Exploring the relationship between male norm beliefs, pain-related beliefs and behaviours: An online questionnaire study

E. Keogh [a *] & K. E. Boerner [b]

[a] University of Bath, UK; [b] Dalhousie University & IWK Health Centre, Canada

[*] Correspondence: Edmund Keogh, Department of Psychology, University of Bath, Claverton Down, Bath, BA2 7AY, United Kingdom, Tel: +44(0)1225 383671; Fax: +44(0)1225 386752; E-mail: e.m.keogh@bath.ac.uk

Running head: Male norm beliefs and pain

Type of manuscript: Original Article

Funding source: KB was supported in part by the Canadian Institutes of Health Research, and received a CIHR Michael Smith Foreign Study Supplement, which enabled this work to be conducted.

Conflict of interests: EK has received unrelated research grants from Reckitt Benckiser Healthcare (UK) Limited, and provided unrelated consultancy services to RB UK Commercial Ltd.

Significance: Pain experience was associated with reduced beliefs in traditional male norms in both men and women. Such beliefs were also related to stigma associated with help seeking for pain. This study confirms that gender-related factors, especially those associated with stereotypical views about male roles, contribute to pain-related beliefs and behaviours.

Keywords: pain, sex, gender, male norms; stereotypes; masculinity, coping, stigma

Abstract

Background: Gender beliefs help explain the variation found in pain amongst men and women. Gender norms and expectations are thought to affect how men and women report and express pain. However, less is known about how such beliefs are related to pain outside of laboratory settings. The aim of this study was therefore to consider the relationship between beliefs in male role norms, pain and pain behaviours in men and women.

Methods: An online questionnaire study was conducted. A total of 468 adults (352 females), with or without pain, completed a series of self-report measures relating to beliefs about pain and male role norms, as well as pain and general health behaviours.

Results: An experience of pain was associated with lower beliefs in traditional male norms. Endorsing stereotypical male norms was related to increased stigma associated with seeking professional help for pain in both men and women, but to a lesser extent associated with general health behaviours. There also seemed to be gender-based beliefs associated with the expression of pain.

Conclusions: Together these findings suggest that beliefs in gender (male) norms are relevant to pain, and that there is utility in exploring variation in pain beyond binary male-female categories.

1. Introduction

Gender provides a framework to understand the variation in pain (Bernardes, Keogh, & Lima, 2008; Boerner et al., 2018). Gender points to socially-learnt beliefs about how men and women should behave when in pain. Traditional masculine norms align with stoicism and reduced willingness to express pain, whereas feminine norms allow for greater emotionality and help seeking. Experimental studies confirm that identification with masculine traits are associated with higher pain thresholds, and identification with feminine traits to greater pain sensitivity (Alabas, Tashani, Tabasam, & Johnson, 2012). Gender also affects how pain is expressed and responded to (Bernardes & Lima, 2010; Bernardes, Silva, Carvalho, Costa, & Pereira, 2014; Robinson et al., 2001; Wratten, Eccleston, & Keogh, 2019).

Gender is also a complex, multifaceted concept, which has not been fully explored within pain (Boerner et al., 2018; Keogh, 2015). For example, not only do gender beliefs affect pain (Ahlsen, Bondevik, Mengshoel, & Solbraekke, 2014; Keogh, 2015), but pain can also affect gender e.g., pain can have a demasculinizing effect. Fortunately, there is related literature on the way gender beliefs affect how men and women approach their health, which may translate to pain (Addis & Mahalik, 2003; Connell, 1995; Levant, 2011). This work often focuses on traditional masculine beliefs, which are associated with poorer health behaviours (e.g., alcohol consumption) and a reluctance to seek help (Leone, Rovito, Mullin, Mohammed, & Lee, 2017; Sloan, Conner, & Gough, 2015; Yousaf, Grunfeld, & Hunter, 2015). Relating this to pain, those who have strong stereotypical views around masculinity may be less comfortable expressing pain to others and be less likely to seek treatment for pain (Keogh, 2015). Such beliefs may also affect how a person views, and responds to, the expressions of pain of others. It would seem useful to consider

these themes further, and to help understand how stereotypical gender views relate to pain beliefs and behaviours.

The primary aim of the current study was to consider the relationship between beliefs in male role norms, pain and pain behaviours. The study drew on the gender and health literature, where research into gender norms, emotional expression and barriers to help seeking is well established. Since much of this work focuses on masculinity and male norms, we looked at these constructs also. We also explored these constructs in both men and women, since masculinity and male norms are not exclusively relevant to biological males (Hyde, Bigler, Joel, Tate, & van Anders, 2018). Women hold beliefs about male norms, and can be socialised to adopt masculine behaviours, and so these constructs are potentially relevant how women view and respond to pain.

It was predicted that men, and those not currently in pain, would report greater stereotypical male role beliefs. Furthermore, those holding stronger traditional views about male roles were expected to be less willing to consult with healthcare professionals about pain, and have poorer health behaviours. Finally, those with stereotypical male role views were expected to consider expressions of pain as more characteristic of women than men.

2. Methods

2.1 Design and participants

The current study comprised of a cross-sectional online survey. A total of 641 participants were opportunistically recruited through advertisements, social media posts etc. Of these, 468 individuals (116 males and 352 females) completed all measures, and formed the final sample (see Supporting Information TableS1 for core characteristics). Thus of those that started, 73% continued to the end of the survey.

Of those that did not compete, 65 withdrew immediately after consenting and without providing basic demographics relating to sex or age. An additional 108 individuals (37 males, 71 females) provided demographic data and started, but did not continue to the end.

We examined whether there were differences in demographics between those who completed the study and those who started but did not finish it. There was a significant difference in age, t (572) =3.04, p = .003, in that non-completers were younger (M = 30.17 years, SD = 12.84) than finishers (M = 35.12 years, SD= 14.39). A 2x2 Pearson Chi square analysis found a significant association between sex of participant and completion, $\chi 2$ (1) = 4.04, p = .045; a higher proportion of women who started the survey, finished it (83.2%), than the proportion of men who finished it (75.8%). There was no significant association in completion amongst those who reported a pain experience within the past 3 months, $\chi 2$ (1) = .00, p=1.00, or those with a painful experience lasting more than 3 months, $\chi 2$ (1) = 2.64, p = .10. Together this suggests that compared to those who did not complete the survey those who finished were older and female, but similar in reported pain status.

2.2 Measures

Participants completed questionnaires about their pain and general health status, pain attitudes and behaviours, and gender-based beliefs. The measures were split into two parts. The first included measures around the key constructs of interest: pain status (including interference), male gender norms, health behaviours, and stigma associated with seeking help for pain. Those who reported experiencing some form of pain were also asked a subset of questions about their pain and pain behaviours. Here, we drew on a study by Sloan et al. (2015), which informed our

choice of general health behaviours, which might relate to pain. The second part focused on pain communication, and since there are no suitable scales, we needed to develop bespoke measures (details below). Given that these latter scales are not validated outside this study, we considered this as exploratory. All measures administered are listed below, and were completed by all participants, unless otherwise stated:

2.2.1 Core measures

Demographics. Participants were asked about their sex, gender identity, sexual orientation, age, ethnicity, and level of education (see Supporting Information Table S1). We are aware that some use the term sex to exclusively mean biological differences. However, we are not making that assumption here, and simply asked participants to self-identify their sex as ‘male’ or ‘female’. Although non-binary options were provided for sex, all participants responded with either ‘male’ or ‘female’. For the purposes of the current study we therefore use the term sex to refer to the binary male-female classification. Gender is used to refer to constructs such as masculinity and femininity, and other gender-related variables.

