Path Analysis on the Determinants of Health Cadres Ability in Early Detection and Management of Pregnancy Risk Factors in Sleman, Yogyakarta, Indonesia

Istri Yuliani1), Bhisma Murti2), Endang Sutisna Sulaeman3), Tedjo Danudjo Oepomo4)

1)Doctoral Program in Community Development/Empowerment, Universitas Sebelas Maret
2)Masters Program in Public Health, Universitas Sebelas Maret
3)Department of Public Health, Faculty of Medicine, Universitas Sebelas Maret
4)Faculty of Medicine, Universitas Sebelas Maret

ABSTRACT

Background: Every pregnant woman has the potential to experience risk, so it is necessary to get serious attention and special treatment by health workers, family, and community. One role of the community is as the health cadres. This study aimed to examine the determinants of health cadre ability in early detection and management of pregnancy risk factors.

Subjects and Method: The research used quantitative method and cross-sectional approach. There were 269 health cadres participating as research samples. The sampling technique used is multistage cluster random sampling. Data were collected using a questionnaire with a Likert scale. Data analysis is done using path analysis.

Results: Cadre’s ability in early detection of pregnancy risk factors was affected by attitude (b = 0.38; SE = 0.10; p < 0.001), experience (b = 0.38; SE = 0.10; p < 0.001), motivation (b = 0.63; SE = 0.14; p < 0.001), compensation (b = 0.68; SE = 0.19; p < 0.001), workload (b = 0.64; SE = 0.23; p = 0.001), education and training (b = 0.68; SE = 0.19; p < 0.001), supervision (b = 0.99; SE = 0.17; p < 0.001), perceived seriousness (b = 0.73; SE = 0.16; p < 0.001), and perceived benefit (b = 0.84; SE = 0.18; p < 0.001). Cadre’s ability in the management of pregnancy risk factors was affected by attitude (b = 0.54; SE = 0.12; p < 0.001), experience (b = 0.18; SE = 0.10; p = 0.079), motivation (b = 0.36; SE = 0.15; p = 0.014), compensation (b = 0.64; SE = 0.20; p = 0.001), supervision (b = 0.36; (b = 0.49; SE = 0.18; p = 0.008), and early detection of pregnancy risk factors (b = 0.29; SE = 0.05; p < 0.001).

Conclusion: Cadre’s ability in early detection of pregnancy risk factors is affected by attitude, experience, motivation, compensation, workload, education and training, supervision, perceived seriousness, and perceived benefit. Cadre’s ability in the management of pregnancy risk factors is affected by attitude, experience, motivation, compensation, supervision, and early detection of pregnancy risk factors.

Keywords: health cadres, early detection, management, pregnancy risk factors, path analysis

Correspondence:
Istri Yuliani. Doctoral Program in Community Development/Empowerment, Universitas Sebelas Maret. Jl. Ir. Sutami 36A, Surakarta 57126, Central Java, Indonesia. Email: istriyuliani1@gmail.com. Mobile: 08122796697
29%), infection (5%), circulatory system disorders (5%) (Ministry of Health of the Republic of Indonesia, 2016). Meanwhile, other problems also play a significant role in causing maternal deaths. This problem concerns social and cultural dynamics. Women have difficulty accessing existing resources due to poverty, discrimination on the basis of race, gender inequality, and criminalization of abortion. Moreover, women prone to pregnancy problems are caused by the practice of early marriage (and teenage pregnancy), high fertility rates which can increase the potential for obstructed births, patriarchal customs that make women’s health, nutrition and education not important, so that this condition trigger pregnancy with risk factors. Basically, every pregnant woman can experience the risk of complications in labor, both in low-risk pregnant women, especially in high-risk pregnant women (Rochjati, 2011).

