Socio-Cultural and Religious Influences During Menstruation Among University Students

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Abstract

Background

Although menstruation is a physiological process it is shrouded with layers of religious and socio-cultural beliefs. The extent to which these socio-cultural and religious beliefs may impact the quality of life of a female university student in our Asian setting has yet to be explored.

Methods

This study was divided into 3 stages. In the first stage 1, a preliminary list of items measuring socio-cultural and religious beliefs during menstruation was generated. In the second stage, exploratory factor analysis was performed using the preliminary list generated. In the third stage, confirmatory factor analysis using reflective measurement model and structural modelling was performed using partial least squares. Practices of these beliefs were included in structural modelling as beliefs without practices may not affect quality of life. Biological symptoms of menstruation were added in as well as another factor that may affect quality of life.

Results

A preliminary list of 22 items was generated based on personal interviews and input from female lecturers. In the second stage, the exploratory factor analysis identified six factors with eigenvalue>1. From the confirmatory factor analysis in third stage, two factors were iteratively removed due to poor factor loadings. The four factors retained were: i) “religious beliefs”; ii) “unpleasant (or dirty) nature of menstruation”; iii) “personal restrictions (dietary and behavior)”; and iv) “restrictions of interactions with male gender”. In structural equation modelling, only 2 factors, i.e., personal restrictions (dietary and behavioral)” (path coefficient 0.74, t-statistics 18.18) and restriction of interactions with males (path coefficient 0.12, t-statistis 3.00) have significant effect on the practices of menstruation beliefs. Biological symptoms (path coefficient -0.34; t-statistics 7.29) and practices of these socio-cultural and religious beliefs (path coefficient -0.17; t-statistics 3.67) in turn, have significant negative effect on quality of life.

Conclusion

Although four factors of socio-cultural and religious beliefs have been identified in this study, only beliefs related to personal dietary and behavioral restrictions and beliefs on restrictions of social interactions with the male gender are significantly practiced, of which, negatively impact quality of life.

Background

Although menstruation is a physiological process, in many parts of the world, it is often coated with layers of socio-cultural and religious beliefs and practices [1]. Compounding this issue is the pervasive notion in many cultures that women are discouraged to discuss menstruation matters openly. This is

because menstruation is often perceived as a “shameful” issue that should be kept hidden and private [2]. This kind of social shroud is particularly “thick” in an Asian society like Malaysia [1].

According to Young and Bacdayan (1965) [3], menstrual sociocultural beliefs can be largely categorized into the following categories: i) the general belief that menstrual fluid is unpleasant, contaminating or even dangerous; ii) menstruating women may not have sexual intercourse or engaging in sexual activities; iii) personal restrictions imposed upon a menstruating woman such as food taboos, restriction of movement, talking, etc.; iv) restrictions imposed upon contact made by a menstruating woman with men and things that belong to men, e.g., personal articles, weapons in ancient times, instruments used in agriculture and fishing, craft tools, religious emblems and shrines, where men are considered the guardians of these religious emblems; v) a menstruating woman may not cook for men; and vi) a menstruating woman should be confined to a restricted space such as menstrual huts for the duration of their periods.

Many studies have been conducted on the impact of the physiology of menstruation on a woman’s quality of life [4, 5], and these include studies done in Asian settings as well [6, 7]. For a female university student, many of these effects have to do with the physiological impact of menstruation on school life such as school absenteeism, restriction of social and recreational activities as well as decreased academic performance [6].

However, the impact of socio-cultural and religious beliefs and practices during menstruation on a woman’s quality of life is much less explored. We conducted this study with the aim of exploring the influence of socio-cultural and religious perceptions and practices on top of the biological impact during menstruation on the quality of life of female university students. The objectives of this study are: i) to develop and validate a questionnaire measuring the sociocultural and religious beliefs during menstruation that impact the quality of life; and ii) to construct a structural equation model describing the relationships of these sociocultural and religious beliefs on quality of life of a female university student.

