

## RESEARCH ARTICLE

# Design and psychometric properties of an instrument to assess metacognition in moral reasoning in medicine

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**Abstract**

**Aim:** The present study aims at designing and assessing the psychometric properties of MCMR instruments to lead the medical ethics education to further goals and more definite steps.

**Design:** This is a cross sectional study.

**Method:** This study was conducted in two phases; identifying the items and designing the instrument. In the preliminary phase, the qualitative study was carried out using conventional content analysis method. In the second phase, psychometric evaluation of instrument was done using face and content validity, construct validity and reliability.

**Results:** On the first phase of this study, 135 items were identified. After determining face and content validity, 111 items reached the stage of exploratory factor analysis. This instrumental analysis indicated the existence of 74 items and ten factors whose variance of the total is explained as 46.883%. Cronbach's alpha value was 0/75. And the intra-cluster correlation coefficient was 0.808.

**KEYWORDS**

instrumentation, metacognition, moral reasoning, psychometricity

## 1 | INTRODUCTION

The moral reasoning is a required skill for thinking, making judgments and decisions (Naghizadeh & Anowrozi, 2010). Walker asserts that moral reasoning is a psychological process where the various aspects of a given action is being analyzed and the best choice, which is assumed to be morally ideal from the viewpoint of this optimization process and adhered to moral guidelines and this is done based on the specialized knowledge and the conscience (Goethals, Gastmans, & de Casterlé, 2010; Swisher, Kessel, Jones, Beckstead, & Edwards, 2012; Zirak, Moghaddsiyan, Abdollahzadeh, & Rahmani, 2011).

## 2 | BACKGROUND

Over the last few years, due to the huge advances in technology, the changing pattern of diseases, increasing life expectancy, increasing general knowledge and differences in the forms and quantity of applications related to health services and health care, Ethics in medicine has undergone a significant growth of attention which has led many universities to introduce some new courses in medical ethics or moral reasoning into their curriculum (Horton, Tschudin, & Forget, 2007; Self, Baldwin, & Wolinsky, 1992).

Because studies reveal that protocol-based approaches and guidelines are inefficient at dealing with the unprecedented health

issues (Freeman, Engels, & Altekruze, 2004). Those individuals who are incapable of integrating these guidelines and personal values into their activities will be dragged down by an enormous pressure and stress which is definitely correlated with the lack of knowledge and training in ethics and subsequently with stressful situations and complex work environment, because sometimes the difference between the personal opinions and the existing principles makes the decision making difficult (Goethals et al., 2010; Han, Kim, Kim, & Ahn, 2010; Tsai & Harasym, 2010). So, the ability of the moral reasoning pertains to the daily needs of the medical profession and the medical team are acquired to be capable of making moral decisions for performing their role besides technical skills and care, (Rejeh, Heravi Karimavi, Borhani, Khatooni, & Zirak, 2014) accordingly in the future, training the medical group will be responsive to some issues like changes in science and technology and the updated models of health service (Horton et al., 2007).

Since the primary objective of the educational programs is students' learning, applying some processes such as planning, monitoring, ordering and rethinking included in the structure of metacognition would be helpful (Safari & Meskini, 2016). Brown [1] believes that Metacognition assists the individuals in planning, learning and problem solving through awareness and organizing the thinking process (Akturk & Sahin, 2011). Likewise, studies has verified the relationship between metacognition and problem-solving skills and indicate that it leads learners to seize the learning opportunities (Safari & Arezy, 2012). Because these moral decisions focus on the individual ethics and personal traits. So, in medical fields, clinical instructors can improve the skill of decision making and moral judgements along with the manner of moral decision making and using the student based approaches through training the professional ethics and standards. (McLeod-Sordjan, 2014; Numminen & Leino-Kilpi, 2007).(Devettere, 2009).

So instructors must be able to assess the moral reasoning process and guide them by revolving about the acquired skills such as thinking, problem solving, critical analysis and decision making among students (Koochi, Khaghanizade, & Ebadi, 2016; Omid, Asgari, & Omid, 2016; Samanci, 2015).

Common training methods in moral reasoning, which are mostly based on the Kohlberg's Six Stages of Moral Development (Zirak et al., 2011), relay on ethical dilemmas and engage learners in ethical decision-making in real or almost-real situations where proper approaches in reasoning and decision-making about ethical issues are trained inclusively. On the other hand, the former tools emphasize on the manner of judgements based on the values of society where the tools were designed and sometimes, they are not usable in some other societies.