Pain status. Participants indicated whether they had experienced any type of pain within the last past 3 months. Those who reported pain were asked whether it had lasted for longer than 3 months. This information was used to assign participants into one of three pain status groups: persistent pain (greater than 3 months), acute pain (less than 3 months), or no pain. This approach has been successfully used to designate pain status in previous studies (Attridge, Keogh, & Eccleston, 2016; Attridge, Noonan, Eccleston, & Keogh, 2015).

Pain experience. If participants indicated a pain experience, they were asked a subset of questions about the nature of their pain and related behaviours (see Supporting Information Tables S1 and S2). Number of painful events was determined through a checklist of commonly experienced conditions (e.g., arthritis, headache, injury, dental pain). An 'other' open text box was also included if their particular condition was not presented. Participants also indicated the frequency of their primary pain (e.g., all the time, daily, weekly, monthly etc.), average intensity of the pain on a 0-10 numerical rating scale, use of prescription and over-the-counter analgesics, as well as whether they had sought help from a healthcare professional for their pain. Checklists were also used to indicate pain information seeking activity (e.g., health professional, physician, friends, Internet), commonly used pain coping behaviours (e.g., taking analgesics, distraction, rest, alcohol), and concerns around medication usage/reasons for not taking analgesics.

Cognitive intrusion from pain. The Cognitive Intrusion from Pain (CIP) scale (Attridge, Crombez, Van Ryckeghem, Keogh, & Eccleston, 2015) was used to measure the extent to which pain has an interruptive effect. The 10-item scale asks participants to indicate the extent to which pain dominates thinking, each scored on a 7-point Likert-type scale: 0 (*not at all applicable*) through to 6 (*highly applicable*). For example, items ask whether pain interrupts thinking, or whether pain intrudes on thoughts. Items are summed, with a higher value indicating greater pain intrusion. The scale has good reliability, and can be used to differentiate between those with and without pain (Attridge, Crombez, et al., 2015).

Health behaviours. The Health Behaviours Inventory – 20 (HBI-20) (Levant, Wimer, & Williams, 2011) comprises of 20 statements to which participants indicated their level of agreement on a 7-point scale, with 1 indicating *strongly disagree* and 7

indicating *strongly agree*. Items related to different healthy and unhealthy behaviours, such as consumption of fat and sugar, through to physical examinations and health checks. The scale produces 5 subscales, three associated with health promotion (diet, self-care, health care use) and two subscales relate to risky health behaviours (anger and stress). The risky behaviours are reverse scored so that a high score on each scale indicated greater healthy behaviours. A total health behaviours score was used.

Stigma associated with seeking help for pain. We used an adapted version of the Self-Stigma Of Seeking psychology Help scale (SSOSH) (Vogel, Wade, & Haake, 2006). The original 10-item version has been extensively used to assess self-stigma associated with seeking psychological help, and has good reliability (Vogel et al., 2006). As we were interested in pain, we adapted it to focus on stigma associated with help seeking for pain from a health professional. Participants indicated on five-point scale the extent they agreed with each item. *Strongly disagree* was scored 1, through to 5 for *strongly agree*, with a higher total score indicating a greater degree of stigma associated with seeking help for pain. Since this is a new version of the SSOSH scale, reliability was calculated (alpha = .85), which was found to be acceptable.

Male Role Norms. The Male Role Norms Scale (MRNS) (Thompson & Pleck, 1986) measures attitudes associated with traditional male roles. It contains 26 items that ask respondents to indicate their level of agreement on a 7-point scale, with 1 indicating *strongly disagree*, and 7 indicated *strongly agree*. Three subscales are calculated. The first subscale (11 items), “status”, contains items associated with expectations that males should have status, confidence and success. The second subscale (8 items), “toughness”, relates to expectations around independence and

strength. The final subscale (7 items) is labelled “anti-femininity”, with items relating to avoiding activities that are viewed as traditionally feminine. A higher score indicates greater agreement with each construct. The subscales have good reliability, and considered a good measure of gender role ideology (Thompson & Bennett, 2015; Thompson & Pleck, 1986).

2.2.2 Exploratory measures around pain communication

Willingness to communicate pain to others. As well as stigma associated with seeking help for pain, we were interested in willingness to communicate pain to others. Given the lack of an appropriate measure, we create a new scale that contained different people who might be consulted when someone is in pain. Of the items, 5 referred to different health care professionals (doctor, nurse, physiotherapist, psychologist, other), and 4 to non-healthcare individuals (partner, family, friends, co-workers). Participants indicated how comfortable they would be (1) discussing their pain, and (2) displaying their pain (e.g., nonverbal signals, such as crying, grimacing etc.) with each individual. An 11-point scale was used, with 0 indicating *not comfortable at all*, and 10 indicating *extremely comfortable*. Two principle components analysis (PCA) with Varimax rotation were conducted, one on the discussing pain responses, and the other on the displaying pain responses. Both PCAs indicated two component solutions, whereby items on component 1 related to those individuals with health professional status, and those on component 2 were the non-healthcare individuals. Four separate total scores were therefore calculated. These were checked for item reliability, which was satisfactory: discussing pain with health care professionals (alpha = .89), discussing pain with non-health care professionals (alpha = .82), displaying pain to health care professionals HCP (alpha = .93), displaying pain to non-health care professionals (alpha = .84).

Gender Expectations of Pain Expression. To determine whether participants had gender-related expectations around the expression of pain we needed to construct a new measure. We selected seven commonly used ways of expressing pain (i.e., grimacing, holding the body, moaning, wincing, crying, talking about pain, suppressing/hiding pain), which reflected verbal and nonverbal channels. We asked participants to indicate on a five-point Likert scale whether each item was more typical of women, more typical of men, or if there was no difference. It was scored from -2 through to +2 with anchors, respectively, phrased as "*much more typical in women*" through to "*much more typical of men*". The middle option (scored 0), indicate that the item was considered equally typical of men and women. A positive score indicates a gender expectation bias of the behaviour being considered more typical of men, and a negative score reflective of a bias of the behaviour being considered more typical of women.

Gender-based health seeking preference for pain. We asked all participants whether they would prefer to see a healthcare professional of the same gender about their pain. Responses included preference for same or opposite gender, or no preference. We also allowed an option to indicate if preference depended on the type/nature of the pain.

Additional measures: other measure were administered as part of a wider study, but were not included in the current investigation: International Physical Activity Questionnaire and Body Mass Index (BMI)

2.3 Procedure

Ethical committee approval was granted for the study. Participants comprised of adults who responded to a request to take part in a study into gender and pain.

The study was advertised on a UK University news page, through a University press release, and through the social media platform Twitter. A dedicated webpage provided a description of the study, and a link to the survey. Following informed consent, participants were presented with the main survey questions. Participants could withdraw at any time, and did not have to answer any question they did not want to. Participation was anonymous, and took between 30-40 minutes to complete.

2.4 Statistical analyses

Data screening examined for missing data, outliers, and normality of distributions. To determine whether sex and pain status produced differences in scale scores, a series of MANOVAs or ANOVA's were conducted with sex (male vs. female) and pain status (no pain vs. acute pain vs. persistent pain) as between-groups factors. When significant main effects of pain status, or significant interactions were found, post-hoc comparisons with a Sidak correction were conducted. To determine whether gender-based beliefs explained additional variance in outcomes, over and above that provided by sex, a series of hierarchical multiple regressions were conducted. Age was entered at the first block, followed by sex and pain group status at the second block. Pain status was dummy coded into two variables: acute pain vs. not; persistent pain vs. not. At the third block, we entered the three subscales from the male role norms scale (MRNS). The order of entry at each block was the same across analyses, with items within each block entered together (i.e., fixed). We examined for a significant change in R^2 between each block. Chi Square analysis were conducted when considered group frequency differences, and correlations conducted between our exploratory pain communication measures and gender-based ideology.

