

Evaluation of the psychometric properties of a version of the London Measure of Unplanned Pregnancy for women's partners

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Abstract

Background

The role of women's partners in pregnancy planning has gained importance with the development of preconception care. The measurement of pregnancy planning/intention has also changed in the last two decades with the development of psychometric measures such as the London Measure of Unplanned Pregnancy (LMUP). The aim of this analysis was to evaluate the psychometric properties of a version of the LMUP for women's partners in the UK.

Methods

The LMUP items, adapted for completion by partners, were piloted and included in a survey of (mainly male) partners in three antenatal clinics in London, UK, as part of a study of pre-pregnancy health and care. The psychometric properties of the partner LMUP were assessed according to the principles of Classical Test Theory

Results

There were 575 partners of pregnant women in the sample, 573 (99.7%) being men. There were high completion rates for all the LMUP items. The distribution of LMUP scores ranged from 1-12, with a negative skew (biased towards planned/intended pregnancies). In terms of reliability (internal consistency), Cronbach's alpha was 0.69, item-rest correlations were >0.2 for five items, and all inter-item correlations were positive. In terms of construct validity, principal components analysis showed that measurement was unidimensional, confirmatory factor analysis showed good model fit, and the convergent validity hypothesis of non-perfect, moderate-to-good agreement between couples' LMUP scores was met.

Conclusions

The partner LMUP performed well in terms of reliability and validity according to internationally-accepted criteria for the performance of psychometric measures and can be used in future research on men and couples. However, we recommend further research relating to the concept of pregnancy planning/intention among partners of all gender identities to understand whether additional content would enhance measurement of the construct. In particular, we recommend further conceptual exploration with men who have experienced unplanned pregnancies.

Keywords

Pregnancy; Intention; Planning; Unplanned; Unintended; Psychometric; Validation; Measurement; Preconception, Men

Background

Much attention has been paid to the measurement of pregnancy planning/intention in the last two decades, with new ways of measuring this concept being proposed.(1-3) The focus of these new measurement efforts has been with women. This is unsurprising given that national and international estimates of pregnancy planning/intention have, for the last 70 years, been based on data from women.(4-10) This is not to say that the role of men has gone unrecognised: for instance, the international Demographic and Health Surveys have always included male interviews as part of the household survey, asking about many aspects of fertility and reproductive health; the U.S. National Survey of Family Growth has included a survey of men, with questions on pregnancy intention, since 2006;(11, 12) and there have been other national and sub-national studies which have focused on couples or men, with perspectives on male pregnancy intention reported by the man.(13-21) However, it is only more recently, particularly with the development of interventions around preconception health and care,(22-26) that the role of men in planning for pregnancy has gained new importance. There has been for some time recognition of the importance of men in all aspects of women's reproductive health and a call for their greater involvement in both research and health care.(27-30)

As with women, the measurement of pregnancy intention among men, when it has happened, has tended to be by a single survey question or by a set of survey questions such as those used by the U.S. National Survey of Family Growth.(11, 12) In contrast, the newer methods of measurement used with women have employed psychometric measurement techniques thereby providing more valid and reliable measurement. The rationale behind psychometric measures is that the construct of interest (or latent-trait) is not easily observed with a single question, and therefore psychometric/statistical techniques are used to combine multiple items that can then be used to produce a scale that relates to the construct of interest. Of the new measures, the London Measure of Unplanned Pregnancy (LMUP), which was developed in the UK, has been the most widely used, with, to date, 16 evaluated language versions across 11 countries(1, 31-40) and many more psychometric evaluation studies currently in progress.(41)