Methods

Participants

Female medical and economic students from Universiti Malaysia Sarawak (UNIMAS), which is a public university in the state of Sarawak in Malaysia, were recruited voluntarily for this study. Sample size was estimated using the population-based sampling method by Krejcie and Morgan (1970) [8]. Based on the total number of approximately 500 female medical students from Year 1 to Year 5 (with confidence interval of 95% and the margin of error 0.05), the estimated sample size for female medical students was 210. And based on the total number of approximately 400 female economic students from Year 1 to Year 3 (with 95% confidence interval and the margin of error 0.05), the estimated sample size for female economic students was approximately 190.

Materials

Exploratory factor analysis (EFA) was performed using Statistical Package for the Social Sciences (SPSS) statistical software with principal axis factoring as the extraction method. Partial least squares structural equation modelling (PLS-SEM) using the SMART-PLS software was performed to measure the impact of various sociocultural factors, religious factors as well as biological symptoms on the quality of life (QoL) during menstruation. The list of common biological symptoms during menstruation was adapted from past study by Wong and Khoo [6] on menstrual-related symptoms in a similar population of Malaysian female adolescents. The validated Quality of Life Enjoyment and Satisfaction Questionnaire – Short Form (also known as Q-LES-Q-SF) by Endicott et al. [9] was adapted to measure quality of life, which is the dependent variable in this study. Q-LES-Q-SF had been similarly used before to measure the impact of menstrual pain [10] and the impact of pre-menstrual related disorders on quality of life. This instrument had also been shown to have good internal consistency and reliability [5].

Procedures

Stage 1: Generation of preliminary list of items using Modified Delphi Technique

Adopting the classification by Young and Bacdayan [3] as described above, personal interviews with female friends and family members were conducted by authors KEP, AKH, NZ and NALY to identify common sociocultural and religious beliefs and practices during menstruation in our local setting. Besides that, literature search was also conducted using keywords such as “menstruation”, “menstruating”, “menstrual”, etc. to skim for information in academic journals, webpages, blogs, etc. From this initial search, a preliminary list of socio-cultural and religious beliefs during menstruation among the various ethnic groups in Malaysia were listed and categorized according to the categories described by Young and Bacdayan [3].

Following that, opinions and suggestions were sought from five female lecturers in UNIMAS to validate and to further improve and refine our preliminary list using the modified Delphi technique. Modified Delphi technique is a structured iterative process aimed to obtain consensus from individuals through a series of communication until the group consensus is reached [11, 12]. In this regard, a group of female lecturers of different ethnicities in Malaysia were invited to participate in a modified Delphi technique through email communications. We asked them how representative our preliminary list was on common sociocultural and religious beliefs during menstruation. After we obtained some initial responses, we further refined our list and added in items based on the inputs from these lecturers. Our edited list was then emailed again to these same female lecturers whether they would agree to this edited list. A cut-off point of 70% agreement was set as the minimum level for an item to be included in the edited questionnaire [11].

Stage 2: Exploratory Factor Analysis (efa)

From this edited list of items intended generated from Stage 1, a preliminary set of questionnaires was developed. In this stage, 100 female medical students and 100 female economic students were asked to volitionally and anonymously rank their agreement on these items in a Likert scale of five, ranging from “1 = strongly disagree” to “5 = strongly agree”. The construct validity was then determined using principal axis factoring as the extraction method via SPSS software. An initial run of factor analysis was performed in order to determine the number of factors to be extracted. Factors with eigenvalues greater than one would be retained.

Once the number of factors was determined, repeated runs of factor analysis were then performed to determine the factor loadings of the items as well as to identify problematic items that may need to be removed. Varimax rotation was used with a cut-off factor loading value of 0.4 as the criteria to determine whether an item was to be removed or not [13]. Pattern coefficient values of less than 0.5 were suppressed. The communality value, which indicates convergent validity of the items, was set at 0.25. Finally, the Cronbach’s alpha coefficients were then checked to evaluate the degree of internal consistency of the items in each construct or factor. A cut-off point of Cronbach’s alpha > 0.6 was set as the criteria of a satisfactory degree of internal consistency [14]. Based on the EFA in this stage, the questionnaire was edited, and some items were deleted as dictated by the indicators in EFA.

