Health Promotion

Development of indicators to measure quality of life for pregnant women (QOL-PW)

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Keywords

Indicators • Quality of life • Pregnant women

Summary

Introduction. *Ideal health assessment includes physical, mental, and social health measures that measure a person's quality of life. This study aims to develop indicators to measure the quality of life of pregnant women.*
Methods. *The design of this study was development research with a cross-sectional data collection. The study sites were in six PHC in Ngawi district and Blitar city, East Java Province, Indonesia. The sample size is 800 pregnant women. Data analysis used the second-order Convincatory Factor Analysis (CFA) method.*
Results. *The indicators to measure the quality of life of pregnant women were all 46, consist of 21 indicators for functional and physical health factors, 6 indicators for mental health and functional factors, and 19 indicators for the social functional and environmental factors. Health factors and physical functions consist of 21 indicators, which are divided into seven aspects. Health factors and mental functions consist of 6 indicators divided into three aspects. The social and environmental function factor consists of 19 indicators divided into six aspects.*
Conclusions. *The indicators of quality of life for pregnant women that are developed can represent most of the conditions of pregnant women, and if they have been validated, they are expected to be applied easily. Indicators of quality of life for pregnant women have provided a sufficient but straight forward way of calculating and cutting off points to categorize the quality of life status of pregnant women.*

Introduction

World Health Organization (WHO) defines pregnancy and labor as a specific condition that is categorized as not a disease, but only biological and social processes that carry health risks [1]. Nevertheless, the fact is that pregnancy and childbirth cannot be categorized as the regular health status of the mother. During pregnancy, chemical, biological, physiological, hormonal, and anatomical changes occur in the mother's body. Emotional and physical changes also occur during pregnancy. These changes are beyond their control, and it is assumed that these changes make them vulnerable both physically and mentally, so that it often affects the overall welfare of pregnant women [2, 3]. Pregnancy is a crucial period for a mother because it poses risks not only to herself but also to the child [4].
Mothers can be physically fit during pregnancy and after delivery, but they are not necessarily mentally and socially healthy. An ideal health assessment will include physical health measures, physical, social and psychological functions, all of which are measures of a person's quality of life [5]. Quality of life must be a significant concern in the health care of pregnant women, namely, quality of life must be the central axis, from the beginning to the last day of life [6]. Quality of life during pregnancy, the most widely discussed area, is physical health. However, this does not play down the critical role of the psychological domain and social relations in quality of life pregnant women. There is an interconnection between affected domains, or in other words, one domain reflects another domain [7].
The indicator widely used throughout the world to assess a person's physical, mental, and social health status, is quality of life. The WHO world health organization states that quality of life is' people's assessment of their position in life in the context of culture and value systems in their homes, related to goals, a combination of physical, psychological (mental) health aspects, level of self-confidence, social relations, belief personal and their relationship with the environment [5]. The definition of quality of life, according to WHO, is a definition that is widely accepted throughout the world.
The process of pregnancy affects or can decrease the quality of life from the beginning of pregnancy until delivery, even the risk of a decrease in the mother's quality of life is higher in pathological pregnancy [8]. The presence of pain, nausea and vomiting, depression, and the absence of a supportive partner can negatively affect the quality of life of pregnant women [7]. The mother's quality of life during the perinatal period can also harm the quality of life felt after delivery, such as postnatal depression, complications during labor, or abnormalities in the baby [9].
In addition to physical health problems, WHO states worldwide about 10% of pregnant women and 13% of new mothers experience mental disorders, mainly depression. This figure is even higher in developing countries, which is 15.6% during pregnancy [10] and 19.8% after giving birth. In cases of severe mental

disorders that can cause severe suffering to the mother, it can even trigger suicidal ideation. Besides, mothers with mental disorders usually cannot perform their daily functions properly. This fact shows that the health problems of pregnant and postnatal women are not only physical but also mental health and social health problems [11].

Another problem that affects the health status of the mother during pregnancy is social and environmental support. Social support from many people, both from husband, family, and friends to the mother during pregnancy, indirectly affects stress during pregnancy [12] and helps protect mothers against postpartum depression [13]. Pregnant women who get higher social support will have low stress levels, while pregnant women who lack or do not get social support will have high-stress levels [14].

The specific quality of life instruments that have been developed and validated to measure the quality of life of pregnant women currently have only one developed in Europe (Czecho-Slovakia), in addition to several generic instruments that often have been used to measure the quality of life of pregnant women. Many literature study articles state that generic instruments such as Short Form-36 (SF-36) [15], World Health Organization Quality Of Life-Bref (WHOQOL-BREF) [16, 17] and specific instruments such as The Nausea and Vomiting of Pregnancy-Specific Health-Related Quality of Life (NVP Specific HRQOL) [18, 19], The specific QOL-GRAV [20], Postpartum Quality of Life (PQOL) [21], Maternal Postpartum Quality of Life (MAPP-QoL), and Mother-Generated Index (MGI) [22] has often been used to measure Health-Related Quality of Life (HRQoL) in pregnant women.

Although several generic and specific life instruments are reliable, according to the researchers, a number of these instruments are considered less suitable for measuring the quality of life in special populations such as pregnant women [22, 19]. While these generic instruments are not sensitive enough to capture small but essential changes or effects of interventions on special populations such as pregnant women. Besides, it will potentially lose the mother's unique perspective with or without morbidity that lasts during pregnancy [23].

Therefore, to measure HRQoL of pregnant women with diverse demographic and socio-cultural backgrounds, new indicators are needed with varying pregnancy conditions. The development of new indicators and instruments will have the following advantages: provide a general HRQoL measure for various pregnancy conditions; allows comparisons between programs that handle pregnancy in different contexts; and allows evaluation of the achievement of targeted local, national, or global targets in the field of maternal and child health [22].