The LMUP comprises six items covering contraceptive use, timing of motherhood, intention, desire for a baby, discussion with the partner, and pre-conceptual preparations. The items are scored 0, 1, or 2, giving a total from 0 to 12, with each increase in score representing an increase in the degree of pregnancy intention. The questions relate to pregnancies that have already occurred, with women recalling the time around conception. Compared with other questions used to assess pregnancy intention, the LMUP has a number of advantages: it has established psychometric properties; its development was based on lay views; it does not rely on women having fully formed childbearing plans; it does not assume a particular form of family building; it does not assume that women have clearly defined intentions and/or actions consistent with intentions; and it is suitable for use with any pregnancy regardless of outcome, i.e. birth, abortion, or miscarriage.(1) The LMUP was developed in order to produce valid and reliable population prevalence estimates of pregnancy planning/intention. It has also been used in many studies in which pregnancy intention/planning is a variable of

interest. More recently, it has been recommended as an outcome measure in relation to preconception care.(42, 43)

The LMUP has now been adapted several times for administration to women's partners because of the need for a comparable measure of pregnancy intention when carrying out research on couples.(44-48) The first adaptation was in the UK when a screening tool was needed to find young men with planned pregnancies for an interview study.(44) Subsequent adaptations for men were in Sweden and Malawi.(45, 47) In keeping with international guidelines,(49-51), an analysis of the psychometric properties of the adapted measure is required in order to know whether an adaptation for partners is valid. So far the only evaluation of psychometric properties that has been carried out has been with the Malawian Chichewa-language version for men, which showed excellent psychometric properties. No similar analysis has been carried out in the UK. The aim of this study is to evaluate the psychometric properties of the LMUP adapted for use with women's partners in the UK.

Methods

The data for this analysis were collected as part of the UK Department of Health-funded "Pre-pregnancy Health and Care in England" project, findings of which have been reported elsewhere.(48, 52-56) The study was approved by the National Research Ethics Service, NRES Committee London – Bromley (REC reference 11/LO/0881).

We carried out a cross-sectional survey of the partners of pregnant women who were attending antenatal clinics at three hospitals in London. The pregnant women themselves were also surveyed at the same time. Findings from both surveys have already been reported.(48, 53, 56) Convenience sampling was used; all partners in the clinic waiting rooms were approached by a researcher and invited to participate. Potential participants were given the project information sheet and allowed time to consider whether they wished to participate, and a record of refusals was kept. In keeping with the terms of our research ethics approval, consent was implied by completion of the paper questionnaire. No identifiable data were collected. The items of the questionnaire, for the most part, mirrored those of the women's survey. From observation in clinics we could see that couples generally completed their questionnaires independently, without discussion.

The six LMUP items, contained in the middle of the partner questionnaire, had minor adaptations which made them suitable for completion by partners (which at the start of the study we assumed to be men), for instance wording change such as "your partner" instead of "you", "...for her to be pregnant" instead of "you to be pregnant", "her pregnancy" instead of "your pregnancy", etc.(57) The only gender-specific phrase included was "becoming a father" in item 2. Five of the adapted questions (items 1-5) had previously been used with young men in a study of teenage pregnancy.(44) Other questions in the survey questionnaire covered topics such as sources of pre-pregnancy care and advice, pre-pregnancy consumption of vitamin, mineral and other supplements, behaviour change once pregnancy was confirmed, and health and socio-demographic information. The partner questionnaire was piloted with a

diverse reproductive health user group which comprised service users and members of the local community. The LMUP items appeared to be well understood and acceptable to participants.

Data entry of the questionnaire data was carried out by a professional data entry company (Abacus), and the data were cleaned and verified by study researchers (BH and DP). The anonymous data were stored on secure UCL password protected servers. Data analysis was carried out using Stata 15. The psychometric properties of the partner LMUP were assessed according to the principles of Classical Test Theory, which underpinned the development of the original LMUP:

Missing data and targeting

The level of missing data for each item was assessed because high levels of missing data can indicate a problem with the understanding or acceptability of an item.(58) Ideally, missing data should be less than 10% or, more stringently, 5%, with the latter figure used in the original LMUP development and evaluation study as a criterion for initial item selection.(1)

As with the original LMUP, respondents who had answered three or more LMUP items were eligible for imputation of missing data and calculation of a total LMUP score.(1) The distribution of total scores was examined to assess the targeting of the scale. Item discrimination was assessed by examination of the endorsement of item response options; in the original LMUP development and evaluation study, values of <80% for a single response option were a criterion for initial item selection.(1)

Reliability

Reliability (internal consistency) was evaluated using Cronbach's alpha,(59) using the standard cut off point of 0.7.(51, 60) Also, item-rest correlations (i.e. the correlation of the item with the other items in the measure) were calculated (>0.2 considered acceptable)(60, 61) and inter-item correlations were examined to check that they were all positive. The stability of the partner LMUP, in terms of test-retest reliability, was not assessed as the survey was anonymous and therefore no two-week follow up could be carried out.