(Lohfeld et al., 2012). Other problems stem from the fact that such instruments do not explicitly measure people's ethical values or their ability to use them in real-life situation but instead use some test scores to classify people's progress with an abstract and conservative moral development scale and according to expert's standpoint, the scoring approach is quite difficult (Abdullah, Salleh, Mahmud, & Ghani, 2010; Kohlberg, 1976; Lohfeld et al.,

2012; McLeod-Sordjan, 2014; Price, Price, Williams, & Hoffenberg, 1998; Tsai & Harasym, 2010). On the other hand, these instruments are less concerned about the motivational factors in choosing the moral attitudes whereas based on social-psychological theories, emotional cases have an effect on moral reasoning (Black & Reynolds, 2016).

Due to the advances in medical ethics, some other instruments including standardized tests, objective reports and assessment of clinical skills were designed to investigate ethical reasoning but even these instruments only focus on the assessment process of students' ability to recognize and analyze ethical dilemmas in clinical environments.

The truth is that, considering the fact that the most current measures of this broad structure are related to emotional reactions and/or have problematic psychometric integrity, all these instruments designed for moral decision-making seem to be inadequate. And this hypothesis suggest that other constructed instruments which are capable of predicting ethical behaviors in any area is rejected as well as in medicine, just two instruments called as QoA (Qualitative outcome assessment) (Goethals et al., 2010) and EHCSF (Ethics and healthcare survey instrument) (Swisher et al., 2012) are designed specifically in medicine (Tsai, Harasym, Coderre, McLaughlin, & Donnon, 2009). But these instruments don't differentiate the level of people's skill and the scoring is done in such a way that individuals with lower skills are not assessed (Tsai et al., 2009).

In his study about defining the instruments of moral reasoning of nurses, Duckett et al., (1992) concluded that these instruments just make a list of decision making approaches and don't consider thinking styles or moral aspects (McAlpine, Kristjanson, & Poroch, 1997). According to Koochi, since the moral and professional developments of students occur in the classroom and the Ethics Code trainings do not suffice, teachers should be able to assess the moral reasoning. This can help teachers choose the aims and effective teaching methodologies. (Koochi et al., 2016) Investigations indicate that there is no metacognitive instrument in moral reasoning specified for medicine and those related narrow studies through presenting medical dilemmas assess the responses to the scenarios quantitatively and they are not based on instrument designing methods (Tsai et al., 2009). However, using metacognitive skills as well as improving problem-solving skills and consequences of learning can lead medical ethics education to further goals and more definite steps. Determination of the individual's metacognitive ability such as self-regulation and self-control ability will make instructors intervene properly to improve and make changes in teaching and learning environment (Ben-David & Orion, 2013; Kuiper & Pesut, 2004; Safari & Meskini, 2016).

Here and now, all the instrument designers share the same opinion that every instrument must be extracted directly from the targeted subjects (Doward, Meads, & Thorsen, 2004). So according to social, economic and cultural differences in different societies, instruction and evaluation of moral reasoning should be based on viewpoints, opinions and values of that given culture (Doward et al., 2004). And the validity and reliability of the instrument must be based on that studied culture.

On the other side, it is to be expected from Iranian society as a community complied with a code of ethics that all decisions be taken based on the religious principles (Larejani & Zahedi, 2001).

Hence, the present study aimed to determine the definition of metacognition in moral reasoning and assess the psychometric properties and design a metacognitive instrument of moral reasoning in the medical profession to guide educational managers on the efficiency of moral reasoning education. May this capability lead to better therapeutic services for improving patients' health.

### 3 | METHODS

This study used the Exploratory sequential mixed method. This study was conducted in two phases: Identifying the items and designing the instrument.

#### 3.1 | Phase I: Identifying items

In this phase, the qualitative study was carried out using conventional content analysis method. In this method, the data analysis began with the frequent data reading and then data categories are extracted by scrutinizing and analyzing the codes (Graneheim & Lundman, 2004).

The research population included 17 faculty members and clinical students of Isfahan and Bushehr University of Medical Sciences. Sampling was a target-oriented approach and since the researcher meant to interview well-informed individuals about the subject of gaining experience. Those who were selected from the medical groups and interviewed had clinical experiences and made moral and clinical decisions for patients in different circumstances and were knowledgeable enough. Their professional data are shown in Table 1.