Stage 3 Confirmatory Factor Analysis (CFA) and Structural Equation Modelling

Confirmatory factor analysis was then performed on the edited questionnaire that we have obtained from the EFA in Stage 2. In this stage, another 300 females medical and economic students were asked to rank their agreement on these items in a Likert scale of five, ranging from “1 = strongly disagree” to “5 = strongly agree”. Reflective measurement model was performed using partial least square (PLS) method in SMART-PLS software. For internal consistency of the items, three parameters were analyzed, i.e., i) Cronbach alpha; ii) composite reliability (CR) index; and iii) the rho A (ρA) coefficient (also known as Dijkstra Henseler’s rho [15–16]). For convergent validity, the factor loadings of all items were obtained, as well as the Average Variance Extracted (AVE) of each factor or construct. Factor loading of > 0.7 was considered as acceptable, whereas factor loading of < 0.4 was deleted. For a loading with values between 0.4 to 0.7, the AVE would then be used to determine whether the item should be accepted. AVE refers to the grand mean value of the squared loadings of all items associated with a factor. AVE of > 0.5 is generally acceptable for an item to be included even if its loading is between 0.4 to 0.7 [13]. For discriminant validity, Fornell and Larcker criterion [17], cross loadings of items as well as the Heterotrait-Monotrait ratio of correlations (HTMT) proposed by Henseler et al. [18] were obtained. All these measurements were generated from the SMART-PLS software.

Structural modelling was then performed to evaluate the influences of these various aspects of sociocultural and religious beliefs and practices on the students’ quality of life. In this regard, the practices of these various beliefs were taken into consideration as the mediating effect on the quality of

life (as measured using Q-LES-Q-SF). The reason to include practices of beliefs as the mediating effect is because beliefs without practices, may not affect their quality of life. Furthermore, not all beliefs would be translated as practices. From a biopsychosocial perspective, the impact of biological symptoms of menstruation on quality of life was also taken into consideration. We adopted the five common biological symptoms of menstruation (i.e., fatigue, abdominal pain/cramp, mood swing, headache and irritability) from a previous study on quality of life [6] as measured on a Likert scale of 5 where 1 = strongly disagree that this symptom is common for me, and 5 = strongly agree that this symptom is common for me.

Institutional ethics approval was obtained prior to starting this research (reference no UNIMAS/NC-21.02/03 – 02 Jld.3(51)). All participants were assured that their data would be kept confidential, no personal identification data such as name, personal identity number, etc. would be revealed and their data would only be used anonymously solely for the purpose of this research. Participants were recruited voluntarily and they were informed that they could withdraw their participation at any time.

Results

A total of 400 female students from UNIMAS were recruited, i.e., 228 medical students and 172 economic students. One hundred (i.e., 47 medical and 53 economic students) out of the 400 participants were recruited in the EFA stage. The remaining 300 participants were recruited in the CFA. The mean age of these 400 participants was 21.42 (SD ± 0.855) years old. With regards to their religious beliefs, 178 of them (44.5%) were Muslims, 106 participants (26.5%) were Christians, 78 (19.5%) were Buddhists, 33 (8.25%) were Hindus and 5 (1.25%) of other religious affiliations. Following sessions of discussion using the modified Delphi technique, a preliminary list of 22 items was generated for EFA. In the EFA stage, the Kaiser-Meyer-Olkin (KMO) [19–20] measure of sampling adequacy was 0.744, which indicates that the sampling adequacy is good for factor analysis. The p-value for Bartlett's test of sphericity was < 0.001, indicating that there are worthwhile correlations among the items. Based on initial eigenvalue > 1, six factors were identified (see the corresponding scree plot, Fig. 1). With the cut-off point of communalities value set at 0.25 to indicate good convergent validity of the items, re-runs of EFA subsequently performed showed that all items were loaded unto the various factors with good factor loadings of more than 0.5. No cross-loading was noted. Cronbach's alpha for these six factors (Factor 1 to 6) are 0.908, 0.898, 0.826, 0.855, 0.875 and 0.661 respectively. The inter-rater reliability measured using intra-class correlation coefficient (ICC) was 7.90 (95% CI 0.723–0.848). Based on the items loaded unto them, Factor 1 was labelled as "Religious beliefs", Factor 2 as "Restriction on cooking and utensils", Factor 3 as "Unpleasant (or dirty) nature of menstruation", Factor 4 as "Personal restrictions (dietary and behavior)", Factor 5 as "Spatial or movement restrictions" and Factor 6 as "Restrictions of interactions with male gender".