Validity

The construct validity of the partner LMUP was assessed in several ways. First, in keeping with previous evaluations of the LMUP, the structural validity of the scale was assessed using principal components analysis. The partner LMUP was considered valid if all items loaded onto one component with an Eigenvalue larger than 1, meaning that they were all measuring the same construct.(62) Further, in keeping with recent recommended standards of assessment,(63) confirmatory factor analysis was also carried out to assess model fit (in this case the six items to a unidimensional model). Model fit was assessed by the CFI (comparative fit index, >0.95 indicating acceptable model fit) and SRMR (standardized root mean squared residual, <0.08 indicating acceptable model fit). Finally, convergent validity was assessed by examining the association of the partner LMUP scores with the scores of the pregnant women (i.e. scores relating to the same pregnancy). The relationship was examined

visually using a scattergram with a line of best fit, and assessed using Spearman's Rho correlation coefficient for non-parametric data, Cohen's kappa with quadratic weights, a measure of agreement, and the linear regression coefficient (R^2). Landis and Koch suggest the following interpretation of the kappa coefficient: 0.41-0.60, moderate; 0.61-0.80, substantial; and 0.81-1.00, almost perfect agreement.(64) Our hypothesis was that the scores should be significantly related, albeit without perfect agreement as partners within a couple may have genuinely differing perceptions about the same pregnancy. It was not possible to assess concurrent criterion validity of the partner LMUP (i.e. to use a currently available external criterion to assess validity) as no agreed "gold standard" validated measure currently exists for this construct.

Scaling

Finally, as with several evaluations of the LMUP for pregnant or recently pregnant women,(32, 35, 38) a Mokken scaling procedure (monotone homogeneity assumption) was carried out as an exploratory analysis based on the principles of modern test theory (as opposed to Classical Test Theory). Items with a Loevinger H coefficient of 0.3 or above were eligible for scaling.(65, 66) (The Loevinger H coefficient relates to Guttman errors, with a lower H value indicating more observed Guttman errors.) The results of Mokken analysis allows investigators to see whether the items conform to a probabilistic Guttman structure, i.e. that items vary in 'difficulty', some being easy to endorse, some being more difficult to endorse, and that respondents who have a particular level of the construct (in this case pregnancy planning/intention) broadly endorse items up to the level of their construct and then do not endorse items beyond that. The whole scale is also assessed by the Loevinger H coefficient, with <0.4 meaning the scale is "weak", $0.4-0.49$ meaning that the scale is "medium", and >0.5 meaning that the scale is "strong".(65) The construction of an adequate scale confirms that the raw score can be used to order respondents on the construct being measured.(66)

Results

Sample

Of the 624 partners of pregnant women attending clinics invited to take part in survey, 575 (92%) completed a questionnaire. The majority of the partners were men, aged over 30 years, and working full time (table 1). Two thirds of the sample were educated to degree level, and about three quarters classified themselves as white. The 575 partners related to approximately half of the participants in the women's survey (table 2). Pregnant women who were from ethnic minority groups or had below degree level education were significantly less likely to have a partner who completed a partner survey questionnaire (table 2). The LMUP scores of the women who had a partner participating in the survey (mean 10.1, SD 2.4) were slightly, but significantly, higher than those who did not (mean 9.7, SD 2.6) (Mann Whitney U, $p<0.001$).