To collect data, semi-structured interviews with individuals were conducted because they have necessary flexibility to elicit in-depth qualitative research. The Information of participants are shown in Table 1.

The interview began with an open-form question.

For example if you are facing a situation where you have to deal with a patient and you have to make a moral decision, what is in your mind and what thing do you think about in your decision? The question was centered on participants' thoughts about moral issues in clinical situations and then the follow-up questions were asked to obtain additional information and clarify them. Depending on how the participants respond to the questions, the interview was directed, and follow-up questions would be determined. Interviews were conducted in clinic, hospital or school of university for the patients' convenience (Table 1) and took 40–60 min. Concurrently with the interviews, data analysis was carried out. Interviews were recorded verbatim. Given that in the qualitative research, it is essential for the researcher to be immersed in data, he listened to the recordings of the interviews repeatedly and reviewed the transcripts several times to highlight the key concepts or meaning units of the statements to identify the initial code. Then the similar codes were merged and classification was done to reach the stage of naming sub-categories, then those categories identified through interviews were compared and in the case of similarity and the possibility of merging, they were merged with each other; at that point, the developed theme emerged.

In this stage, the subcategories were investigated in order to find the data extracts and finally the basic concepts were extracted, and themes were formed. The codes and statements were used to design questionnaire items. In the next stage, the initial pool of items developed by studying available sources and instruments.

**TABLE 1** The information of participants

No. participant	Work experience	Specialty	Job	Education	Age
1	15	Midwifery	Faculty	Master	35
2	20	Oncology	Faculty	Specialist	52
3	3	Gynaecology	Faculty	Specialist	32
4	7	Infectious	Faculty	Specialist	32
5	20	Rheumatology	Faculty	Specialist	55
6	5	Nephrology	Faculty	Specialist	30
7	15	Nursing	Faculty	Master	48
8	23	Reproductive health	Faculty	PhD	47
9	35	Paediatric	Faculty	Specialist	65
10	12	Cardiologist	Faculty	Specialist	35
11	26	Nuclear medicine	Faculty	Specialist	50
12	30	Nephrology	Faculty	Specialist	53
13	4	Surgery	student	Residency	33
14	30	Gastroenterologist	Faculty	Specialist	55
15	3	Reproductive health	Student	PhD	29
16	22	Reproductive health	Faculty	PhD	49
17	16	Emergency	Faculty	Specialist	49

### 3.2 | Phase II

The identified items were analyzed by those who majored in medical ethics and tool designers.

Duplicate items removed. Some of the items had changed and had been revised grammatically.

To confirm the existence of reliability and validity of the made questionnaire, the psychometric procedures were performed as follows:

#### 3.2.1 | Determination of face validity

In face validity of the instrument, which intends to scrutinize the appearance of the targeted construct (Polit & Beck, 2014), quantitative and qualitative face validity were applied which implies the evaluation of tool, its conciseness and comprehensibility by the target population.

To determine the qualitative face validity, 13 participants were asked to test the difficulty level, ambiguity and coherency (the extent to which the phrases are coherent and properly related) of questions.

To determine the quantitative face validity, the method of impact factor with following formula was applied (5). In this stage, 13 subjects of the target population were asked to check every single phrase to determine the importance of each phrase based on a 5-point Likert scale:

(Extremely important = 5 points

Very important = 4 points

Moderately important = 3

Slightly important = 2

Not important at All = 1)

Impact factor = Frequency (Percentage) × The importance.

Impact scores of the items were measured using the formula: percentage of participants who give each item scores as 4 or 5 × mean of importance and the statements which had an impact factor >1.5 were chosen as the appropriate statements and maintained for the following stages (Hajizadeh & Asghari, 2011).

#### 3.2.2 | Determination of content validation

In content-related validity which are, three experts in the areas of moral reasoning and medical ethic and instrument development the content coverage of the instrument is assessed based on the objective of the research (Polit & Beck, 2017) which are performed qualitatively and quantitatively.

### 3.3 | Qualitative content validity

On the qualitative content validity section, 11 experts working in Medical Ethics, Medical Education, Persian Literature and Instrument Designing were asked to make comments on the content

of instrument structures in terms of grammar, clarity, using correct phrases and avoiding duplication.