In the CFA stage, all four items in Factor 2 "Restriction on cooking and utensils" and all four items in Factor 5 "Spatial or movement restrictions" were iteratively removed due to poor factor loadings. Similarly, two items in Factor 1 "Religious beliefs", one item in Factor 3 "Unpleasant (or dirty) nature of menstruation" and three items in Factor 4 "Personal restrictions" were deleted due to low loadings. The factor loadings of all other items were acceptable and adequate because other items have high scores of

loadings to complement AVE. All the factors achieved adequate convergent validity as the AVE was more than 0.5. The final result of the factor loadings were tabulated in (Table 2). The Cronbach alpha values, CR indices as well as the AVE values were satisfactory, indicating good convergent and divergent validity (see Table 1 for details). The ρA of in this study was 0.7, further suggesting good convergence and internal consistency.

Table 1
Cronbach's Alpha, Composite Reliability and Average Variance Extracted (AVE) values of the Retained Four Factors in CFA

Belief Factors	Cronbach's Alpha	Composite Reliability	AVE
Religious	0.772	0.894	0.809
Restrictions of interactions with male gender	0.661	0.813	0.610
Personal restrictions	0.864	0.895	0.550
Unpleasant nature of menstruation	0.826	0.882	0.608

Table 2
Final version of the Factor Loadings and Cross-loadings of items of Socio-cultural and Religious Beliefs During Menstruation

	Religious	Interactions with male	Personal	Unpleasant
Religious				
Not allowed to enter holy places	**0.938**	0.214	0.092	0.247
Not allowed to read or cite holy book	**0.859**	0.274	0.038	0.237
Restrictions on the interactions with male				
Not allowing the male gender to touch used sanitary pad	0.196	**0.449***	0.154	0.167
Not allowed to sit around and mingle with male	0.177	**0.893**	0.418	0.373
Not allowed to touch properties and belongings of the male gender	0.263	**0.912**	0.443	0.413
Personal Restriction				
Not allowed to eat cold food	-0.029	0.260	**0.788**	0.212
Not allowed to take iced water	-0.070	0.239	**0.801**	0.226
Not allowed to eat brinjal	0.203	0.466	**0.736**	0.459
Not allowed to eat papaya	0.211	0.477	**0.706**	0.498
Not allowed to eat pineapple	0.160	0.363	**0.749**	0.373
Not allowed to use any medications to relieve pain	0.133	0.425	**0.625**	0.361
Not allowed to wash hair and taking cold shower	-0.102	0.287	**0.770**	0.329
Unpleasant (or dirty) nature of menstruation				
Not allowed to step over plants	0.133	0.292	0.391	**0.839**
Not allowed to throw fallen hair into trash bin	0.311	0.443	0.400	**0.848**
Not allowed to throwing clipped fingernail into trash bin	0.297	0.404	0.358	**0.813**
Not allowed to touch flowers	0.216	0.309	0.370	**0.860**

Note: *Although the loading for this item was slightly low (0.449), but the AVE > 0.5, indicating that the item was acceptable to be included (according to Hair et al. [13]).

	Religious	Interactions with male	Personal	Unpleasant
Need to wrap used sanitary pad properly before disposing	0.023	0.188	0.229	**0.463**
Note: *Although the loading for this item was slightly low (0.449), but the AVE > 0.5, indicating that the item was acceptable to be included (according to Hair et al. [13]).				

In the structural modelling stage, the items in the four belief factors were subjected to the mediating effect of the practices of these beliefs. By bootstrapping the path coefficients, it was found that only the 2 factors, i.e., restriction of interactions with males and personal restrictions have significant effect on the "practices of menstruation beliefs", with t-statistics of 3.00 and 18.18 respectively. Even then, the path coefficient of factor "Restrictions of interactions with male gender" is weaker (0.12) compared to that of factor "Personal restrictions" (0.74). The path coefficients of both "menstruation practices" (of these socio-cultural and religious beliefs) and "biological symptoms" in turn, had significant negative effects on the quality of life. Furthermore, biological symptoms were shown to have greater negative impact on the quality of life (path coefficient − 0.34; t-statistics 7.29) compared to the practices of these religious and sociocultural beliefs (path coefficient − 0.17; t-statistics 3.67) (see Table 3). The final path model for this study was shown in supplementary (Fig. 1).