Efforts to accelerate the reduction of MMR can be done by ensuring that every mother is able to access quality maternal health services, such as maternal health services, delivery assistance by trained health workers in health care facilities, postpartum care for mothers, special care and referral in the event of complications. But the reality of maternal death is not that simple. On one hand, indeed access to health before, for a moment, and after birth will reduce the incidence of maternal deaths. But there are other more complex factors that need to be considered. Efforts to reduce MMR are not only the responsibility of the health sector, but also need to involve cross-sectoral roles and the role of the community. The role of the community here, one of which is involvement in becoming a health cadre (Departemen Kesehatan RI, 2009). Health cadres have an important role and contribute to the reduction of MMR through early detection and management of risk factors for pregnancy.

To achieve the success of efforts to reduce MMR through early detection and management of pregnancy risk factors, it is necessary to study the ability of health cadres and the factors that influence them. The ability of health care cadres in managing pregnancy risk factors is an indicator of intellectual behavior (Azwar, 2006).

Health cadres who are voluntarily motivated to serve the health sector, should have sufficient educational background, so as to enable them to analyze health problems that occur in the community. Health cadres are required to have knowledge and skills in accordance with the tasks carried out, so that they can be effective in carrying out their roles, both in empowering the community and in the role of efforts to reduce maternal mortality (Iswarawanti, 2010). Health health cadres must also receive continuous guidance both with supervision and education and training. Continuous supervision, guidance, education and training can improve health cadre performance (Kok et al., 2015).

The role of health cadres in efforts to reduce AKI through early detection and management of pregnancy risk factors is very important, so the purpose of this study is to determine the determinants of the ability of health cadres in early detection and management of risk factors for pregnancy.

**SUBJECTS AND METHOD**
This was a quantitative study with a cross-sectional design. The data were collected from February 7 to May 5, 2016. The population of the study was active
health cadres at 25 health centers in Sleman Regency with a total of 892 people. A sample of 269 active health cadres was collected by multistage cluster random sampling.

The dependent variables were the ability of health cadres in early detection and management of risk factors for pregnancy. The independent variables were age, attitude, experience, motivation, compensation, supervision, workload, education and training, supervision, perceptions of seriousness and perceptions of benefits.

The data were analyzed by path analysis, which consisted of 5 steps: (1) model specification, (2) model identification, (3) model fit, (4) parameter estimation, and (5) re-specification model.

**RESULTS**

1. **Sample Characteristics**
   Table 1 showed sample characteristics. Table 1 showed that the majority the sample had secondary education and worked as housewife.

| Characteristics | Criteria          | n   | Percentage (%) |
|-----------------|-------------------|-----|----------------|
| Education       | Primary School    | 66  | 24.54          |
|                 | High School       | 166 | 61.71          |
|                 | College           | 37  | 13.75          |
| Occupation      | Housewife         | 199 | 73.98          |
|                 | Civil Servant     | 1   | 0.37           |
|                 | Private employee  | 69  | 25.65          |

2. **Univariate Analysis**
   Mostly the cadres were at age 36-50 years old (58.74%). For the attitude, most of them (68.4%) is in the category of quite good. For the experience, more people have> 5 years experience than those <5 years. For the motivation, mostly (82.9%) are in the fairly good category. For the compensation, most of them (77.0%) are in the bad category. Related to the workload, most of them (60.6%) are in the fairly good category.

   Most of the sample (44.6%) had low education and training, 50.2% received low supervision. As many as 56.9% samples had strong perceived seriousness. As many as 59.5% samples had strong perceived benefit. As many as 59.5% cadres had good ability in the early detection on the risk factors of pregnancy. As many as 47.6% cadres had poor ability in managing the risk factors among pregnant women.

3. **Bivariate Analysis**
   Table 3 showed that the higher the score of attitude, experience, motivation, compensation, workload, education and training, supervision, perceived benefit, and perceived seriousness, the higher the ability of health cadres in early detection of risk factors for pregnancy.

   The higher the score of attitude, experience, motivation, compensation, supervision, and early detection, the higher the ability of health cadres in managing pregnancy risk factors.