3. Results

3.1 Data screening

All scale variables were initially screened for missing values (Tabachnick & Fidell, 2007). Where the missing items were less than 20% of the total number of items in the scale, we used a group mean substitution (for example, for the stigma scale, there are 10 items; if there were up to 2 missing items, these were replaced with the sample mean). Distributions were checked by viewing histograms, and none were found to be skewed. All scales were checked for outliers, using z scores with ±3.29 as a cut off. When extreme outliers were detected, we followed the recommendations of Tabachnick and Fidel (2007) and lowered/increased the score to the next highest scores. This approach was used on the adapted SSOSH-pain scale (3 participants), male role norm - status (1 participant). When we ran the analyses on the original and screened data (with outlier corrections), the pattern of results was essentially the same.

3.2 Descriptive information and group characteristics

Participant information, including pain experience, can be found in Supporting Information Tables S1 and S2. Means and standard deviations for the various scales, by sex and pain status are presented in Table 1. We examined whether there were any difference in the frequency of males and females in each pain group using a Chi-Square test of association. This was not significant, $\chi 2$ (2) = .07, p = .97, indicating the proportion of males and females in each pain group was similar. We also considered whether there were any age-related differences across sex and pain status groups, by conducting a 2x3 ANOVA. Significant main effects were found for sex, F (1,461) = 7.80, p < .005; η_p^2 = .02, and pain status group, F (2,461) = 19.42, p

< .001; η_p^2 = .08. Males (*M* = 39 years) were older than females (*M* = 34 years), and those reporting persistent pain were generally older (*M* = 41 years) than those with acute (*M* = 33 years) or no pain (*M* = 30 years). This is to be expected, and age was included in the analyses where appropriate.

3.3 Main Analyses

3.3.1 Effect of pain status and sex on core measures

The first set of analyses sought to determine whether sex differences in core pain, gender role norms, and health-related attitudes and behaviours would be moderated by pain status. MANOVAs contained sex (male vs. female) and pain status (no pain vs. acute pain vs. persistent pain) as between-groups variables.

Self-stigma. For the SSOSH-pain scale, there were no significant main effects for sex, *F* (2, 462) = 2.09, *p* = .15; η_p^2 = .00, or pain status, *F* (2, 462) = 1.62, *p* = .20; η_p^2 = .01), or a significant interaction between the two, *F* (2, 462) = 1.78, *p* = .17; η_p^2 = .01. Co-varying age did not affect this pattern of effects.

Cognitive intrusion from pain. The ANOVA indicated a significant main effect for pain status, *F* (2, 461) = 4.87, *p* = .01; η_p^2 = .02. Post hoc comparison with Sidak correction indicated a significant difference between those with persistent (*M* = 38.94) and acute (*M* = 33.72) pain, but not compare to those with no pain, (*M* = 36.31). There was no significant main effect of sex, *F* (2, 461) = 3.06, *p* = .08; η_p^2 = .01, or a significant interaction between sex and pain status, *F* (2, 461) = 2.03, *p* = .13; η_p^2 = .01. Co-varying age did not affect this pattern of effects.

Health behaviours. ANOVA revealed a significant main effect for sex, with males (*M* = 16.41) reporting slightly higher healthy behaviours than females (*M* = 15.56), F(1, 461) = 7.82, *p* < .005; η_p^2 = .02. A significant main effect of pain status was also found (no pain *M* = 16.35, acute pain *M* = 16.10, persistent pain *M* = 15.11), *F* (2, 461) = 3.70, *p* < .05; η_p^2 = .02. Post-hoc comparisons with a Sidak correction revealed that the persistent pain group had significantly lower health scores than both of the other groups, *p*<.05. If age was added as a covariate, then the pain-related group differences were no longer significant. However the main effects of sex remained significant.

Male Role Norms Scales. The three MRN subscales were entered into a MANOVA. There was a multivariate main effect of sex, *F* (3, 458) = 13.73, *p* < .001; Wilk's Λ = .92, η_p^2 = .08, and for pain status, *F* (6, 916) = 3.05, *p* < .01; Wilk's Λ = .96, η_p^2 = .02, but no significant interaction, *F* (6, 916) = .48, *p* = .82; Wilk's Λ = .99, η_p^2 = .00. For sex, significant univariate main effects were found for all three subscales in the expected direction of higher scores in males: status (male *M* = 40.60, female *M* = 37.20), *F* (1, 460) = 10.61, *p* < .001; η_p^2 = .02), toughness (male *M* = 28.68, female *M* = 23.68), *F* (1, 460) = 39.87, *p* < .001; η_p^2 = .08, anti-femininity (male *M* = 20.18, female *M* = 16.53), *F* (1, 460) = 22.74, *p* < .001; η_p^2 = .05. For the main effect of pain status, significant univariate effects were found for all three scales: status (no pain *M* = 41.61, acute pain *M* = 38.08, persistent pain *M* = 36.40), F(2, 460) = 6.51, *p* < .005; η_p^2 = .03, toughness (no pain *M* = 27.38, acute pain *M* = 25.09, persistent pain *M* = 23.68), *F* (2, 460) = 5.79, *p* < .005; η_p^2 = .03, anti-femininity (no pain *M* = 19.61, acute pain *M* = 17.16, persistent pain *M* = 16.82), *F* (2, 460) = 3.87, *p* < .05;

η_p^2 = .02. For all three subscales, post-hoc comparisons with a Sidak correction indicated that there were significant differences, p<.05, between the no pain group and both the acute and persistent pain groups. No differences were found between the acute and persistent pain groups. This suggest that experience of pain might be associated with a lower endorsement of stereotypical male norms. There were no significant interactions between sex and pain status for any of the subscales: status, F (2, 460) = .67, p = .51; η_p^2 = .00, toughness, F (2, 460) = .07, p = .93; η_p^2 = .00, anti-femininity scale, F (2, 460) = .14, p = .87; η_p^2 = .00. When controlling for age, this resulted in a non-significant effect of pain on male status and anti-femininity, but the group difference on toughness remained significant.

Tables 1-4 here

3.3.2 Association of male gender norms with core outcomes

The second set of analyses addressed whether gender-based male norms adds to the explanation of health and pain in addition to that provided by binary sex classification i.e., male vs. female. This was examined through a series of hierarchical regression analyses in which we enter age at the first block, sex and pain status (dummy coded) at the second block, and the male role norm subscales at the third block. Outcome variables were stigma associated with seeking help for pain, pain interference, and general health behaviours. In the regression analyses we use the commonly used terms ‘predictor’ and ‘outcome’ to differentiate our variables. However, this is a cross-sectional study, and so results need to be

interpreted as tests of association rather than causation. Tables 2-4 present a summary of results.

Predicting stigma in seeking support for pain. Overall R^2 was significantly related to the predictor variables, $R^2 = .07$; F (7, 457) = 5.21, $p < .001$ (see Table 2). Age was a significant negative predictor at block 1, whereas none of the variables added at block 2 (sex and pain status) significantly improved R^2. However, when the MRNS subscales were entered at block 3, a significant change was found in R^2. All three of the male role norms subscales were significantly associated with stigma. Interesting, whereas status and anti-femininity were positively associated, toughness was negatively associated with stigma. Inspection of univariate correlations indicate a non-significant positive association between toughness and stigma, $r = .03$, $p = .25$. This suggest that toughness may be operating as a suppressor variable.

*Predicting cognitive intrusion from pain***.** For cognitive intrusion the overall model was only significant at the second block, $R^2 = .02$; F (4, 460) = 2.98, $p < .05$ (see Table 2). The only significant predictor was sex, beta = .11; $t = 2.28$, $p < .05$, with females reporting greater intrusion. Male role norms did not contribute to explained variance.