Table 3
Path Coefficients from Structural Equation Modelling

	Path coefficients	Standard deviation	T-statistics	P-values
Biological symptoms ◊ QoL	-0.34	0.05	7.29	**< 0.001**
Menstruation Practices ◊ QoL	-0.17	0.05	3.67	**< 0.001**
Religious beliefs ◊ Menstruation Practices	0.00	0.03	0.15	**0.88**
Beliefs about restrictions of interactions with male gender ◊ Menstruation Practices	0.12	0.04	3.00	**< 0.001**
Beliefs of personal restrictions ◊ Menstruation Practices	0.74	0.04	18.18	**< 0.001**
Beliefs of the unpleasant nature of menstrual blood ◊ Menstruation Practices	0.00	0.04	0.04	**0.97**

Discussion

Our study showed that religious and sociocultural beliefs during menstruation among university students can be broadly divided into 4 categories: i) religious restrictions; ii) restrictions of social interactions with the male gender; iii) personal restrictions (with regards to dietary and behavior); and iv) unpleasant (or

dirty) nature of menstrual blood. A study on the attitudes and beliefs toward such restrictive behaviors during menstruation was similarly conducted in Fiji, Papua New Guinea and Solomon Islands [21]. In that study, the authors found that there were four overarching, but often interacting themes. Three of out these 4 themes are very similar to the four categories of beliefs that we found (with the exception of the category of religious beliefs which was not listed in that paper by Mohamed et al. [21]). The first theme is the belief that menstrual blood is 'dirty'. According to this belief, menstruating women are prevented from, or should choose to refrain from certain household tasks including food preparation, cooking and doing housework. This is similar to the category of the belief of the "unpleasant or dirty nature of menstrual blood" in our study. The second theme is the belief that menstrual blood and menstruating girls/women can bring 'bad luck' to men and boys. According to this belief, menstruating women are prevented from, or should to refrain from working in the garden, picking up fruits and avoiding contact with men and boys. This is similar to the belief of "restrictions of social interactions with the male gender" in our study although we classify the restriction to work in the garden under the category of the "unpleasant or dirty nature of menstrual blood" in our study. The third theme in the study by Mohamed et al. [21] is the belief of "shame and secrecy that surrounds menstruation". This refers to the need of secrecy in washing, cleaning and changing of sanitary pad or menstrual cloth and to ensure that the opposite gender do not see their menstrual blood. In our study, the need to wrap soiled sanitary pad and to dispose it properly is also an important belief although we classify this belief under the "unpleasant or dirty nature of menstrual blood" category. The fourth theme of belief addressed by Mohamed et al. [21] is the belief of the impact of certain behaviours on menstruation, health and well-being (similar to the category of personal dietary and behavioural restrictions in our study). This refers to certain restrictions that may result in heavier menstrual flow or menstrual cramps such as drinking iced or cold water, eating sour things, bathing in cold water or washing hair. These similarities may be reflective of the universality or pervasiveness of some of these sociocultural beliefs during menstruation across the globe.

Nonetheless, although menstruation is regarded as a physiological phenomenon shrouded with layers of religious and sociocultural beliefs [1, 21–22], only beliefs related to dietary and behavioral restrictions and beliefs related to restrictions of social interactions with the male gender are shown to have significant effects on menstruation practices, which in turn, seems to have a significant adverse effect on the quality of life.

Interestingly, the religious beliefs during menstruation do not seem to have much significant effect on the practices of these beliefs. This could be due to the diverse religious backgrounds of our participants, the wide array of these religious beliefs and restrictions in each of these religions as well as the different degree of compliance to these restrictions by our participants. For the majority Muslim participants, they are restrained from performing religious rituals [23] including the restriction to enter the mosque as well as the prohibition to pray nor fast during the *Ramadan* fasting month [24]. The second largest religious group among our participants were the Christians. For the Christians community, generally they do not have any restrictions during menstruation except in some Orthodox Church denominations where menstruating women are prohibited to partake communion during menstruation [25]. In Hinduism, menstruating women are forbidden from entering "pooja room" (the prayer area in a house) and the

temple [26]. In Buddhism, menstruating women are restricted from performing certain religious rituals and ceremonies in temples as well as meditation [27]. Menstruation is also believed to make a woman loses her ‘qi’ (or inner energy) [27].