Table 1: Socio-demographic characteristics of partner sample

Partners' characteristics	% (n)
Gender (n=575)	
Male	99.7 (573)
Female	0.3 (2)
Ethnicity (n=519)	
White	73.8 (383)
Mixed	4.4 (23)
Asian	12.1 (63)
Black	6.6 (34)
Other	3.1 (16)
Academic qualification (n=508)	
Degree or above	66.7 (339)
Below degree	33.3 (169)
Age group (n=575)	
<25	3.7 (21)
25-29	12.5 (72)
30-34	34.3 (197)
35-39	23.8 (137)
40+	25.7 (148)
Employment status (n=519)	
Full time (35 or more hours per week)	84.0 (436)
Part time (<35 hours per week)	6.9 (36)
Unemployed	4.0 (21)
Long term sick/disability	0.4 (2)
Full time education	2.3 (12)
Other	2.3 (12)

Table 2: Women’s survey: those whose partners completed a questionnaire

Women’s characteristics	% (n) whose partners completed questionnaire	P value	Adjusted odds ratio* (95% confidence interval)	P value
All women (1173)	49.0 (575)	-	-	-
Who women live with:		0.007		0.283
Husband	46.8 (328)		1.00	
Partner	48.9 (114)		1.16 (0.85-1.59)	
Not husband or partner	31.0 (31)		0.77 (0.47-1.25)	
Ethnicity		<0.001		<0.001
White	47.7 (336)		1.00	
Mixed	41.4 (24)		0.83 (0.47-1.48)	
Asian	50.8 (61)		1.19 (0.79-1.78)	
Black	18.8 (19)		0.30 (0.18-0.52)	
Other	57.6 (34)		1.44 (0.82-2.51)	
Academic qualification		<0.001		<0.001
Degree or above	51.8 (332)		1.00	
Below degree	35.4 (135)		0.55 (0.42-0.73)	
Age		0.647		-
<25	45.1 (37)			
25-29	44.7 (92)			
30-34	48.4 (203)			
35-39	44.5 (114)			
40+	39.7 (27)			
*Each odds ratio adjusted for other variables in the model				