Predicting health behaviours. The overall model was significant, $R^2 = .12$; F (7, 457) = 10.06, $p < .001$ (see Table 2). Age was a significant predictor at block 1. Block 2 variables improved the explanation of R^2, with sex being the only significant predictor (males reported better health behaviours). Although the change in R^2 was significant at block 3, none of the male role norms variables were significant.

3.4 Exploratory analyses on pain communication

3.4.1 Sex and pain status differences in pain communication

Discussing pain/displaying pain to others. A MANOVA was conducted on the four communicating pain to others scales (see Table 3). No significant multivariate or univariate effects were found for pain status or sex on any variable, either as main effects or in interaction. Controlling for age did not change this pattern.

*Gender expectations of pain expression***.** To determine whether there are gender-related biases for expressions of pain (for means see Table 3), we conducted a series of one-sample t-tests on each of the seven pain expression items, with 0 as the comparison chance level (i.e., no gender-bias). There were significant differences (see Figure 1). Holding the body (*M* = -.19), *t* (463) = -5.06, *p*< .001, moaning (*M* = -.12), *t* (463) = -2.64, *p* < .01), crying (*M* = -1.19), *t* (463) = -36.10, *p* < .001, and talking about pain (*M* = -.83), *t* (463) = 19.30, *p* < .001, were viewed as more indicative of women, whereas suppressing/hiding pain was viewed as more typical of men (*M* = .64), *t* (464) = 12.85, *p* < .001.

These items were also entered into a 2x3 MANOVA, with sex (male vs. female) and pain status (no pain vs. acute pain vs. persistent pain) as the between-groups factors. An overall multivariate effect of sex was found, *F* (7, 452) = 4.09, *p* < .001; Wilk's Λ = .94, η_p^2 = .06. The main effect of pain status, *F* (14, 904) = 1.14, *p* = .31; Wilk's Λ = .97, η_p^2 = .02, and the interaction was non-significant, *F* (14, 904) = 1.49, *p* = .11; Wilk's Λ = .96, η_p^2 = .02. Univariate analysis indicated significant main effects of sex for holding the body (males *M* = -.02, females *M* = -.24), *F* (1, 458) = 10.04, *p* < .005, η_p^2 = .02, and suppressing/hiding pain (males *M* = .90, females *M* = .56), *F* (1, 458) = 6.86, *p* < .01, η_p^2 = .02. In addition, a significant univariate main effect of pain status was found for suppressing/hiding pain (no pain *M* = .96, acute pain *M* = .55, persistent pain *M* = .61), *F* (2, 458) = 3.02, *p* < .05, η_p^2 = .01. Post-hoc

comparisons with a Sidak correction indicated significant differences between no pain and acute pain groups, and between no pain and persistent pain groups (p<.05). No significant differences were found between the acute and persistent pain groups. A significant interaction was found between sex and pain status for holding the body, F (2, 458) = 3.43, p < .05, η_p^2 = .02. Follow-up analysis showed no sex difference in the acute pain group (p = .92), whereas for the no pain (p < .05) and persistent pain groups (p < .01), female participants viewed holding the body as more typical of females than males. Controlling for age removed the pain group effects, as well as the sex differences for moaning. The rest remained in a similar direction as reported above.

Preference of gender of healthcare professional. A 2x4 Chi square analysis was conducted on the healthcare professional preferences given by males and females. A significant association was found, $\chi 2$ (3) = 20.19, p < .001. More males (72%) than females (51.1%) indicated no preference, whereas more females (33.8%) than males (15.5%) indicated that it would depend on the type of pain. A relatively smaller proportion of participants indicated that they would prefer a same (male = 7.8%; female = 12.8%) or opposite-sex healthcare professional (male = 4.3%; female = 2.3%).

Figure 1 here

3.4.2 Correlations between pain communication measures

The final analyses examined whether there were significant relationships between male role norms, discussing pain/displaying pain to others and gender expectations for pain expressions. Table 4 shows higher male role norms was related to lower comfort in discussing pain with healthcare professionals. Male role norms were also related to some of the gender-based pain expression expectations. Those with higher male role norm beliefs where more likely to view moaning, crying and grimacing as typical of female pain expressions, and viewed suppressing/hiding pain as more indicative of typical male pain expressions.

4. Discussion

Those experiencing acute or persistent pain reported less pronounced stereotypical beliefs that men should be strong and stoic, when compared to those without pain. This occurred independently of binary sex classification. One possibility is that lower stereotypical beliefs about male roles mean participants are more likely to feel comfortable reporting pain, as this would not be interpreted as challenging or threatening. An alternative intriguing possibility is that experiencing pain might reduce beliefs around masculine stereotypes. This latter explanation is consistent with views that pain can have a demasculinizing effect, both in terms of how men perceive themselves, as well as how others perceive them (Ahlsen et al., 2014; Bernardes & Lima, 2010). These findings also suggest the relationship between male gender norms and pain occurs in both men and women. It would be interesting to consider whether pain experiences generally challenges preconceptions about being stoic, tough and independent, and whether resistance to appearing ‘weak’ or ‘dependent on others’ leads to a more difficult adjustment to pain.

As expected both binary sex category and gender beliefs were related to pain beliefs and behaviours. However, the precise nature of this relationship varied. Sex had a stronger association with cognitive interference and health behaviours, whereas male norm roles related more to help seeking beliefs. This difference could reflect relatively weak or inconsistent associations between variables. Alternatively, and perhaps more likely, is that binary sex and gender beliefs are differentially associated with health and pain, and only by examining both is it possible to identify and understand the relative relationship they have with pain.

These sex and gender findings are worth considering further. The sex difference in cognitive intrusion from pain is consistent with the study by Attridge et al. (2013), who found women reported higher interference than men. Since gender has not previously been considered in this context, the current study suggests that these male-female differences are less likely linked to (male) gender-based ideology. Alternatively, other gender-based constructs may be more important. For example, expectations around femininity might lead to greater vigilance for signals of pain (in others), and more so in women. A stronger role for binary sex was also found for general health behaviours, with males reporting better health. This was surprising given that men are thought to engage in poorer health behaviours (e.g., greater alcohol use, fewer healthcare checks). For example, Sloan et al. (2014) found UK males to report higher negative health behaviours, including higher saturated fat and alcohol consumption. However, even in this study patterns were mixed (e.g., men reported greater physical activity and fibre intake), and for some variables, binary sex was found to be a stronger predictor than gender. There are also other examples of inconsistencies, including studies that find no differences in health seeking behaviours between men and women (Wang, Freemantle, Nazareth, & Hunt, 2014).

Explanations for the variation in patterns found across studies are unclear at present, and so further research is required before making definite conclusions.

We also found examples where male gender ideology played a stronger role than binary sex. Male role norms were related to stigma in seeking help for pain, which is consistent with views that stereotypical masculine ideology can be a barrier to support seeking. Our findings extend this to pain, and suggests masculine ideology may be a relevant barrier for women also. Interestingly, we found that male role norms were related to discussing pain with healthcare professions (with greater endorsement of male role norms related to less comfort in discussing pain), and less so with friends and family. Further exploration of the role gender norms have for both men and women is warranted, especially around support seeking for pain.