   The older the age, the higher the experience of health cadres. The older the age of the health cadre, the more frequent the supervision received by health cadres. The higher the motivation score and experience score, the higher the compensation obtained.
Table 2. Frequency distribution of respondents according to research variables

| Variable                          | Criteria              | Total | Percentage (%) |
|----------------------------------|-----------------------|-------|-----------------|
| **Age**                          |                       |       |                 |
| < 21                             | 1                     | 0.37  |                 |
| 21-35                            | 58                    | 21.56 |                 |
| 36-50                            | 158                   | 58.74 |                 |
| > 50                             | 52                    | 19.33 |                 |
| **Behaviour**                    |                       |       |                 |
| Good                             | 78                    | 29.00 |                 |
| Fair                             | 184                   | 68.40 |                 |
| Not so fair                      | 7                     | 2.60  |                 |
| Poor                             | 0                     | 0.00  |                 |
| **Experience**                   |                       |       |                 |
| < 5 years                        | 93                    | 34.60 |                 |
| 5- < 10 years                    | 59                    | 21.90 |                 |
| 10- < 15 years                   | 47                    | 17.50 |                 |
| ≥ 15 years                       | 70                    | 26.00 |                 |
| **Motivation**                   |                       |       |                 |
| Good                             | 43                    | 16.00 |                 |
| Fair                             | 223                   | 82.90 |                 |
| Not so fair                      | 3                     | 1.10  |                 |
| Poor                             | 0                     | 0.00  |                 |
| **Compensation**                 |                       |       |                 |
| Good                             | 0                     | 0.00  |                 |
| Fair                             | 5                     | 1.90  |                 |
| Not so fair                      | 57                    | 21.19 |                 |
| Poor                             | 207                   | 76.95 |                 |
| **Working load**                 |                       |       |                 |
| Good                             | 0                     | 0.00  |                 |
| Fair                             | 163                   | 60.60 |                 |
| Not so fair                      | 106                   | 39.40 |                 |
| Poor                             | 0                     | 0.00  |                 |
| **Education and training**       |                       |       |                 |
| Good                             | 9                     | 3.35  |                 |
| Fair                             | 53                    | 19.70 |                 |
| Not so fair                      | 120                   | 44.61 |                 |
| Poor                             | 87                    | 32.34 |                 |
| **Supervision**                  |                       |       |                 |
| Good                             | 0                     | 0.00  |                 |
| Fair                             | 27                    | 10.00 |                 |
| Not so fair                      | 107                   | 39.80 |                 |
| Poor                             | 135                   | 50.20 |                 |
| **Seriousness perception**       |                       |       |                 |
| Good                             | 32                    | 11.90 |                 |
| Fair                             | 153                   | 56.90 |                 |
| Not so fair                      | 79                    | 29.30 |                 |
| Poor                             | 5                     | 1.90  |                 |
| **Benefits perception**          |                       |       |                 |
| Good                             | 90                    | 33.40 |                 |
| Fair                             | 160                   | 59.50 |                 |
| Not so fair                      | 19                    | 7.10  |                 |
| Poor                             | 0                     | 0.00  |                 |
| **The ability of health cadres in early detection of risk factors for pregnancy** |           |       |                 |
| Good                             | 25                    | 9.29  |                 |
| Fair                             | 160                   | 59.48 |                 |
| Not so fair                      | 72                    | 26.77 |                 |
| Poor                             | 12                    | 4.46  |                 |
| **Health cadres' ability to manage pregnancy risk factors** |     |       |                 |
| Good                             | 8                     | 3.00  |                 |
| Fair                             | 70                    | 26.00 |                 |
| Not so fair                      | 128                   | 47.60 |                 |
| Poor                             | 63                    | 23.40 |                 |
Table 3. Determinants of the ability of health cadres in early detection and management of risk factors for pregnancy