The purpose of this study is to develop new indicators to measure the quality of life of pregnant women with diverse socio-demographic backgrounds and varying pregnancy conditions.

Methods

This type of research is development research with the research design used is cross-sectional because data collection is done at one time.

The research location is six public health center with details of 3 public health center in Blitar City, which is an area with a high maternal mortality rate (AKI), and 3 public health center in Ngawi Regency, which is a region with a low MMR category in East Java Province, Indonesia. The data collection time is estimated from January 2019 to March 2019.

The research sample was a portion of pregnant women who had antenatal care (ANC) examinations at three Community Health Centers in Ngawi Regency and Blitar City, East Java Province. The simple random sampling formula is used to determine the sample [24]. Based on this equation, a sample size of 800 pregnant women was obtained from a total population of 25,200 pregnant women. The simple random sampling equation used is as follows:

$$n = \frac{Z^2_{1-\frac{\alpha}{2}} P(1-P)N}{d^2(N-1) + Z^2_{1-\frac{\alpha}{2}} P(1-P)}$$

Quality of life pregnant women who will be developed with this study consists of 3 factors:

1. functional and physical health factors: consisting of 7 variables (aspects);
2. functional and mental health factors: consisting of 5 variables (aspects);
3. social and environmental function factors: consist of 13 variables (aspects).

Interviews were conducted while pregnant women were visiting pregnancy check-up (ANC) at the health center. The interview is done once during pregnancy, regardless of gestational age.

Before arriving at the data collection stage, identification, confirmation, validation, and reduction of all variables (aspects) and all items that make up each aspect are first carried out. The process of identification, confirmation, validation, and reduction is carried out in 4 stages, namely:

1. Phase I: conduct a comprehensive and in-depth literature study to identify all domains, variables (aspects), and items that make up the quality of life indicator for pregnant women. In studying this literature, three domains, 25 aspects, and 115 indicators of quality of life have been identified. Details of the whole domain, aspects, and indicators have been explained in the conceptual framework;
2. Phase II: confirm and validate all domains, aspects, and indicators that make up the indicators of quality of life for pregnant women by conducting a preliminary study using the in-dept interview method for pregnant women in two regions, namely Ngawi Regency and Sumenep Regency;
3. Phase III: testing instruments to determine their validity and reliability so that the number of indicators is reduced to 115 variables in the end. The trial of the instrument was conducted by interview using a

questionnaire to 30 pregnant women who were doing ANC at the Mulyorejo Health Center, Surabaya;
4. Phase IV: confirm and validate all domains, aspects, and indicators that make up the quality of life indicator for pregnant women using the review method by some experts. Based on the results of the expert review, it was found that there were several inputs, including the number of items it was suggested not to be reduced by the consideration that if it were not significant, it would be wasted by itself at the time of the Confirmatory Factor Analysis (CFA) so that the number of indicators remains as before, namely 115 indicators.

Data processing and data analysis are carried out in the following stages:
1. before the questionnaire for data collection was applied to pregnant women in Ngawi Regency and Blitar City, the validity and reliability tests were first conducted by interviewing 30 pregnant women outside the study location. Then the instrument validity was analyzed using the correlation test, and the instrument reliability was analyzed alpha Cronbach;
2. after making improvements to the questionnaire based on the validity and reliability test results, the data was collected at 3 Puskesmas in Ngawi Regency and 3 Puskesmas in Blitar City;
3. if the data has been collected, then check and repair (editing) if there is data entry on the wrong or lacking questionnaire. Next, provide a code (coding) for each answer on the questionnaire that has been filled in completely;
4. it gives a score for each question item analyzed and summits the answers to some question items that make up one aspect or variable. Each question item is given two answer choices, namely yes, and no. The scoring of each question item is as follows:
   a. score 0 if the answer is No;
   b. score 1 if the answer is Yes;

   If the question item is negative, then the answer score is categorized as follows:
   a. score 0 if the answer is Yes;
   b. score 1 if the answer is No;
5. enter all responsive answer data into the data processing program on the computer, all items, and all aspects;
6. we are analyzing all variables, using the second-order Convincatory Factor Analysis (CFA) to determine significant variables in each aspect and quality of life factors of pregnant women using SmartPLS software;
7. develop an indicator model based on the results of the CFA;
8. calculates the cut of point value for each factor based on the average value () quality of life pregnant mother + Standard Deviation (SD) value;
9. categorizing the value of quality of life for pregnant women for each factor as follows:
   a. low: if the value of quality of life for pregnant women ≤ SD;
   b. medium: if -SD < value of quality of life for pregnant women < +SD;
   c. high: if the value of quality of life for pregnant women > +SD.

This research has obtained a certificate of ethical approval from the Ethics Commission of the Faculty of Public Health, Universitas Airlangga No. 553/EA/KEPK/2018.

Results

Results of analysis of quality of life indicators for pregnant women

Indicator analysis results quality of life pregnant women for functional factors and physical health (factor A) indicate aspects of daily living activities (A1), aspects of dependence on drugs or help from others (A2), aspects of energy and fatigue (compared to before pregnancy) (A3), aspects of mobility (A4), aspects of pain and discomfort (A5), sleep and rest aspects (A6) and aspects of workability (outside and at home) (A7) are significant. That result has a meaning that all aspects of functional and physical health factors play a role in the status of the quality life of pregnant women. However, not all indicators from every aspect of function factors and physical health are significant (Tab. I).

CFA results in function factors and physical health (factor A) quality of life pregnant mother, and the loading factor value of each indicator can be seen in Figure 1.