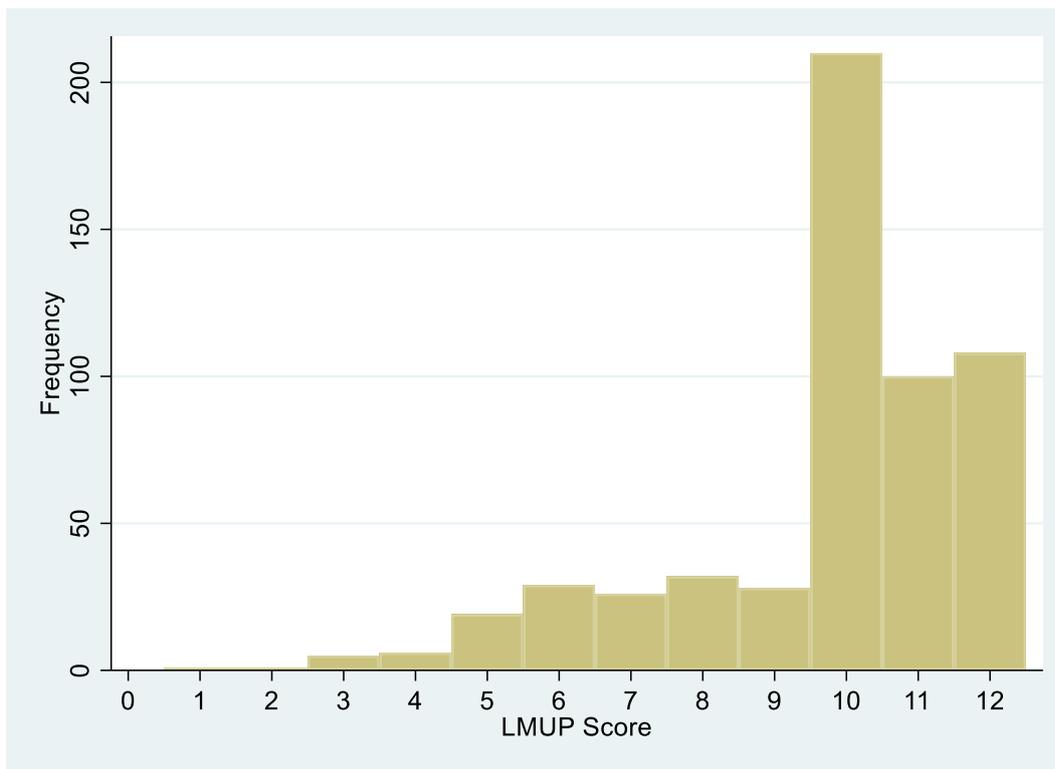
Missing data and targeting

There were low levels of missing data for all the LMUP items (table 3). Of the 575 partners, 98.3% (565) completed three or more LMUP items and therefore were eligible for calculation of a full LMUP score. Total LMUP scores ranged from 1 to 12 (mean 9.7, SD 2.1, median 10, inter-quartile range 2), with a strong negative skew (figure 1). The item responses showed the bias towards higher scoring response options on items 1-5, with item 6 showing a different response pattern (table 3).

Table 3: Frequencies of partner LMUP item response options

Item no.	Summary of item content	% (n)
1	In the month that your partner became pregnant... 0. Always used contraception 1. Inconsistent use/Failure 2. Not using contraception missing	1.6 (9) 7.1 (41) 87.5 (503) 3.8 (22)
2	In terms of becoming a father... 0. Wrong time 1. Ok, but not quite right time 2. Right time missing	0.9 (5) 12.5 (72) 84.4 (485) 2.3 (13)
3	Just before your partner became pregnant... 0. Did not intend to get pregnant 1. Intentions kept changing 2. Intended to get pregnant missing	12.5 (72) 8.0 (46) 76.4 (439) 3.1 (18)
4	Just before your partner became pregnant... 0. Did not want a baby 1. Had mixed feelings about having a baby 2. Wanted to have a baby missing	1.6 (9) 14.3 (82) 80.7 (464) 3.5 (20)
5	Before your partner became pregnant... 0. Never discussed having children together 1. Discussed but had not agreed 2. Agreed we would like her to be pregnant missing	1.6 (9) 15.1 (87) 80.9 (465) 2.4 (14)
6	Before pregnancy... 0. No pre-pregnancy actions 1. One pre-pregnancy action 2. Two or more pre-pregnancy actions missing	52.5 (302) 21.6 (124) 19.7 (113) 6.3 (36)

Figure 1: Histogram of partner LMUP scores



Reliability

The Cronbach’s alpha for the six LMUP items was 0.69. The item-rest correlations were above 0.2 for items 1-5, and 0.15 for item 6 (table 4). Without item 6, the Cronbach’s alpha for the remaining items was 0.80. All inter-item correlations were positive. The relationship between item 6 and the total LMUP score showed the expected pattern of positive association.

Table 4: Item-rest correlations, component loadings, and Loevinger H values

Items	Item-rest correlations	PCA: Component loadings	CFA: Factor loadings	Mokken: Loevinger H
1 – contraception	0.38	0.58	0.44	0.44
2 – timing	0.45	0.68	0.55	0.43
3 – intention	0.66	0.87	0.91	0.60
4 – desire	0.55	0.74	0.59	0.45
5 – discussion	0.63	0.83	0.81	0.58
6 - preparations	0.15	0.22	0.16	0.34