We also considered gender expectations around pain expression. Women were generally thought to use vocal and emotional methods for expressing pain more (talk about pain, crying), whereas men were expected to hide or suppress pain. Furthermore, for the items showing the strongest male gender expectations (i.e., supressing/hiding pain), the bias was more pronounced amongst men i.e., men viewed supressing pain as more typical of men. A similar effect was not found for crying, however, although we did find women viewed holding the body as more indicative of a how women express pain. These findings are consistent with work into gender-based expectations around pain coping (Keogh & Denford, 2009; Wratten et al., 2019). They also relate to evidence that gender-based expectations affect how healthcare providers judge the pain of others (Bernardes, Costa, & Carvalho, 2013; Hirsh, Hollingshead, Matthias, Bair, & Kroenke, 2014; Samulowitz, Gremyr, Eriksson, & Hensing, 2018; Schafer, Prkachin, Kaseweter, & Williams, 2016). For example, Schafer et al. (2016) found that trainee health professionals appraised women’s pain

as less trustworthy, and in need of psychological support. It would be fascinating to see whether stereotypical views about the expression of pain affects how observers' interpret the pain of others, and if this affects helping behaviours.

The cross-sectional self-report nature of this study means we cannot infer causal effects. It is unclear whether gender ideology leads to differences in pain behaviour, and whether the experience of pain produces to shifts in gendered behaviours and perceptions. The sample was also self-selecting, responding to an invitation to participate in a gender and pain study. Demographics suggest the sample to be well educated, and a higher number of women than men completed it. It is possible the sample is unrepresentative of the wider population. There is related evidence that gender-related factors affect recruitment into pain studies, which may produce a selection bias (Boerner, Eccleston, Chambers, & Keogh, 2017; Feijo et al., 2018). Gender-related associations are also likely to be influenced by age, generational cohort, and cultural effects regarding the internalized gender beliefs and ideologies that a given group were exposed to. Caution is also required, given the variance explained was small, and moderately sized sample. This points to a need to identify other factors that may be more strongly involved. Whilst we need to appreciate these limitations, the current study should be viewed as a starting point for future research. There is merit in extending this work, starting with experimental and prospective longitudinal approaches to establish causal links between gender and pain, before moving on to inform interventional-based approaches.

We focused on one type of gender ideology, and so consideration of other constructs is warranted (Thompson & Bennett, 2015; Tobin et al., 2010). Beliefs around femininity may be associated with a greater willingness to express pain and seek help, and so we should consider whether beliefs around female role norms

contribute to how pain is viewed and judged. Given that gender approaches highlight how beliefs about male and female roles are socially learnt (Bussey & Bandura, 1999), future studies should consider developmental aspects of the acquisition of such gendered constructs, how this interacts with biological sex, and examine links with the pain behaviours of men and women. The current findings suggest that the gendered context of pain is relevant, and so further research should consider the way in which such beliefs impact on interpersonal interactions around pain. This would build on recent work that examines the sex of those involved in dyadic interactions around pain, which might affect how individuals express pain (Boerner, Chambers, McGrath, LoLordo, & Uher, 2017; Edwards, Eccleston, & Keogh, 2017; Gougeon, Gaumond, Goffaux, Potvin, & Marchand, 2016; Vigil & Alcock, 2014). Greater focus should be placed on the gendered beliefs of observers, and how this affects the way in which they understand and respond to another person's pain.

The potential clinical relevance of these findings are also worth considering. For example, both binary sex classification and gender-based attitudes could be considered when designing and delivering pain management programmes. Like other aspects of health, some components of pain management may need to target men and women in different ways, whereas for others, the focus may need to be on gender-based beliefs and behaviours that are common to men and women. Given the present findings of gender-related barriers associated with help-seeking for pain, health care systems could consider ways to make pain services more accessible and less stigmatizing to individuals who endorse strong masculine beliefs (Leone et al., 2017). Whilst we considered whether male role norms relate to cognitive interference, there are other functional outcomes that may be related to gender beliefs, including social and work-related outcomes, which could be considered.

Similarly, it would be fascinating to explore whether clinically relevant process variables impacts on the relationship between gender-based beliefs and clinical outcomes for pain. Finally, there is a need to understand whether the gender-based beliefs of healthcare professionals are associated with treatment decisions.

In conclusion, this study demonstrates merit in taking a contemporary gender approach to pain. This allowed us to identify new themes relevant to pain, focusing our attention on health behaviours, pain communication, and help seeking. This is a starting point, opening up a range of different directions in which we can take to better understand, and ultimately, manage the pain experiences of men and women.

5. Acknowledgements/conflict of interest statement

KB was supported in part by the Canadian Institutes of Health Research, and received a CIHR Michael Smith Foreign Study Supplement, which enabled this work to be conducted. KB is now at the University of British Columbia and BC Children's Hospital, Vancouver, Canada.

EK has received research grants from Reckitt Benckiser Healthcare (UK) Limited, and provided unrelated consultancy services to RB UK Commercial Ltd.

This work has been presented at the following conferences: British Pain Society Annual Scientific Meeting, UK (2017), European Health Psychology Society Conference, Ireland (2018).

6. Author contribution

EK conceptualised the study, led the analysis, interpreted the results and wrote the manuscript. KB conceptualised the study, collected the data, contributed to the interpretation of findings and writing of the manuscript.

7. References

Addis, M. E., & Mahalik, J. R. (2003). Men, masculinity, and the contexts of help seeking. *American Psychologist, 58*(1), 5-14. doi:10.1037/0003-066x.58.1.5

Ahlsen, B., Bondevik, H., Mengshoel, A. M., & Solbraekke, K. N. (2014). (Un)doing gender in a rehabilitation context: A narrative analysis of gender and self in stories of chronic muscle pain. *Disability and Rehabilitation, 36*(5), 359-366. doi:10.3109/09638288.2013.793750

Alabas, O. A., Tashani, O. A., Tabasam, G., & Johnson, M. I. (2012). Gender role affects experimental pain responses: A systematic review with meta-analysis. *European Journal of Pain, 16*(9), 1211-1223. doi:10.1002/j.1532-2149.2012.00121.x

Attridge, N., Crombez, G., Van Ryckeghem, D., Keogh, E., & Eccleston, C. (2015). The experience of cognitive intrusion of pain: Scale development and validation. *Pain, 156*(10), 1978-1990. doi:10.1097/j.pain.0000000000000257

Attridge, N., Keogh, E., & Eccleston, C. (2016). The effect of pain on task switching: Pain reduces accuracy and increases reaction times across multiple switching paradigms. *Pain, 157*(10), 2179-2193. doi:10.1097/j.pain.0000000000000627

Attridge, N., Noonan, D., Eccleston, C., & Keogh, E. (2015). The disruptive effects of pain on n-back task performance in a large general population sample. *Pain, 156*(10), 1885-1891. doi:10.1097/j.pain.0000000000000245

Bernardes, S. F., Costa, M., & Carvalho, H. (2013). Engendering pain management practices: The role of physician sex on chronic low-back pain assessment and treatment prescriptions. *The Journal of Pain, 14*(9), 931-940. doi:10.1016/j.jpain.2013.03.004

Bernardes, S. F., Keogh, E., & Lima, M. L. (2008). Bridging the gap between pain

and gender research: A selective literature review. *European Journal of Pain, 12*(4), 427-440. doi:10.1016/j.ejpain.2007.08.007

Bernardes, S. F., & Lima, M. L. (2010). Being less of a man or less of a woman: Perceptions of chronic pain patients' gender identities. *European Journal of Pain, 14*(2), 194-199. doi:10.1016/j.ejpain.2009.04.009

Bernardes, S. F., Silva, S. A., Carvalho, H., Costa, M., & Pereira, S. (2014). Is it a (fe) male pain? Portuguese nurses' and laypeople's gendered representations of common pains. *European Journal of Pain, 18*(4), 530-539. doi:10.1002/j.1532-2149.2013.00387.x

Boerner, K. E., Chambers, C. T., Gahagan, J., Keogh, E., Fillingim, R. B., & Mogil, J. S. (2018). The conceptual complexity of gender and its relevance to pain. *Pain, 159*(11), 2137-2141. doi:10.1097/j.pain.0000000000001275

Boerner, K. E., Chambers, C. T., McGrath, P. J., LoLordo, V., & Uher, R. (2017). The effect of parental modeling on child pain responses: The role of parent and child sex. *The Journal of Pain, 18*(6), 702-715. doi:10.1016/j.jpain.2017.01.007

Boerner, K. E., Eccleston, C., Chambers, C. T., & Keogh, E. (2017). Sex differences in the efficacy of psychological therapies for the management of chronic and recurrent pain in children and adolescents: A systematic review and meta-analysis. *Pain, 158*(4), 569-582. doi:10.1097/j.pain.0000000000000803

Bussey, K., & Bandura, A. (1999). Social cognitive theory of gender development and differentiation. *Psychological Review, 106*(4), 676-713. doi:10.1037/0033-295X.106.4.676

Connell, R. W. (1995). *Masculinities*. Berkeley: University of California Press.