Factor values for physical function and health (factor A) quality of life for pregnant women, calculated based on the loading factor value of each indicator. Calculation of factor values for physical function and health (factor A) quality of life pregnant mother use the following equation:

$$A = (0.411\times A1\_a)+(0.41\times A1\_b)+(0.347\times A1\_c)+(0.297\times A1\_e)+(0.357\times A1\_f)+(0.365\times A2\_c)+(0.353\times A2\_d)+(0.448\times A3\_a)+(0.467\times A3\_b)+(0.416\times A3\_c)+(0.388\times A4\_a)+(0.358\times A5\_a)+(0.334\times A5\_b)+(0.337\times A5\_c)+(0.366\times A5\_d)+(0.356\times A6\_a)+(0.38\times A6\_b)+(0.413\times\times A6\_c)+(0.446\times A7\_a)+(0.492\times A7\_b)+(0.347\times A7\_c)$$

Based on the equation, the average value of the functional factor and physical health (factor A) is obtained quality of life pregnant mother of 5.5707 with a standard deviation of 1,36624. Categorization of functional factors and physical health (factor A)) quality of life pregnant mother use the following criteria:
1. physical Function and Health < 4.20446 are categorized as low;
2. physical Functions and Health 4.204461 to 6.93694 categorized as moderate;
3. physical Health and Functions > 6.936941 are categorized high.

As many as 84.3% of pregnant women do not have problems with their physical function and health (in moderate and high conditions), but there are still 16.3% who have low physical or functional health and function conditions. A description of the results of the categorization of functional factors and physical health (factor A) quality of life pregnant mother can be seen in Table II.

Tab. I. The CFA analysis of functional factors and physical health (factor A) significant quality of life for pregnant women 2019.

Aspect	Indicator description	p	p
A1 Daily life activities	(A1_a) Mother is still cleaning the house as usual during pregnancy	0.000	0.000
	(A1_b) Mother is still washing clothes and other household equipment, during pregnancy	0.000	
A1 Daily life activities	(A1_c) Mother still cooks and prepares food for the family as usual, during pregnancy	0.000	0.000
	(A1_e) Mother is still caring for other family members (children, husband, parents) as usual, during pregnancy	0.000	
	(A1_f) Mother still does other daily activities as usual (for example work, shopping), during pregnancy	0.000	
A2 Dependence on drugs or other people's help	(A2_c) Mother has used other people's rocks to do daily activities (> one month) during pregnancy	0.000	0.000
	(A2_d) Mothers are currently using other people's rocks to carry out daily activities (> one month) during pregnancy	0.000	
A3 Energy and fatigue	(A3_a) Mothers feel slower doing daily activities during pregnancy	0.000	0.000
	(A3_b) Mothers find it harder to carry out daily activities during pregnancy	0.000	0.000
	(A3_c) Mother feels tired easily doing daily activities during pregnancy	0.000	
A4 Mobility	(A4_a) Mothers still find it easy to walk in daily activities, during pregnancy	0.000	0.000
A5 Pain and discomfort	(A5_a) Mother feels healthy during pregnancy	0.000	0.000
	(A5_b) Mothers feel more easily ill during pregnancy	0.000	
	(A5_c) Mother feels physically comfortable during pregnancy	0.000	
	(A5_d) Mother feels uncomfortable (aching, nausea, cramps, heavy body) during pregnancy	0.000	
A6 Sleep and rest	(A6_a) Mother often experience sleep disorders (often wake up during sleep, nightmares, delirious, and can not breathe comfortably) during pregnancy	0.000	0.000
	(A6_b) Mothers often experience difficulty falling asleep during pregnancy	0.000	0.000
	(A6_c) Mothers often cannot rest comfortably during pregnancy	0.000	
A7 Ability to work (outside and at home)	(A7_a) Mother feels the amount of work that can be done every day becomes less during pregnancy	0.000	0.000
	(A7_b) Mother feels the type or type of daily work that can be done to be reduced during pregnancy	0.000	
	(A7_c) Mother feels the results of daily work is not as expected during pregnancy	0.000	

Functional and mental health factors (factor B)

The analysis of quality of life indicators for pregnant women as a whole for functional factors and mental health (factor B) shows that not all significant factors play a role in assessing the quality of life status of pregnant women. There are three significant aspects, namely aspects of self-perception and appearance (B1), aspects of dependence on drugs or help from others (B3), aspects of spirituality, religion, and beliefs (B4), meaning that all three aspects of the function and mental health factors play a role or contribute on the quality of life status of pregnant women (Tab. III).

CFA results in function factors and mental health (factor B) quality of life pregnant mother, as well as the loading factor value of each indicator, can be seen in Figure 2.

Factor values for function and mental health (factor B) quality of life for pregnant women, calculated based on the loading factor value of each indicator. Calculation of factor values for function and mental health (factor B) quality of life pregnant mother use the following equation:

$$B = (0.344\times B1\_e)+(0.35\times B1\_f)+(0.312\times B3\_b)+(0.251\times B4\_a)+(0.188\times B4\_d)+(0.213\times B4\_e)$$

Based on these equations, the average value of functional factors and mental health (factor B) is obtained quality of life pregnant mother of 0.9981 with a standard deviation of 0.46151. Categorization of functional factors and mental health (factor B) quality of life pregnant mother uses the following criteria:

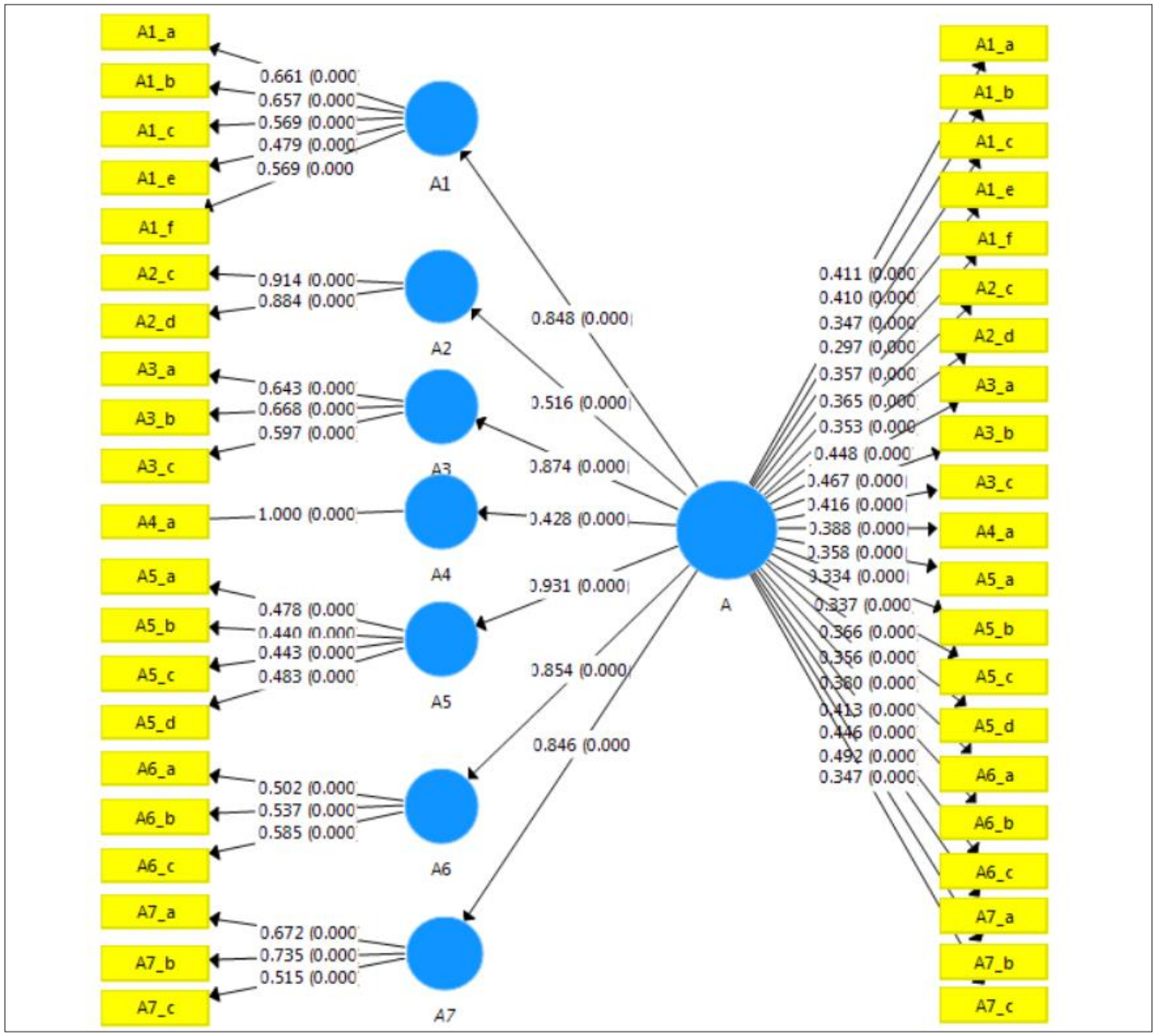
1. function and Mental Health < 0.53659 categorized as low;
2. function and Mental Health 0.536591 to 1.45961 categorized as moderate;
3. function and Mental Health > 1.459611 is categorized high.

By category for function and mental health factors (factor B) quality of life, pregnant women are known to have a mental function and low health category of 14.2%. At the same time, 85.8% of pregnant women have moderate and high mental health functions and categories. A description of the categorization of mental health and function factors (factor B) quality of life pregnant women can be seen in Table IV.

Social and environmental function factors (factor C)

The results of the analysis of overall quality of life indicators for pregnant women for social and environmental function factors (factor C) show that not all significant factors play

Fig. 1. CFA results from physical function and health factors (factor A) quality of life pregnant women 2019.



Tab. II. Results of analysis of Physical Function and Health categories (factor A) quality of life pregnant mother 2019.

Physical Function and Health Categories	n	Percentage (%)
Low	126	15.8
Moderate	544	68.0
High	130	16.3
total	800	100.0

a role in assessing the quality of life status of pregnant women. There are five significant aspects, namely aspects of support from other family members (C2), aspects of support from others (C3), aspect of freedom, physical safety and security (C7), aspects of the home environment (C9), aspects of opportunities for obtaining pregnancy information (C10). That result has the meaning that these five aspects of social and environmental function factors play a role or contribute to the quality of life status of pregnant women (Tab. V).

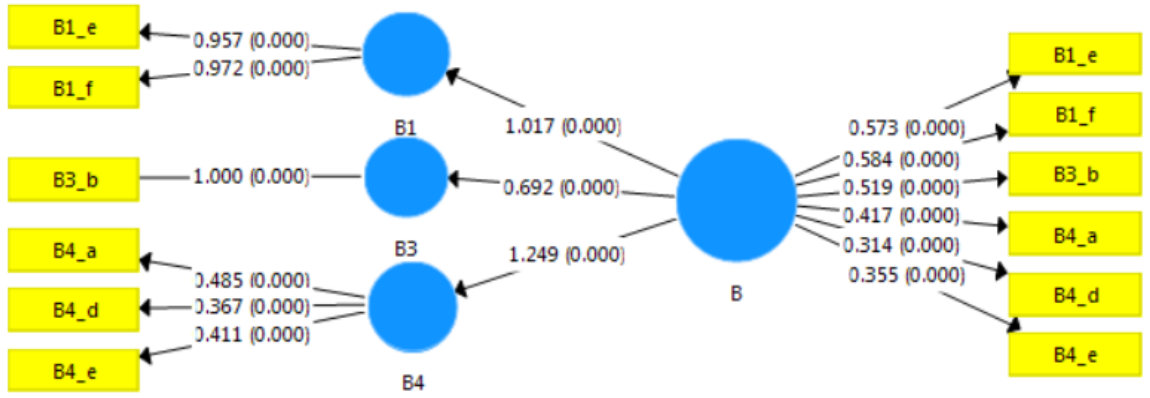
CFA results from social and environmental function factors (factor C) quality of life pregnant mother, as well as the loading factor value for each indicator shown in Figure 3.