| Dependent Variable                                      | Independent Variable      | r     | p       |
|---------------------------------------------------------|---------------------------|-------|---------|
| The ability of cadres in early detection of risk factors for pregnancy | Attitude                  | 0.23  | <0.001  |
|                                                         | Experience                | 0.17  | <0.001  |
|                                                         | Motivation                | 0.20  | <0.001  |
|                                                         | Compensation              | 0.16  | <0.001  |
|                                                         | Workload                  | 0.12  | 0.005   |
|                                                         | Education and training    | 0.24  | <0.001  |
|                                                         | Supervision               | 0.25  | <0.001  |
| Cadre’s ability to manage pregnancy risk factors        | Perception of seriousness | 0.20  | <0.001  |
|                                                         | Perception of benefits    | 0.21  | <0.001  |
| Experience                                              | Attitude                  | 0.23  | <0.001  |
| Supervision                                             | Experience                | 0.09  | 0.079   |
| Compensation                                            | Motivation                | 0.12  | 0.014   |
|                                                         | Compensation              | 0.16  | 0.001   |
|                                                         | Supervision               | 0.13  | 0.008   |
|                                                         | Early Detection           | 0.31  | <0.001  |
| Experience                                              | Age                       | 0.56  | <0.001  |
| Supervision                                             | Age                       | 0.13  | <0.005  |
| Compensation                                            | Motivation                | 0.11  | 0.047   |
|                                                         | Experience                | 0.24  | <0.001  |

4. Path Analysis
This study had 12 observed variables. Degree of freedom was 26 (over identified). The value of the goodness of fit including CMIN= 1.49; p= 0.52; GFI= 0.98, AGFI= 0.93; NFI= 0.93; CFI= 0.97; and RMSEA= 0.04. The results of this measurement can be interpreted that the empirical model has fulfilled the criteria specified and it was in accordance with empirical data. Figure 1 showed the structural model with unstandardized solution. The model in the study did not need to be respecified because the output of the model designed was in accordance with the provisions of the model, which was in accordance with the sample data shown by the saturation model and the regression coefficient which was more than zero.

Table 4 showed that cadre’s ability in early detection of pregnancy risk factors was affected by attitude (b= 0.38; SE=0.10; p<0.001), experience (b=0.38; SE=0.10; p<0.001), motivation (b=0.63; SE=0.14; p<0.001), compensation (b=0.68; SE=0.19; p<0.001), workload (b=0.64; SE=0.23; p= 0.005), education and training (b=0.68; SE=0.19; p=0.001), supervision (b= 0.99; SE=0.17; p<0.001), perceived seriousness (b=0.73; SE=0.16; p<0.001), and perceived benefit (b=0.84; SE=0.18; p<0.001).

Cadre’s ability in the management of pregnancy risk factors was affected by attitude (b= 0.54; SE= 0.12; p<0.001), experience (b= 0.18; SE= 0.10; p= 0.079), motivation (b=0.36; SE=0.15; p=0.014), compensation (b=0.64; SE=0.20; p= 0.001), supervision (b= 0.36; b= 0.49; SE= 0.18; p= 0.008), and early detection of pregnancy risk factors (b= 0.29; SE= 0.05; p <0.001).
Figure 1. Structural model with unstandardized solution

