimies *et al.* 1982). Despite the ability to achieve an erection, our participants reported that the effects of decreased energy, changed mood and feelings of indifference made successful intercourse more difficult and frustrating.

All participants welcomed the opportunity to discuss the sexual and emotional issues associated with the need for hormone replacement therapy. In particular, there was a consistent desire to establish what constituted 'normal'. Most had not met other people with the same problem and felt isolated and ignorant, despite regularly attending the outpatient clinic. Attendance at outpatient clinics does not mean that people discuss their sexual problems with healthcare professionals or other patients, especially intimate issues such as sexuality. Likewise, no man or partner felt that they had received appropriate counselling about the effects of their disease on sexual functioning, lifestyle and relationships when testosterone therapy was first recommended. Furthermore, eight of the 10 felt that they had *never* had adequate sex education.

Study limitations

The sample size was small (approximately 4% of the relevant population), which limits the power to exclude differences and to generalize the findings beyond the sample. Inspection

What is already known about this topic

- The most common indication for testosterone replacement is hypogonadism.
- Testosterone replacement is safe and almost always successful by all methods, but implants are the most effective in maintaining sexual function and have fewer side effects.
- The physiological action of testosterone.
- Psychological well-being as a result of improvement in masculine self-concept and general well-being are important considerations.

What this paper adds

- It is important to determine people's perceptions of testosterone replacement and the associated psychological factors as part of routine clinical assessments because of the significant effects on relationships.
- Men needing testosterone replacement to achieve puberty have different perceptions of the therapy from those who require replacement in adulthood, particularly with respect to libido.
- Sexual counselling should be provided for recipients and their partners when testosterone therapy is commenced, and offered on an ongoing basis as required.

of the data shows no trend towards difference, and the similarity to the findings in other studies enhances their validity. The random nature of the sample selection and the agreement between subjects and between subjects and partners enhances the validity of the results.

Conclusions and recommendations

Our findings reflect the importance of determining people's perceptions of testosterone replacement and the associated psychological factors as part of routine clinical assessments because of the significant effects on relationships. The assumption that low testosterone concentration means the complete absence of erection and sexual functioning is incorrect. Men needing testosterone replacement to achieve puberty have different perceptions of the therapy from men who require replacement in adulthood, particularly with respect to libido. Partners are usually aware of the need for a replacement implant before their husbands are. Overall, implants are the preferred replacement method because of the quality and duration of the effect.

Sexual counselling should be provided for recipients and their partners when testosterone therapy is begun, and

offered on an ongoing basis as required. The aspects of the interview schedule relating to physical well-being and sexual functioning could be completed by patients while they wait to see the doctor as an adjunct to the physical examination and blood tests to aid clinical decision-making.

Although the results of this study may not be able to be generalized to other populations they contribute information that will assist in planning and developing counselling and support services for men receiving testosterone replacement and their partners and suggest important areas for further study. It would also be important to replicate the study with a larger sample and other populations.

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