Value factors for social and environmental functions (factor C) quality of life for pregnant women, calculated based on the loading factor value of each indicator. Calculation of factor values for social and environmental functions (factor C) quality of life pregnant mother use the following equation:

Tab. III. CFA analysis results in functional factors and mental health (factor B) quality of life pregnant mother which is significant in 2019.

Aspect	Indicator description	p	p
B1 Self-perception and appearance	(B1_e) Mother feels this pregnancy changes the value of the mother as a woman	0.000	0.000
	(B1_f) Mother feels this pregnancy changes the value of the mother as a wife	0.000	
B3 Positive feelings in pregnancy	(B3_b) Mother feels be exclusive or special because of this pregnancy	0.000	0.000
B4 Spirituality, religion, and belief	(B4_a) Mother feels this pregnancy is a special or extraordinary event	0.000	0.000
	(B4_d) Mother performs religious services for this pregnancy	0.000	
	(B4_e) Mother performs certain cultural events or rituals for this pregnancy	0.000	

Fig 2. CFA results from physical function and health factors (factor B) quality of life pregnant women 2019.



Tab. IV. Results of the analysis of categories of mental function and health factors (factor B) quality of life for pregnant women 2019.

Mental Health and Function Category	n	Percentage (%)
Low	144	14.2
Moderate	538	67.3
High	148	18.5
Total	800	100.0

$$C = (0.363\times C1\_a)+(0.331\times C1\_d)+(0.282\times C1\_e)+(0.319\times C1\_g)+(0.319\times C1\_h)+(0.426\times C1\_j)+(0.302\times C1\_l)+(0.41\times C2\_a)+(0.457\times C2\_e)+(0.397\times C3\_a)+(0.507\times C3\_b)+(0.478\times C3\_c)+(0.324\times C6\_a)+(0.345\times C6\_d)+(0.3\times C9\_c)+(0.269\times C9\_d)+(0.483\times C10\_a)+(0.499\times C10\_b)+(0.452\times C10\_c)$$

Based on these equations, the average value of social and environmental function factors (factor C) is obtained quality of life pregnant mother of 6.7559 with a standard deviation of 0, 76678. The categorization of social and environmental function factors (factor C) quality of life pregnant mother use the following criteria:

1. social and environmental function factors < 5.98912 are categorized as low;
2. social and environmental function factors of 5.989121 to 7.52268 are categorized as moderate;
3. social and environmental function factors > 7.522681 are categorized high.

By category for social and environmental function factors (factor C) quality of life, pregnant women in Table VI are known to have social and environmental functions low category of 13.3%. At the same time, 86.8% of pregnant women have moderate social and environmental functions (factor C). There are no pregnant women who have high social and environmental function categories.

Results of analysis of indicators of quality of life for pregnant women

The results of the analysis of quality of life indicators for pregnant women on physical health and function factors (factor A) show all aspects (7 aspects) of physical health and function factors (factor A) play a role or contribute to the quality of life status of pregnant women.

Significant aspects of the function factor and physical health (factor A) are 1) aspects of daily living activities (A1), 2) aspects of dependence on drugs or help from others (A2), 3) aspects of energy and fatigue (compared to before pregnancy) (A3), 4) aspects of mobility (A4), 5) aspects of pain and discomfort (A5), 6) aspects of sleep and rest (A6), and 7) aspects of the ability to work (outside and at home) (A7).

The results of the analysis of quality of life indicators for pregnant women on the function factor and mental health (factor B), showed four significant aspects of the

Tab. V. CFA analysis results from social and environmental function factors (factor C) quality of life pregnant mother which is significant in 2019.

Aspect	Indicator description	p	p
C1 Support from husband	(C1_a) The husband pays more attention than usual to the mother during pregnancy	0.000	0.000
	(C1_d) The husband provides sufficient money and materials for necessities during pregnancy	0.000	
	(C1_e) The husband delivers when the mother leaves the house during pregnancy	0.000	
C1 Support from husband	(C1_g) The husband advises, comforts and soothes the mother's heart during pregnancy	0.000	0.000
	(C1_h) Husband often mentions mother and fetus in the womb, during pregnancy	0.000	
	(C1_j) The husband always asks the condition of the mother during pregnancy	0.000	
	(C1_l) The husband invites the fetus to communicate during pregnancy	0.000	
C2 Support from other family members	(C2_a) Other family members pay much attention to the mother, during pregnancy	0.000	0.000
	(C2_e) Other family members also provide information about pregnancy during pregnancy	0.000	
C3 Support from others	(C3_a) Some neighbors or friends have asked about the condition of the mother and fetus during pregnancy	0.000	0.000
	(C3_b) Some neighbors or friends advise, comfort and calm the heart of the mother, during pregnancy	0.000	
	(C3_c) Some neighbors or friends provide information about pregnancy, during pregnancy	0.000	
C6 Financial resources	(C6_a) The financial condition of the family is sufficient to meet the needs of the pregnancy	0.000	0.000
	(C6_d) Mother already has a reserve or savings for labor	0.000	
C9 Home environment	(C9_c) Mothers can easily ask for help from their closest relatives in an emergency or emergency related to pregnancy	0.000	0.000
	(C9_d) Mothers easily ask for help from neighbors in urgent or emergency conditions related to pregnancy	0.000	
C10 Opportunity obtain pregnancy information	(C10_a) The family also gets information about the condition of the mother's pregnancy	0.000	0.000
	(C10_b) The family understands the condition of the mother's pregnancy	0.000	
	(C10_c) Information about the condition of the mother's pregnancy is beneficial for the mother's family	0.000	

function factor and mental health (factor B), namely 1) aspects of self-perception and appearance (B1), 2) aspects of feeling positive in pregnancy (B3), and 3) aspects of spirituality, religion, and beliefs (B4).