Table 4. The Result of Path Analysis

| Dependent Variables | Independent Variables | b    | SE   | p      | β    |
|---------------------|-----------------------|------|------|--------|------|
| **Direct Effect**    |                        |      |      |        |      |
| Early Detection      | ← Attitude            | 0.58 | 0.11 | <0.001 | 0.23 |
| Early Detection      | ← Experience          | 0.38 | 0.09 | <0.001 | 0.17 |
| Early Detection      | ← Motivation          | 0.63 | 0.14 | <0.001 | 0.20 |
| Early Detection      | ← Compensation        | 0.68 | 0.19 | <0.001 | 0.16 |
| Early Detection      | ← Workload            | 0.64 | 0.23 | 0.005  | 0.12 |
| Early Detection      | ← Education and Training | 0.68 | 0.12 | <0.001 | 0.24 |
| Early Detection      | ← Supervision         | 0.99 | 0.17 | <0.001 | 0.25 |
| Early Detection      | ← Perceived Seriousness | 0.73 | 0.16 | <0.001 | 0.20 |
| Early Detection      | ← Perceived Benefit   | 0.84 | 0.18 | <0.001 | 0.21 |
| Management           | ← Attitude            | 0.54 | 0.12 | <0.001 | 0.23 |
| Management           | ← Experience          | 0.18 | 0.10 | 0.079  | 0.09 |
| Management           | ← Motivation          | 0.36 | 0.15 | 0.014  | 0.12 |
| Management           | ← Compensation        | 0.64 | 0.19 | 0.001  | 0.17 |
| Management           | ← Supervision         | 0.49 | 0.18 | 0.008  | 0.13 |
| Management           | ← Early Detection     | 0.29 | 0.05 | <0.001 | 0.31 |
| **Indirect Effect**  |                        |      |      |        |      |
| Experience           | ← Age                 | 0.47 | 0.43 | <0.001 | 0.56 |
| Supervision          | ← Age                 | 0.06 | 0.28 | 0.030  | 0.13 |
| Compensation         | ← Motivation          | 0.09 | 0.04 | 0.047  | 0.11 |
| Compensation         | ← Experience          | 0.13 | 0.03 | <0.001 | 0.24 |

Fit Model

- CMIN = 1.49, p = 0.52 > 0.05
- GFI = 0.98 ≥ 0.90
- AGFI = 0.93 ≥ 0.90
- NFI = 0.93 ≥ 0.90
- CFI = 0.97 ≥ 0.95
- RMSEA = 0.04 ≤ 0.08
DISCUSSIONS
1. Determinants of health cadres ability in early detection of risk factors for pregnancy

Attitude were positively and significantly associated with the ability of health cadres in early detection of risk factors for pregnancy. A strong attitude was a predictor of good behavior. Attitudes can have a very strong influence on a person's behavior or vice versa, attitudes would not affect someone if it was not related to their lives (LaPiere, 1934). Attitude toward a behavior were determined by beliefs in a behavior (behavior beliefs) and the costs or benefits of the behavior (Ajzen, 2005). Based on this opinion, health cadres who have a positive attitude towards risk factors for pregnancy would prevent the occurrence of risk factors for pregnancy, because pregnancy risk factors can threaten maternal and infant health.

Experience has a positive and significant influence on the ability of health cadres in early detection of risk factors for pregnancy. Experience was a knowledge or skill that has been known and mastered by someone who was the result of an act or work that has been done for some time (Kambarami et al., 2016). These results were in accordance with previous studies which stated that health cadres with a longer duration of work were able to recognize the health problems of pregnant women more (Hariwibowo et al., 2012). The experience of health cadres was measured by looking at the length of work to become a health cadre. Health cadres with a longer working period were believed to have had various experiences in solving various health problems.

Motivation has a positive and significant influence on the ability of health cadres in early detection of risk factors for pregnancy. Motivated health workers can do their job effectively (Aduo-Adjei et al., 2016). The main motivations of health cadre in work were social honor, moral and religious obligations (Glenton et al., 2010). Health cadres can be maintained and motivated by factors other than wages. Obtaining and sharing experiences with community members, building relationships between cadres and the community, has a higher value than just being appointed as an employee or getting transport money (Singh et al., 2016).

Compensation has a positive and significant effect on the ability of health cadres in early detection of risk factors for pregnancy. Compensation did not have to be in the form of money or salary, but can be in the form of awards. Appreciation was a factor that facilitate the growth of community participation (Ife and Tesoriero, 2008). Government funding support was also one of the factors associated with cadres' ability to solve local health problems (Sulaeman et al., 2012). Awards in financial or other forms were also important to maintain and manage the involvement and motivation of health cadres (Takasugi and Lee, 2012).

Workload influenced the ability of health cadres in early detection of pregnancy risk factors, the better the workload, the higher the ability of health care cadres in early detection of risk factors for pregnancy. A good workload was a workload that was not too low or too high. The results showed that 60.6% of health cadres had a fairly good workload. A worker has good performance qualitatively and quantitatively when the workload was at a moderate level (moderate) (Bruggen, 2015).