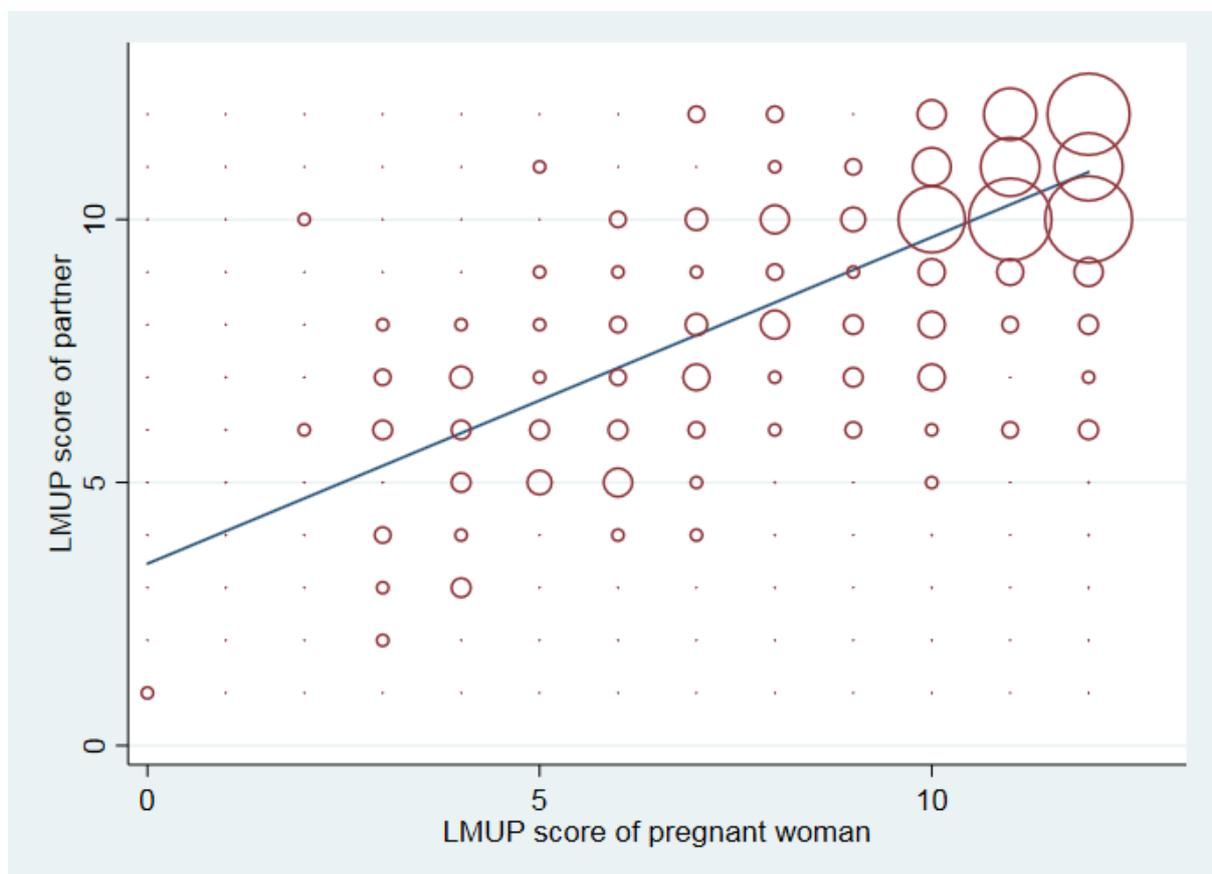
PCA – principal components analysis; CFA – confirmatory factor analysis

Validity

The principal components analysis showed that all items loaded onto one component (Eigenvalue = 2.8). Component loadings were moderate to high for items 1-5, and lowest for item 6 at 0.22 (table 4). Confirmatory factor analysis showed model fit (CFI = 0.97 and SRMR = 0.038), with moderate to high factor loadings for items 1-5, with item 6 at 0.16 (table 4).

LMUP scores for both pregnant women and their partners were available for 519 couples. (The LMUP scores of the 519 partners with corresponding female partner scores were not significantly different to the 46 partners without a corresponding female partner score, i.e. respectively, mean 9.75, SD 2.04 versus 9.48, SD 2.39, Mann Whitney U test, $p=0.652$.) The relationship between the scores of the 519 couples is shown in figure 2. Of the 519 couples, 30.8% (160) had the same LMUP score, 36.6% (190) were one score apart, 21.6% (112) were two scores apart, 6.2% (32) were three points apart, and 4.8% (25) were four or more points apart. The mean LMUP score of the female partners was 10.14, SD 2.41 compared with 9.7, SD 2.1 (as reported above), Wilcoxon matched pairs test, $p<0.001$. For the 519 couples' scores, Spearman's rho was 0.57 ($p<0.001$), weighted kappa 0.71, and R^2 0.54.