Indicator analysis results quality of life pregnant women on social and environmental function factors (factor C), showed significant aspects, namely aspects of support from the husband (C1), 2) aspects of support from other family members (C2), 3) aspects of support from others (C3), 4) aspects of financial resources (C6), 5) aspects of the home environment (C9), and 6) aspects of opportunities for obtaining pregnancy information (C10) (Tab. VII).

Discussion

Functional and physical health factors (factor A)

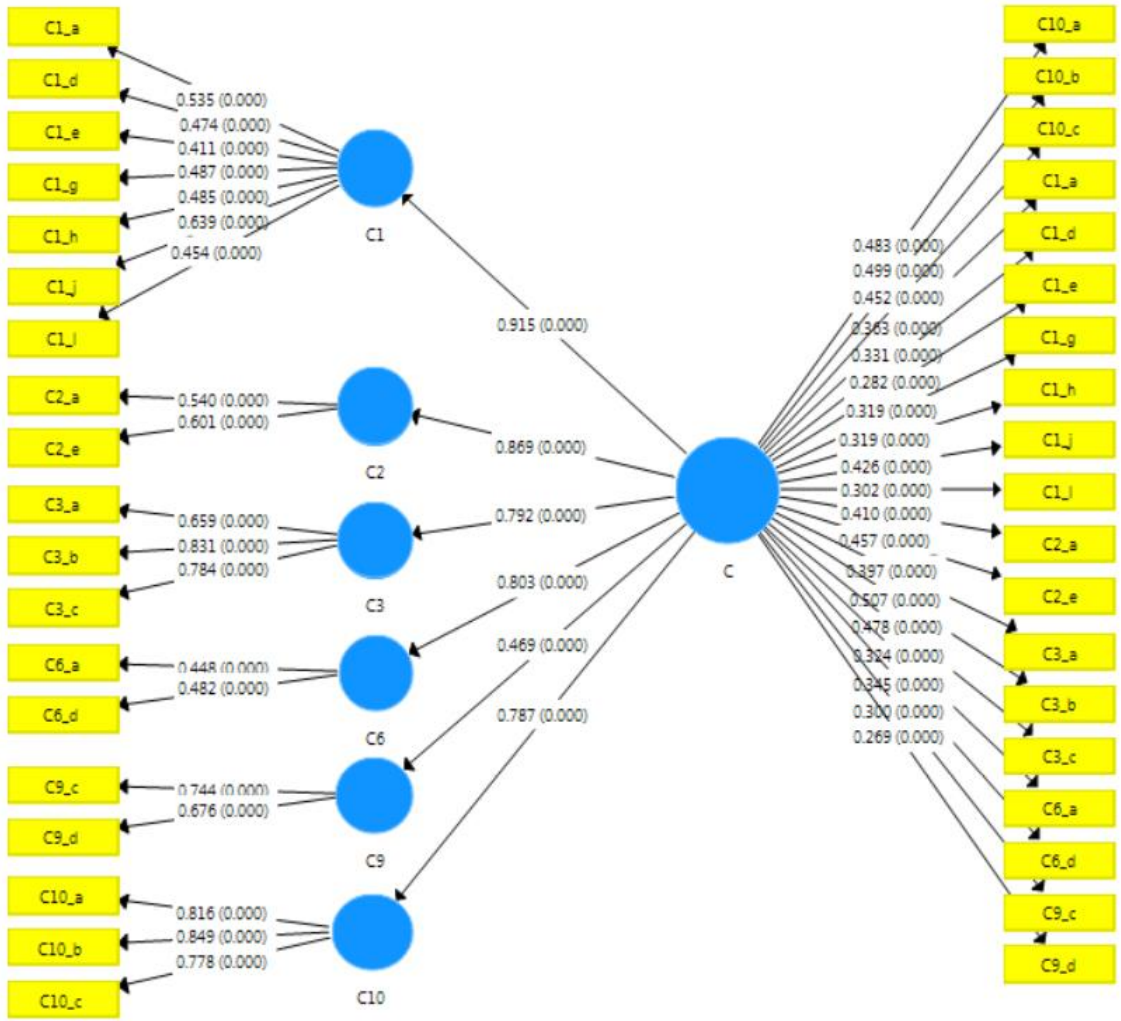
Indicator development quality of life pregnant women are based on the understanding of the concept of healthy WHO, a person is called healthy if physically, mentally, and socially healthy [21]. The number of quality of life indicators for pregnant women for functional factors and physical health (factor A) is 25 indicators. The indicator is divided into seven aspects, including aspects of the ability to carry out daily life activities, aspects of dependency on the assistance of others, aspects of energy and fatigue, aspects of mobility, aspects of pain and discomfort, aspects of sleep and rest, and aspects of workability.

The study results are following the study, which states the limitations of physical activity during pregnancy are the risk of a low quality of life during pregnancy [26]. The women who value their quality of life are higher in this domain, they declare higher energy expenditures when doing daily activities, work, and exercising [27].