Our study has a number of limitations. First, this study was conducted in only one center in Malaysia, i.e., in the state of Sarawak. The demographic characteristics in Sarawak may not be generalizable to the demographic characteristics in other parts of Malaysia, notably in terms of religious affiliations. Should this study be repeated in other parts of Malaysia where the percentage of Muslims may be higher, the impact of religious beliefs may be more significant. Second, this study was only conducted among young university students. The perceptions, compliance and their impacts on quality of life may different in older age groups. For example, a study done by Lawlor and Choi [28] showed that younger women generally have a more positive attitudes towards menstruation as they perceived menstruation as a natural physiological process rather than a process shrouded with taboos and myths. Third, this study was solely conducted from a quantitative approach. To better capture the emotions, concerns and fears surrounding these religious and sociocultural beliefs during menstruation, an added qualitative dimension may add richness and color to our perception.

Conclusions

In conclusion, menstruation should not be viewed purely from a biological lens. Instead it should be viewed from a biopsychosocial lens due to the fact that there are layers and overlapping religious and sociocultural beliefs surrounding menstruation. Four categories of religious and sociocultural beliefs have been identified in this study but only beliefs related to personal dietary and behavioral restrictions and beliefs on restrictions of social interactions with the male gender are significantly related to the practices of such beliefs, of which, negatively impact quality of life.

Abbreviations

UNIMAS
Universiti Malaysia Sarawak
EFA
Exploratory factor analysis
SPSS
Statistical Package for the Social Sciences
PLS
partial least squares
PLS-SEM
Partial least squares structural equation modelling
Q-LES-Q-SF
Quality of Life Enjoyment and Satisfaction Questionnaire – Short Form
CFA

Confirmatory Factor Analysis
CR
composite reliability
ρA
rho A coefficient or Dijkstra Henseler's rho
AVE
Average Variance Extracted
HTMT
Heterotrait-Monotrait ratio of correlations
KMO
Kaiser-Meyer-Olkin (test to assess the sampling adequacy)
ICC
intra-class correlation coefficient
QoL
quality of life

Declarations

- Ethics approval and consent to participate: Institutional ethics approval was obtained prior to starting this research (reference no UNIMAS/NC-21.02/03-02 Jld.3(51)). Participant's information sheet was given and written consent was obtained from participants prior to their participation. All participants were assured that their data would be kept confidential, no personal identification data such as name, personal identity number, etc. would be revealed and their data would only be used anonymously solely for the purpose of this research. Participants were recruited voluntarily, and they were informed that they could withdraw their participation at any time.
- Consent for publication: Permissions were also obtained from the participants to publish their data anonymously without revealing their names and identities.
- Availability of data and material: The data used and analyzed during the current study are available from the corresponding author on reasonable request.
- Competing interests: All authors declare that they do not have any competing or conflict of interest in this study.
- Funding: Not applicable.
- Authors' contributions: All authors (Keng Sheng Chew = KSC, Shirly Siew Ling Wong = SSLW, Kian Ee Po = KEP, Ahmad Khairi Hassan = AKH, Norizzati Zulkhairi = NZ, Nurul Ammiera Lyieanna Yusman = NALY) were responsible for the acquisition of the quantitative data as well initial drafting of the manuscript. KEP, AKH, NZ and NALY were responsible for conducting personal interviews with female friends and family members to identify common sociocultural and religious beliefs and practices during menstruation in our local setting. All authors were responsible for conception of the project, instrument development, and revisions of the manuscript as well as contributing to the intellectual

content of the manuscript. KEP, AKH, NZ and NALY were responsible for data collection and SSLW was responsible in facilitating the data collection from female students in economic programs. KEP, AKH, NZ and NALY were responsible for preliminary analysis of the data, while KSC and SSLW were responsible for model validation and path analysis via structural equation modelling. Drafting and writing the manuscript were contributed by KSC, all authors approved the final version of the manuscript and all authors are accountable for all aspects of the work in relation to the accuracy or integrity of the work.