Figure 2: Scattergram of couples' LMUP scores



Scaling

The Mokken analysis showed that the items conformed to a basic Guttman structure with all Loevinger H values above 0.3 (table 4). Items 1, 2, 4, and 5 differed only slightly in their difficulty to endorse (ranging from item 2 at 0.008 to item 1 at 0.016), followed by item 3 (0.129), and item 6 (0.560) being the most difficult to endorse. The Mokken Scaling Procedure selected five items into the scale (items 1-5) giving an Loevinger H coefficient of 0.56 for the overall scale. Retaining item 6 in the scale gave a Loevinger H coefficient of 0.50.

Discussion

Overall, our analysis showed that the partner LMUP performed well according to internationally-accepted criteria for the performance of psychometric measures, and remarkably like the women's LMUP as originally developed and in subsequent evaluations. Notably, the partner LMUP appeared to be well understood, acceptable and had high levels of item completion. The measurement was demonstrated to be unidimensional, with relationships between the items following the same pattern as seen in the women's LMUP (i.e. with items 2-5 most strongly correlated with the overall score, and the behaviour-related items, 1 and 6, less strongly correlated, and all items positively correlated with each other), plus acceptable reliability.

Only one other study has examined the psychometric properties of the LMUP adapted for partners. Yeatman and Smith-Greenaway(47) adapted the women's Chichewa LMUP(33) for Malawian men, including modification of item 6 (pre-conceptual preparations) to suit the local context, followed by pre-testing and piloting. They found a bi-modal distribution of LMUP scores (similar to the Malawian women in their sample) and excellent psychometric properties. In terms of reliability/internal consistency, Cronbach's alpha was 0.91 and all item-rest correlations >0.2 (with a pattern of correlations similar to that of the women in their sample, which is also similar to that found internationally). In terms of construct validity, principal components analysis showed that measurement was unidimensional and hypothesis testing showed that the LMUP scores performed in the way expected. The Malawian sample, with its full range of pregnancy intention (notably, there is no legal abortion in Malawi) provides reassurance that excellent psychometric properties are possible (including for item 6, pre-conceptual preparations) when the full range of the construct is present.

The reliability (internal consistency) of the partner LMUP was at the threshold of the accepted standard (Cronbach's alpha >0.7) for group-level comparisons, and without item 6 (pre-conceptual preparations) the alpha increased to 0.8. We believe that the sample composition and endorsement patterns (i.e. the skew toward more planned pregnancies due to the sample being of men attending antenatal care) affected the alpha value and we recommend retaining item 6 for reasons of content validity in line with recommendations(51, 61) and for future evaluation. Preconception care for men is likely to develop over time as part of the wider development of preconception care.(67, 68) The modification of item 6 to fit

local circumstances (i.e. listing pre-conceptual preparations that are most relevant to a particular population) is well established with the women's LMUP and in future or in other contexts, if necessary, item 6 in the partner LMUP can be extended or adjusted to optimise relevant content.

The construct validity of the partner LMUP was excellent. In terms of structural validity, both the principal components analysis and the confirmatory factor analysis showed that measurement was unidimensional, even with the lower component/factor loading of item 6 (pre-conceptual preparations). In terms of convergent validity, our hypothesis of non-perfect, moderate-to-good agreement between partners in their assessment of the same pregnancy was met. The presence of couples' LMUP scores in this analysis is a strength.

In terms of content validity, no issues or problems with the understanding of the LMUP items were raised and there were very few missing data in our study (the most on item 6, pre-conceptual preparations). However, although there was piloting of the partner LMUP before use in the main study, there were no cognitive interviews so we have not conducted a comprehensive investigation here. Further, our main concern is that there may be other aspects of pregnancy intention/planning which are unique to men/partners that are not captured by the partner LMUP. We did not carry out our own independent qualitative fieldwork, such as an body of in-depth interviews focused on men's/partner's conceptualisations of pregnancy intention/planning. There is relatively little existing qualitative work to draw on but what there is available suggests that men's conceptualisations of pregnancy intention largely overlap with women's.(69) There may, however, be other aspects too. For instance, a range of ideas about responsibility for pregnancy exist,(70-75) there appears to be an ideal of financial stability as a pre-requisite for pregnancy planning,(72, 76, 77) and there is a possible pejorative discourse of unintended pregnancy as entrapment among a minority of men.(69, 71)