The second significant aspect that determines the value of functional factors and physical health (factor A) quality of life for pregnant women is the dependence of pregnant women on others' help to do daily activities. This study's results indicate that pregnant women who need help from others to carry out their daily activities have a lower quality of life than those who are still able to do daily activities without the help of others. Factors influencing the quality of life of pregnant women are having family and friends. Family (including husband or partner) and friends can be sources of physical, mental, and economic assistance and support, but the opposite can also be a burden for pregnant women [28].

The third significant aspect that determines the value of functional factors and physical health (factor A) quality of life for pregnant women is the mother's energy and fatigue during her pregnancy. This study's results indicate that mothers who lack energy and experience fatigue during pregnancy have a lower quality of life value than pregnant women who do not experience a

Fig 3. CFA results from social and environmental function factors (factor C) quality of life pregnant women 2019.



lack of energy and fatigue. The level of physical activity decreases during pregnancy, and the lack of physical activity contributes to the decrease in the quality of life of pregnant women, including increased anxiety, depression, and symptoms of fatigue [29].

The fourth aspect that is significant in determining the value of functional factors and physical health (factor A) quality of life for pregnant women is the mobility a mother can carry out during pregnancy. The results of this study indicate that mothers who feel they can still do mobility and do not experience mobility difficulties during pregnancy have a better quality of life value than pregnant women who find it challenging to do mobility during pregnancy. Research result in Netherlands states that the Pregnancy Mobility Index (IMK) score increases during pregnancy and decreases after delivery. A higher IMK score means that pregnant women have lower mobility abilities. It was also mentioned that women with back or pelvic pain problems scored higher in the Pregnancy Mobility Index domain than women without back or pelvic pain [30].

The fifth significant aspect that determines the value of the physical function and health factors (factor A) quality of life for pregnant women is the pain and discomfort felt by the mother during her pregnancy. The results of this study indicate that mothers who do not feel sick and remain comfortable during their pregnancy have a better quality of life values than pregnant women who feel sick and uncomfortable during their pregnancy. This result follows research in France, which states there are significant differences in quality of life between pregnant women with low back pain and those without lower back pain in the dimensions of mental health, physical health, and social relations. Lower back pain also decreases physical and psychosocial health during pregnancy [31].

The sixth aspect that significantly determines the value of functional factors and physical health (factor A) quality of life for pregnant women is the condition of pregnant women to be able to sleep and rest during pregnancy. The results of this study indicate that mothers who can sleep and rest during pregnancy have a better quality of life values than pregnant women who are unable to sleep and rest during pregnancy. Research results in Turkey stated that sleep quality and quality of life of pregnant women were significantly worse than those of non-pregnant women.

Tab. VI. Results of analysis of categories of social and environmental function factors (factor C) quality of life pregnant mother 2019.

Social and Environmental Function Category	n	Percentage (%)
Low	106	13.3
Moderate	694	86.8
High	0	0.0
Total	800	100.0

Tab. VII. Summary of the number of aspects and indicators of quality of life for pregnant women in East Java in 2019.

Factor	Aspects and indicators	Early	Significant
A. Physical Function and Health	Aspect	7	7
	Indicator	28	21
B. Function and Mental Health	Aspect	5	3
	Indicator	32	6
C. Social and Environmental Functions	Aspect	13	6
	Indicator	55	19
Total	Aspect	25	16
	Indicator	115	46

The results of the analysis in the study showed that the risk of poor sleep quality increased 2.11-fold in the second trimester compared to the first trimester, and 1.86-fold in the third trimester compared to the first trimester [32].

The seventh aspect that significantly determines the value of the function factor and physical health (factor A) quality of life for pregnant women is the ability of pregnant women to work during their pregnancy. The results of this study indicate that mothers who can work at home and outside the home during pregnancy, have a better quality of life values than pregnant women who are not or less able to work during their pregnancy. The results of this study are in line with the research using longitudinal data from China, Mexico, and Tanzania, to find out the relationship between pregnancy and time use in the past week on 1) housework, 2) providing care, 3) agricultural work, and 4) non-agricultural independent work, stated that they did not find significantly different time-use patterns between pregnant and non-pregnant women. The study found that women in several developing countries are known not to reduce the volume, number, and type of work during pregnancy [33].

Functional and mental health factors (factor B)

The number of quality of life indicators for pregnant women for function and mental health factors (factor B) for East Java is six indicators. The indicator is divided into three aspects: aspects of self-perception and appearance, aspects of positive feelings in pregnancy, and aspects of spirituality, religion, and beliefs. The number of indicators for functional and mental health factors (factor B) is more comprehensive when compared to the specific QOL-GRAV mental health indicators which consist of 2 indicators: 1) psychological changes related to pregnancy do not allow the mother to do what she needs, and 2) satisfaction mother in arranging to adapt to her pregnancy [20].

The first significant aspect determining the value of mental health and function factors (factor B) quality of life for pregnant women is the aspect of self-perception and appearance. This study indicates that pregnant women who have good self-perception and appearance will have a higher quality of life value than pregnant women who do not have good self-perception and appearance. The study results are following the study in Tokat, Turkey, which uses the Body Image Perception Scale instrument. The results showed that non-pregnant women (controls) had the highest Body Image Perception scores, while the 3rd-trimester pregnant women group had the lowest Body Image Perception scores [34].

The second significant aspect that determines the value of mental health and function factors (factor B) quality of life for pregnant women is the aspect of positive feelings in pregnancy. This study's results indicate that pregnant women who have positive feelings in pregnancy will have a higher quality of life value than pregnant women who do not have positive feelings in pregnancy. The aspect of positive feelings in pregnancy is feeling to be someone special or individual because of the pregnancy. This study's results are following the same research that pregnant women who feel happy and optimistic about their pregnancy [28].