Education and training have a positive and significant effect on the ability of health cadres in early detection of risk factors for pregnancy. Health cadres lack skills due to lack of program orientation, education and support for their role (Gau et al.,...
2. Determinants of health cadres ability in pregnancy risk factor management

Attitude had a positive and significant effect on the ability of health cadres in managing risk factors for pregnancy. A behavior would produce positive consequences so individuals would tend to be favorable towards the behavior, on the contrary, individuals who have a negative evaluation attitude towards individual behavior would tend to be unfavorable towards the behavior. Health cadres who felt that there were serious health problems, have the desire to get training in how to detect early health problems, so that they can carry out early detection and manage health problems at the community level (Neupane et al., 2017).

Experience has a positive and significant effect on the ability of health cadres in managing risk factors for pregnancy. Health cadres with more experience have better creativity and innovation so that they can manage pregnancy risk factors by implementing various strategies (Coatsworth et al., 2017).

Motivation has a positive and significant effect on the ability of health cadres in managing risk factors for pregnancy. Motivation can improve work performance of health cadres. Highly motivated individuals can overcome various obstacles such as poor work environments, concerns about personal security and inadequate equipment (Luoma, 2006). One of the main motivating factors for health personnels included appreciation from managers, colleagues and communities, stable work and salary and training (Dieleman et al., 2003). However, despite not receiving a salary, health cadres have an intrinsic desire to volunteer, and their motivation often comes from the support they received from their families, when other sources of
motivation were insufficient (Greenspan et al., 2013).

Compensation has a positive and significant effect on the ability of health cadres in managing pregnancy risk factors. Compensation was not the only factor that influenced the ability of health cadres in managing pregnancy risk factors, but compensation for health cadres needed to be considered because compensation was also expected by health cadres. Compensation did not have to be in the form of money, but can be given in other forms, for example by holding a family gathering for health cadres, recreation, giving uniforms and others. Awards, whether financial or non-financial, were important for health cadres (Takasugi and Lee, 2012).

Supervision has a positive and significant influence on the ability of health cadres in managing risk factors for pregnancy. Supervision activities would have a good impact and guarantee a high standard of service quality if it was done well. Supervision can increase the motivation of health cadres in carrying out their duties (Curtale et al., 1995). Supervision was also a factor that affected the retention and motivation of health cadres (Strachan et al., 2012).

The ability of health cadres in early detection of pregnancy risk factors has a positive and significant effect on the ability of health cadres in managing risk factors for pregnancy. Early detection by health cadres about the existence of risk factors and complications of pregnancy, as well as adequate management as early as possible, was the key to success in reducing maternal and neonatal mortality (Departemen Kesehatan RI, 2009).

Age has a positive and significant influence on experience. Age also has a positive and significant effect on supervision. According to Hariastuti, experience can increase success in community empowerment (Hariastuti, 2014). Continuous supervision conducted by professional staff can increase the effectiveness of health cadres in providing services to clients (Snowdon et al., 2017).

Motivation and experience have a positive and significant effect on compensation. Motivated cadres usually have better performance (Aduo-Adjei et al., 2016), so the award received was better. Awards, whether in the form of financial or other awards, were important for maintaining and managing the involvement and motivation of health cadres (Takasugi and Lee, 2012). Work experience was one of the predictors of compensation. The longer the work experience, the greater the compensation received (Knighton et al., 2018).

Determinants of the ability of health cadres in early detection of pregnancy risk factors include: attitude, experience, motivation, compensation, workload, education and training, supervision, perceived seriousness and perceived benefits. Determining the ability of health cadres in managing pregnancy risk factors included: attitude, experience, motivation, compensation, supervision and ability of health cadre in early detection of pregnancy risk factors, while experience and supervision were influenced by age, compensation was influenced by motivation and experience.

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