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Figures

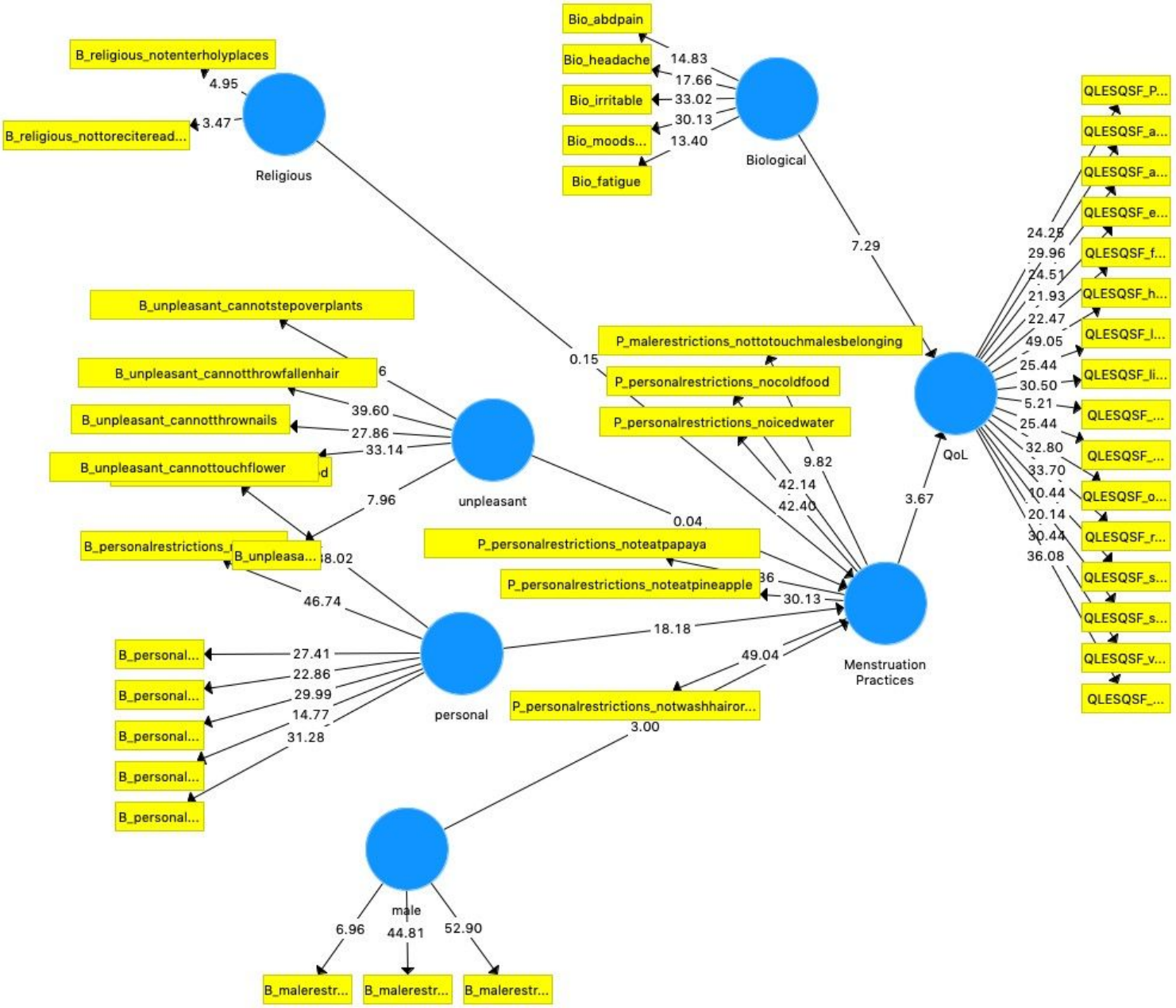

Figure 1

Path model of religious and sociocultural beliefs and practices during menstruation among Malaysian university students