Edwards, R., Eccleston, C., & Keogh, E. (2017). Observer influences on pain: An

experimental series examining same-sex and opposite-sex friends, strangers, and romantic partners. *Pain, 158*(5), 846-855. doi:10.1097/j.pain.0000000000000840

Feijo, L. M., Tarman, G. Z., Fontaine, C., Harrison, R., Johnstone, T., & Salomons, T. (2018). Sex-specific effects of gender identification on pain study recruitment. *The Journal of Pain, 19*(2), 178-185. doi:10.1016/j.jpain.2017.09.009

Gougeon, V., Gaumond, I., Goffaux, P., Potvin, S., & Marchand, S. (2016). Triggering descending pain inhibition by observing ourselves or a loved-one in pain. *The Clinical Journal of Pain, 32*(3), 238-245. doi:10.1097/AJP.0000000000000244

Hirsh, A. T., Hollingshead, N. A., Matthias, M. S., Bair, M. J., & Kroenke, K. (2014). The influence of patient sex, provider sex, and sexist attitudes on pain treatment decisions. *The Journal of Pain, 15*(5), 551-559. doi:10.1016/j.jpain.2014.02.003

Hyde, J. S., Bigler, R. S., Joel, D., Tate, C. C., & van Anders, S. M. (2018). The future of sex and gender in psychology: Five challenges to the gender binary. *American Psychologist*. doi:10.1037/amp0000307

Keogh, E. (2015). Men, masculinity, and pain. *Pain, 156*(12), 2408-2412. doi:10.1097/j.pain.0000000000000328

Keogh, E., & Denford, S. (2009). Sex differences in perceptions of pain coping strategy usage. *European Journal of Pain, 13*(6), 629-634. doi:10.1016/j.ejpain.2008.07.002

Leone, J. E., Rovito, M. J., Mullin, E. M., Mohammed, S. D., & Lee, C. S. (2017). Development and testing of a conceptual model regarding men's access to

health care. *American Journal of Mens Health, 11*(2), 262-274. doi:10.1177/1557988316671637

Levant, R. F. (2011). Research in the psychology of men and masculinity using the gender role strain paradigm as a framework. *American Psychologist, 66*(8), 765-776. doi:10.1037/a0025034

Levant, R. F., Wimer, D. J., & Williams, C. M. (2011). An evaluation of the Health Behavior Inventory-20 (HBI-20) and its relationships to masculinity and attitudes towards seeking psychological help among college men. *Psychology of Men & Masculinity, 12*(1), 26-41. doi:10.1037/a0021014

Robinson, M. E., Riley, J. L., Myers, C. D., Papas, R. K., Wise, E. A., Waxenberg, L. B., & Fillingim, R. B. (2001). Gender role expectations of pain: Relationship to sex differences in pain. *The Journal of Pain, 2*(5), 251-257. doi:10.1054/jpai.2001.24551

Samulowitz, A., Gremyr, I., Eriksson, E., & Hensing, G. (2018). "Brave Men" and "Emotional Women": A theory-guided literature review on gender bias in health care and gendered norms towards patients with chronic pain. *Pain Research & Management*. doi:10.1155/2018/6358624

Schafer, G., Prkachin, K. M., Kaseweter, K. A., & Williams, A. C. (2016). Health care providers' judgments in chronic pain: The influence of gender and trustworthiness. *Pain, 157*(8), 1618-1625. doi:10.1097/j.pain.0000000000000536

Sloan, C., Conner, M., & Gough, B. (2015). How does masculinity impact on health? A quantitative study of masculinity and health behavior in a sample of UK men and women. *Psychology of Men & Masculinity, 16*(2), 206-217. doi:10.1037/a0037261

Tabachnick, B. G., & Fidell, L. S. (2007). *Using multivariate statistics* (5th ed.). London: Allyn and Bacon.

Thompson, E. H., & Bennett, K. M. (2015). Measurement of masculinity ideologies: A (critical) review. *Psychology of Men & Masculinity, 16*(2), 115-133. doi:10.1037/A0038609

Thompson, E. H., & Pleck, J. H. (1986). The structure of male-role norms. *American Behavioral Scientist, 29*(5), 531-543. doi:10.1177/000276486029005003

Tobin, D. D., Menon, M., Menon, M., Spatta, B. C., Hodges, E. V. E., & Perry, D. G. (2010). The intrapsychics of gender: A model of self-socialization. *Psychological Review, 117*(2), 601-622. doi:10.1037/A0018936

Vigil, J. M., & Alcock, J. (2014). Tough guys or sensitive guys? Disentangling the role of examiner sex on patient pain reports. *Pain Research & Management, 19*(1), E9-E12. doi:10.1155/2014/531396

Vogel, D. L., Wade, N. G., & Haake, S. (2006). Measuring the self-stigma associated with seeking psychological help. *Journal of Counseling Psychology, 53*(3), 325-337. doi:10.1037/0022-0167.53.3.325

Wang Y, Freemantle N, Nazareth I, Hunt K (2014) Gender differences in survival and the use of primary care prior to diagnosis of three cancers: An analysis of routinely collected UK General Practice data. *PLoS ONE, 9*(7), e101562. doi:10.1371/journal.pone.0101562

Wratten, S., Eccleston, C., & Keogh, E. (2019). Perceptions of gendered and ungendered pain relief norms and stereotypes using Q-methodology. *Pain, 160*(2), 395-406. doi:10.1097/j.pain.0000000000001409

Yousaf, O., Grunfeld, E. A., & Hunter, M. S. (2015). A systematic review of the factors associated with delays in medical and psychological help-seeking

amoung men. *Health Psychology Review, 9*(2), 264-276. doi:10.1080/17437199.2013.840954

Supporting Information Table captions

Supporting Information Table S1: *Participant characteristics for the entire sample and by pain status, and for those reporting pain, including descriptive statistics of pain experiences.*

Supporting Information Table S2: *Types of pain reported by participants experiencing either acute or persistent pain.*

Table captions

Table 1: *Means and standard deviations (in parenthesis) for the core scales, by sex and pain status.*

Table 2: *Predicting pain interference, stigma and general health behaviour from age, sex, pain experience and male role norms.*

Table 3: *Means and standard deviations (in parenthesis) for discussing/displaying pain and gender expectations of pain expressions by pain status and sex.*

Table 4: *Correlations between male role norms subscales, the discussing pain/displaying pain to others scales and items from the gender pain expressions scale.*

Figure captions

Figure 1: *Gendered expectations in pain expression communication by participant sex. Error bars represent standard error of the mean.*

Supporting Information Table captions

Supporting Information Table S1: *Participant characteristics for the entire sample*

Supporting Information

Table S1: *Participant characteristics for the entire sample and by pain status, and for those reporting pain, including descriptive statistics of pain experiences.*