Our sample included two female partners. Our partner questionnaire was originally focussed on partners being of male gender but we quickly realised during data collection that there would be some female partners. The wording of the partner LMUP was gender neutral apart from the phrase "in terms of becoming a father" in item 2 (one female partner omitted the item, the other answered). Both female partners answered sufficient items to have a total LMUP score. So, although not perfect, the partner LMUP appeared to be usable by female partners. It would be possible, if desired, to change the phrase in item 2 to "in terms of becoming a parent" to ensure completely gender neutral wording. However, social and legal change in the UK has been rapid over the last 10-15 years, the trend towards same-sex couples having children is set to increase, and the awareness of the needs of same-sex couples (and other modern forms of family formation) by researchers, including ourselves, and maternity services has grown. In the longer term, further work to assess the content validity of the partner LMUP among partners (including male, female, trans, non-binary etc) may determine whether separate partner versions for men and other groups may be a more suitable way forward.

Limitations

The sample was a convenience sample of partners (mainly men, but also two women) who were in antenatal clinics. Therefore they were likely to be the partners who had personal employment circumstances that allowed them to attend the clinic, and possibly were those who were more invested in their partner's pregnancy. Our sample was under-represented in terms of the partners of black and mixed ethnicity women, those with below degree level education, and those not living with a partner, all factors known to be associated with unplanned pregnancies. Also, being a sample drawn from antenatal clinics, pregnancies ending in abortion were excluded. The overall effect of this sample composition was that lower intention pregnancies were under-represented. In Classical Test Theory (the basis for this analysis), the composition of the sample and the distribution of the construct (pregnancy planning/intention, which we know is highly socially patterned) can affect the psychometric properties produced. For instance, the endorsements of item response options on items 1-5 included some very high values (the bias towards planned pregnancies), and these values would likely be more in the mid-range in a more balanced sample. Similarly, therefore, item 6 (pre-conceptual preparations) with its lower endorsement stands out as different to the other items in this analysis, appearing to perform less well. In fact nearly half the sample reported at least one pre-conceptual preparation and this "poorer" performance of the item is likely an artefact of the pattern of endorsements. There is no suggestion that the item was irrelevant, nor that it was being misunderstood. Overall, even with the under-representation of unplanned pregnancies in the sample and its effect on item endorsement patterns, the partner LMUP performed well in terms of its psychometric properties.

As the data collected in our sample were anonymous, it was not possible to re-contact survey participants to assess the stability (test-retest reliability) of the partner LMUP, so ideally this should be tested in future studies. In terms of construct validity, unlike the women's LMUP, we did not carry out any hypothesis tests of expected relationships of the construct with other variables. Although we can make guesses at relationships, actual empirical evidence is limited currently and we were not sufficiently confident to form hypotheses against which the partner measure would be judged (as opposed to an exploratory analysis which one could conduct outside a psychometric evaluation). We hope that over time, with greater research interest in partner's perspectives on pregnancy planning/intention, the evidence base in this area will increase and this new form of measurement will assist this.

Conclusions

The partner LMUP performed well in terms of reliability and validity according to internationally-accepted criteria for the performance of psychometric measures. Therefore it is a good partner measure to the female LMUP in research on couples. The partner LMUP is certainly better than existing single survey questions (or sets of survey questions) on pregnancy intention/planning. However, we recommend further research relating to the concept of pregnancy intention/planning among partners of all gender identities to know whether there are any key additional areas of the construct that would be important to

represent in the content to enhance measurement. In particular, we recommend further conceptual exploration with men who have experienced unplanned pregnancies.

Abbreviations

CFA – Confirmatory factor analysis

LMUP – London Measure of Unplanned Pregnancy

PCA – Principal components analysis

SD – Standard deviation

Competing interests

The authors declare there are no competing interests.

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