The third aspect that significantly determines the value of the function factor and mental health (factor B) quality of life for pregnant women is spirituality, religion, and belief. This study's results indicate that pregnant women who have spirituality, religion, and reasonable beliefs have a higher quality of life value than pregnant women who lack spirituality, religion, and reasonable beliefs. Research result in the Northeast of Brazil shows that the happiness of being a mother is the area with the most considerable positive influence on the quality of life of pregnant women related to health [35].

Social and environmental function factors (factor C)

The number of quality of life indicators for pregnant women for social and environmental function factors (factor C) for East Java is 19 indicators. The indicator is divided into six, namely aspects of support from the husband, aspects of support from other family members, aspects of support from others, aspects of financial resources, aspects of the home environment, and aspects of family opportunities to obtain pregnancy information. The number of indicators for social and environmental function factors (factor C) is more comprehensive when compared to the indicators of social relations and the specific QOL-GRAV which consists of 2 indicators: 1) maternal satisfaction with current partners, and 2) maternal satisfaction with social life now [20].

The first significant aspect determining the value of social and environmental function factors (factor C) quality of life for pregnant women is the aspect of support from the husband. The husband or partner should be the first person who is the closest and most reliable mother when pregnant. However, the various problems and circumstances often cause pregnant women to put their husbands are not always the first person to rely on pregnant women. Research result in the Ogun state, Nigeria found that husbands generally supported their pregnant wives, but very few were directly involved in the care of their wife's labor because her husband accompanied only 42% of pregnant women during antenatal visits [36].

The second significant aspect that determines the value of social and environmental function factors (factor C) quality of life for pregnant women is the aspect of support from other family members. This study's results indicate that pregnant women who get support from other family members have a higher quality of life value than pregnant women who do not get support from other family members. The results of this study are following the study in urban areas of India that says some people are needed by pregnant women to get close to them and provide support, namely mothers, relatives and female friends, husbands, and other family members [37].

Research states that life satisfaction is significantly correlated with social support. Social support can positively and significantly improve the relationship between spiritual well-being and quality of life in pregnant women [38]. Other studies in Iran, the social support scores of families felt by pregnant women have a direct impact on maternal welfare scores [39].

The third significant aspect determining the value of social and environmental function factors (factor C) quality of life for pregnant women is the aspect of support from others, in this case, support from neighbors or friends. The results of this study indicate that pregnant women who get support from others have a better quality of life value than pregnant women who do not get support from others. The results of this study are following the study which states that support in the form of tangible assistance such as household affairs, financial resources, or intangible assistance such as psychological support from relatives, and friends directly determine the value of quality of life for pregnant women [40].

The fourth aspect that significantly determines the value of social and environmental function factors (factor C) quality of life for pregnant women is the aspect of financial resources. This study indicates that pregnant women who have adequate family financial conditions during pregnancy and who have additional costs or savings for labor have a better quality of life. Insecure family economic problems can be a source of stress for pregnant women. This study's results are consistent with the review, which states one of the main factors associated with a better quality of life for pregnant women is the absence of social and economic problems the family [28].

The fifth aspect that significantly determines the value of social and environmental function factors (factor C) quality of life for pregnant women is the home environment aspect. The results of this study indicate that pregnant women who have a comfortable and secure home environment to ask for help if there is an emergency, have a better quality of life value than pregnant women who have a less comfortable home environment and are not easy to ask for help when there is an emergency. This study's results are following the study in rural areas of Egypt, which states that pregnant women receive considerable support from family members living together, their family of origin, and their neighbors assist pregnant women in seeking health services [41]. Other studies in rural areas of Sri Lanka mention almost the same thing, that social support obtained by pregnant women is limited to support from close family (family of origin), friends and community health midwives [42].

The sixth aspect that significantly determines the value of social and environmental function factors (factor C) quality of life for pregnant women is the aspect of family opportunity to obtain pregnancy information. This study indicates that pregnant women who have family chances of getting pregnancy information have a better quality of life values than pregnant women who do not have family chances of getting pregnancy information. Research result [43] stated that young mothers, ethnic minorities, and women from low socioeconomic groups showed the greatest desire to get more information about pregnancy and birth. In comparison, the results of research [44] stated that there was a significant relationship between family support and the number of pregnancies and pregnancy complications. This relationship causes the mother to have more pregnancies and pregnancy complications, get lower social support.

Conclusions

The indicators to measure the quality of life of pregnant women in East Java consist of 46 indicators which are divided into three factors, namely 1) health and physical function factors, 2) health and mental function factors, and 3) social and environmental function factors, with details as following: the function and physical health factor (factor A) are 1) aspects of daily living activities (A1), 2) aspects of dependence on drugs or help from

others (A2), 3) aspects of energy and fatigue (compared to before pregnancy) (A3), 4) aspects of mobility (A4), 5) aspects of pain and discomfort (A5), 6) aspects of sleep and rest (A6), and 7) aspects of the ability to work (outside and at home) (A7). The the function and mental health factor (factor B) are 1) aspects of self-perception and appearance (B1), 2) aspects of feeling positive in pregnancy (B3), and 3) aspects of spirituality, religion, and beliefs (B4). The social and environmental function factors (factor C) are aspects of support from the husband (C1), 2) aspects of support from other family members (C2), 3) aspects of support from others (C3), 4) aspects of financial resources (C6), 5) aspects of the home environment (C9), and 6) aspects of opportunities for obtaining pregnancy information (C10).

Indicators of quality of life for pregnant women have high suitability to be used to measure the quality of life for pregnant women. Measurement of quality of life in pregnant women using indicators of quality of life for pregnant women can be one of the preventions efforts to reduce morbidity in pregnant women.

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Authors' contributions

NP contributed to the development of ideas, research design and all the work of the authors for the selection and conduct of the research process. NP as the sole author wrote the entire section and completed the manuscript.

Conflict of interest statement

There is no conflict of interest to declare.

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