	Whole sample (*n* = 468)	No pain (*n* = 77)	Acute Pain (<3 months) (*n* = 216)	Persistent Pain (3+ months) (*n* = 175)
Age[1]	*M* = 35.12 (*SD* =14.39)	*M* = 29.74 (*SD* =13.35)	*M* = 32.59 (*SD* = 12.75)	*M* = 40.59 (*SD* = 15.04)
Sex				
- Female	352	57	163	132
- Male	116	20	53	43
- Other (non-binary)	0	0	0	0
Gender				
- Female	343	57	158	128
- Male	114	19	53	42

- Other (non-binary)	10	1	5	5
- Missing	1	0	0	1
Sexual Orientation				
- Heterosexual	407	67	184	156
- Homosexual/Gay/Lesbian	19	3	11	5
- Bisexual	28	3	14	11
- Asexual	4	2	1	1
- Other	5	1	3	1
- Prefer not to say	5	1	3	1
Ethnicity[2]				
- White/European	322	39	153	130
- Non-White	58	17	28	13
- Unclear/missing	85	19	35	31
Education[2]				
- Not completed	12	2	7	3
- Secondary School	69	24	28	17
- A-Levels/Training	78	12	30	36

- Undergraduate Degree	139	17	68	54
- Postgraduate Degree	167	20	82	65
Pain intensity		N/A	6.29 (1.86)	7.73 (1.76)
Frequency of primary pain				
- 1+ episodes per day		N/A	18 (8.3%)	122 (69.7%)
- 1+ episodes per week		N/A	61 (28.3%)	41 (22.4%)
- 1+ episodes per month		N/A	101 (46.7%)	11 (6.2%)
- < 1 monthly episodes		N/A	35 (16.2%)	0 (0%)
- Missing		N/A	1 (.5%)	0 (0%)

Note: M = mean; *SD* = standard deviation; *n* = number of participants; [1] *n* = 467; [2] *n*= 465.

Table S2: *Types of pain reported by participants experiencing either acute or persistent pain.*

	Acute Pain			Persistent Pain		
	Number of times pain indicated	Percentage of participants	Percentage of type of pain	Number of times pain indicated	Percentage of participants	Percentage of type of pain
Arthritis	8	3.7%	1.0%	41	23.4%	5.6%
Backache	**100**	46.3%	12.2%	**105**	60.0%	14.4%
Hangover	46	21.3%	5.6%	24	13.7%	3.3%
Headache	**126**	58.3%	15.3%	**91**	52.0%	12.5%
Menstrual pain	**88**	40.7%	10.7%	45	25.7%	6.2%
Muscular pain (not back)	**72**	33.3%	8.8%	**68**	38.9%	9.4%
Migraine	37	17.1%	4.5%	25	14.3%	3.4%
Minor injury	**87**	40.3%	10.6%	42	24.0%	5.8%
Major injury	5	2.3%	0.6%	3	1.7%	0.4%
Neck pain	48	22.2%	5.8%	**60**	34.3%	8.3%

Nerve damage	2	0.9%	0.2%	35	20.0%	4.8%
Post-surgical pain	4	1.9%	0.5%	15	8.6%	2.1%
Sciatica	13	6.0%	1.6%	27	15.4%	3.7%
Sports injury	39	18.1%	4.7%	22	12.6%	3.0%
Stomach pain	52	24.1%	6.3%	**54**	30.9%	7.4%
Throat infection	27	12.5%	3.3%	11	6.3%	1.5%
Tooth/dental pain	40	18.5%	4.9%	23	13.1%	3.2%
Other	28	13.0%	3.4%	36	20.6%	5.0%
Total number of participants	216	100.0%	100.0%	175	100.0%	100.0%

Note: Participants could indicate experiencing more than one type of pain; Top five types of pain reported by those with acute and persistent pain are indicated in **bold.**

Table 1

Means and standard deviations (in parenthesis) for the core scales, by sex and pain status.

	No Pain				Acute Pain				Persistent Pain			
	Male		Female		Male		Female		Male		Female	
MRN Status	45.55	(11.68)	40.07	(10.39)	39.85	(10.15)	37.51	(10.17)	38.98	(7.90)	35.57	(10.33)
MRN Toughness	30.75	(7.18)	26.19	(6.39)	28.75	(7.23)	23.90	(6.33)	27.60	(5.95)	22.31	(6.89)
MRN Anti-femininity	22.45	(7.65)	18.61	(7.12)	19.58	(6.60)	16.37	(6.18)	19.86	(7.22)	15.84	(6.48)
CIP	35.60	(14.17)	37.03	(13.29)	30.30	(12.88)	37.13	(15.32)	38.72	(13.81)	39.15	(13.57)
SSOSH-pain	50.80	(3.04)	51.04	(3.21)	50.13	(2.70)	50.10	(2.82)	49.79	(3.23)	51.09	(3.36)
HBI-20	18.07	(3.34)	15.75	(3.99)	16.10	(4.11)	16.10	(3.50)	16.01	(3.70)	14.82	(3.22)

Note: MRN = Male Role Norms Scale; CIP = Cognitive Intrusion from Pain scale; SSOSH-pain = Self-Stigma Of Seeking Help scale – Adapted for Pain; HBI-20 = Health Behaviour Inventory.

Table 2

Predicting pain interference, stigma and general health behaviour from age, sex, pain experience and male role norms.

Block	Variables	*B*	SE *B*	Beta	*t*	Partial *r*	VIF	Change R^2	Total R^2
	DV = CIP								
1	Age	.042	.046	.042	.908	.042	1.000	.002	.000
2	Sex	3.532	1.548	.107	2.282*	.106	1.029	.024*	.017*
	Persistent Pain	2.124	2.015	.072	1.054	.049	2.188		
	Acute Pain	-1.349	1.891	-.047	-.714	-.033	2.051		
3	MRN Status	.114	.088	.082	1.293	.060	1.925	.009	.019*
	MRN Toughness	-.283	.150	-.139	-1.891	-.088	2.567		
	MRN Anti-femininity	.143	.145	.068	.990	.046	2.243		
	DV = SSOSH-pain								
1	Age	-.022	.010	-.102	-2.209*	-.102	1.000	.010*	.008*
2	Sex	.309	.331	.044	.934	.044	1.029	.020*	.022**

	Persistent Pain	.054	.431	.009	.126	.006	2.188		
	Acute Pain	-.796	.404	-.129	-1.969*	-.091	2.051		
3	MRN Status	.063	.018	.213	3.414*	.158	1.925	.043***	.060***
	MRN Toughness	-.083	.031	-.190	-2.640*	-.123	2.567		
	MRN Anti-femininity	.061	.030	.135	2.000*	.093	2.243		
	DV = HBI-20								
1	Age	-.072	.011	-.285	-6.396***	-.285	1.000	.081***	.082***
2	Sex	-1.282	.376	-.152	-3.411***	-.157	1.029	.004**	.104***
	Persistent Pain	-.393	.489	-.052	-.803	-.037	2.188		
	Acute Pain	-.029	.459	-.004	-.064	-.003	2.051		
3	MRN Status	-.006	.021	-.017	-.285	-.013	1.925	.003**	.342***
	MRN Toughness	.050	.036	.096	1.381	.064	2.567		
	MRN Anti-femininity	.055	.035	.104	1.595	.074	2.243		

Note: CIP = Cognitive Intrusion from Pain scale; SSOSH-pain = Self-Stigma Of Seeking Help scale – Adapted for Pain; HBI-20 = Health Behaviour Inventory; MRN = Male Role Norms Scale; Sex (0 = male, 1 = female); Persistent Pain (0 = no pain, 1 = persistent pain); Acute Pain (0 = no pain, 1 = acute pain). * $p < .05$, ** $p < .01$, *** $p < .001$.

Table 3

Means and standard deviations (in parenthesis) for discussing/displaying pain and gender expectations of pain expressions by pain status and sex.

	No Pain				Acute Pain				Persistent Pain			
	Male		Female		Male		Female		Male		Female	
Discuss Pain - HCP	44.60	(9.90)	45.14	(9.06)	44.67	(10.03)	44.31	(9.51)	45.42	(7.88)	43.91	(10.22)
Discuss Pain – Fam	29.95	(7.41)	30.46	(6.04)	29.40	(9.18)	30.69	(8.03)	27.80	(8.79)	28.77	(9.00)
Display Pain - HCP	44.85	(10.47)	41.65	(10.04)	42.02	(11.34)	40.07	(12.28)	43.49	(10.77)	39.87	(11.72)
Display Pain - Fam	27.47	(10.81)	27.40	(7.44)	26.60	(8.97)	28.16	(9.36)	25.97	(9.51)	25.66	(9.17)
GEP - Grimacing	-.10	(.91)	.07	(.90)	.33	(.76)	.01	(.84)	.14	(.90)	.02	(.84)
GEP - Holding body	.05	(.89)	-.44	(.73)	-.17	(.65)	-.16	(.86)	.14	(.65)	-.25	(.77)
GEP - Moaning	-.40	(.88)	-.04	(.91)	-.21	(.80)	-.10	(1.03)	-.12	(.86)	-.10	(1.02)
GEP - Wincing	-.10	(.64)	-.04	(.87)	-.02	(.67)	-.04	(.77)	.05	(.62)	-.05	(.71)

GEP - Crying	-1.20	(.95)	-1.18	(.63)	-1.17	(.71)	-1.25	(.71)	-.86	(.75)	-1.23	(.66)
GEP - Talking	-.95	(1.10)	-.75	(.97)	-1.00	(.93)	-.73	(.96)	-.74	(.80)	-.95	(.87)
GEP - Suppress/hide	1.20	(.95)	.88	(.98)	.92	(.99)	.44	(1.14)	.74	(.77)	.57	(1.11)

Note: HCP = Health Care Professionals; Fam = Family and Friends; GEP = Gender expectations for the expression of pain.

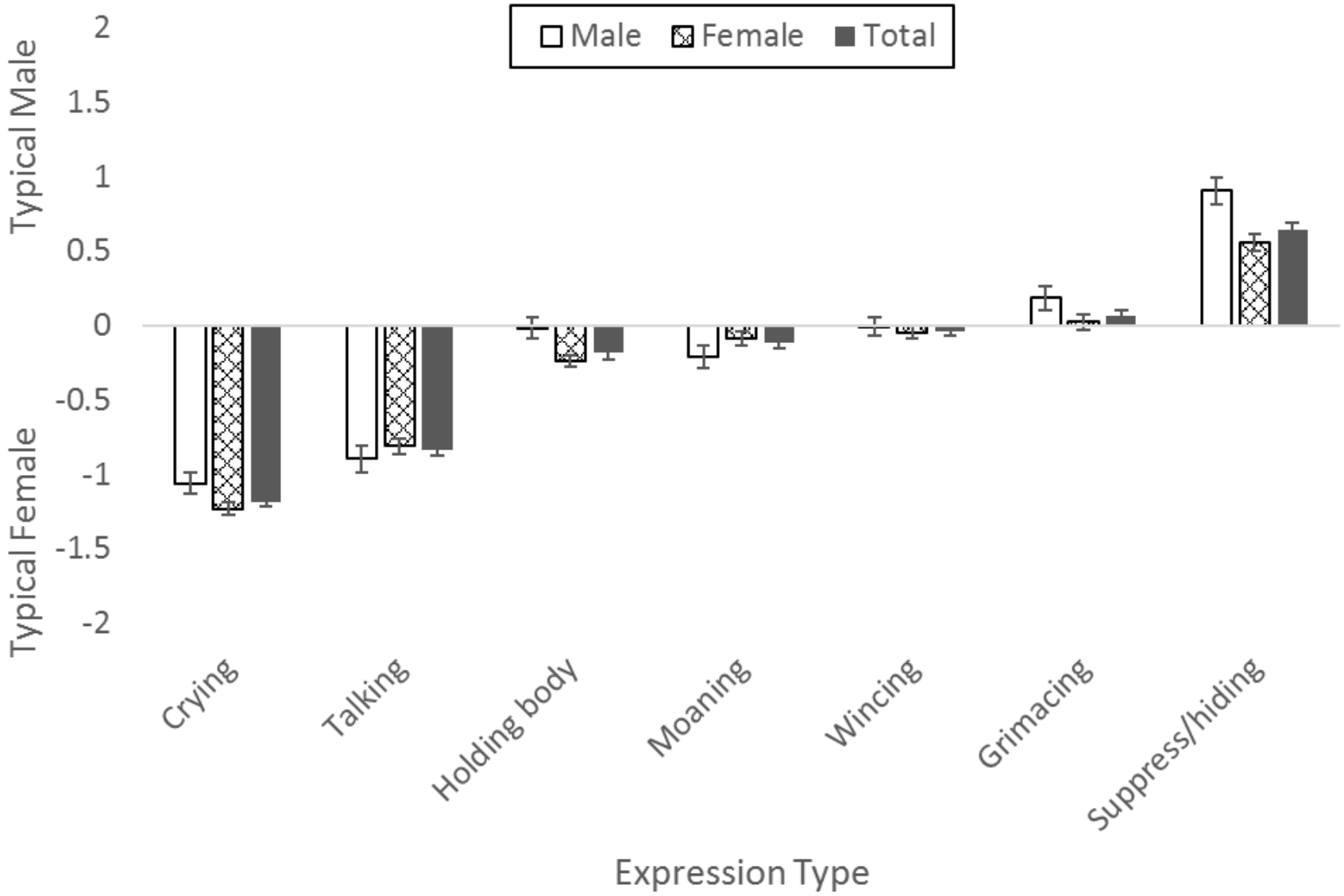
Table 4

Correlations between male role norms subscales, the discussing pain/displaying pain to others scales and items from the gender pain expressions scale.

	MRN Status	MRN Toughness	MRN Anti Femininity	SSOSH-pain	CIP	HBI-20
Discuss Pain - HCP	-.11*	-.10*	-.17**	-.34**	-.02	-.22**
Discuss Pain - Fam	.04	-.05	-.09	-.23**	-.08	-.11*
Display Pain - HCP	.01	-.00	-.03	-.23**	.03	-.15**
Display Pain - Fam	.07	-.01	-.02	-.17**	-.04	-.08
GEP - Grimacing	-.23**	-.07	-.11*	-.06	-.11*	-.11*
GEP - Holding body	-.07	-.00	-.08	-.06	-.00	-.01
GEP - Moaning	-.20**	-.18**	-.20**	-.18**	-.02	-.15**
GEP - Wincing	-.08	.02	.06	-.13**	-.02	-.06

GEP - Crying	-.16**	-.17**	-.24**	-.07	.01	-.13*
GEP - Talking	-.05	-.03	-.08	-.00	-.03	-.03
GEP - Suppress/hide	.16**	.15**	.13**	-.03	-.02	.06

Note: HCP = Health Care Professionals; Fam = Family and Friends; GEP = Gender expectations for the Expression of Pain; MRN = Male Role Norms Scale; CIP = Cognitive Intrusion from Pain scale; SSOSH-pain = Self-Stigma Of Seeking Help scale – Adapted for Pain; HBI-20 = Health Behaviour Inventory * $p < .05$, ** $p < .01$


Male
Female
Total
Typical Male
Typical Female
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
Crying
Talking
Holding body
Moaning
Wincing
Grimacing
Suppress/hiding
Expression Type