### 3.4 | Quantitative content validity

Content validity index (CVI) and the ratio of content validity approaches were applied to verify the quantitative content validity.

In calculating the CVI, the classification was done based on the relevance of the statements from experts' viewpoint. So three criteria including simplicity, relevance and clarity were calculated for each statement using 4-point Likert scale A (Polit & Beck, 2017). Content validity index was calculated by dividing the total number and rate of the agreement (positive responses) for each statement with ratings 3 and 4 by the total number of responses:

$$\frac{\text{Total number of positive responses for each item with a rating of 3 and 4}}{\text{Total number of responses.}}$$

Based on this approach, items which their CVI is <0.7 are unacceptable, between 0.79–0.7, they need revision and higher than 0.79, they are appropriate. Then, S-CVI or scale-leveled CVI was calculated based on the means of all item-leveled CVIs in the instrument, which it has to be 0.9 or higher to be considered appropriate (Polit & Beck, 2017).

For Content Validity Ratio "CVR" (Freeman et al., 2004), 11 qualified experts were requested to specify whether an item is necessary for operating a construct in a set of items or not. To this end, they were requested to score each item from 1–3 with a three-degree Likert scale (not necessary = 1, useful but not essential = 2, essential = 3) to be sure of choosing the most important and most correct content.

The numeric value of content validity ratio was determined by Lawshe's formula:

NE: The number of experts who chose the "necessary" option

N = Total number of experts

According to Lawshe in the present study, given that from 11 experts participated in the assessment of CVR, the minimum acceptable score is 0.59 (Polit & Beck, 2017).

### 3.5 | Determination of construct validity

Construct validity demonstrates the extent to which the instrument measurement procedure adheres to the given theoretical concept (Hajizadeh & Asghari, 2011). Before working on the construct validity, a pilot study was conducted to examine the defects of the instrument and internal consistency on 20 students and Cronbach's alpha was measured. In construct validity, the number of samples was calculated at least five times bigger than the number of the designed instrument (Munro, 2005).

This cross-sectional study was done on nursing and midwifery students of Bushehr, Isfahan and Shiraz Universities of Medical Sciences with clinical degrees in 2018 and since the number of items

was 111, 600 questionnaires were distributed of which 553 were returned.

The ratio between conceptual definitions and operational concepts or words in the tool was investigated by construct validity and for this purpose, there are several methods where exploratory factor analysis, hypothesis testing and discriminant validity were used.

Before applying exploratory factor analysis, an item analysis was first applied. The internal and item-total correlation had been measured. In this stage, if every single item with correlation coefficient of above 0.3 was not associated with at least one other item that item would be eliminated from the questionnaire (Hayton, Allen, & Scarpello, 2004; Plitcha & Kelvin, 2013). If the correlation coefficient between two items was more than 0.7, one of those items would be eliminated (Hayton et al., 2004). Likewise, if the correlation coefficient between the item and the total questionnaire was <0.3, that item would be eliminated (Jones et al., 2009).

The sample extracted from construct validity was used to conduct item analysis.

Factor analysis was conducted using the main components and through an orthogonal rotation method called Equamax Rotation (Han et al., 2010). Maximum frequent repetition of process for convergence of factor analysis method (Tsai & Harasym, 2010) was 50 times. Kaiser's Meyer-Alkin statistic (Rejeh et al., 2014) (KMO) was calculated to assess the adequacy of the sample size, the amount of 8.0 or more was considered appropriate (Plitcha & Kelvin, 2013). Bartlett Sprite Test (Safari & Meskini, 2016) was conducted to determine whether the model for factor analysis was appropriate or not. Parallel analysis method (Akturk & Sahin, 2011) was performed to determine the number of factors (Akturk & Sahin, 2011; Henson & Roberts, 2006; Ledesma & Valero-Mora, 2007).

To perform parallel analysis, aiming at determining the number of factors in questionnaire, firstly, the Eigen values of the actual data were calculated. Then, by using the Syntax in SPSS V20 and giving the command of generating random data from actual data, random data were extracted, and their Eigen values were calculated. The extraction of random data was repeated 50 times. Subsequently, the mean and 95th percentile of Eigenvalues resulted from 50 repetitions of the data extraction for each factor. Finally, Eigen values of random data were compared with those of actual data and only those factors whose Eigen values were more than mean and 95th percentile of random eigenvalue (Franklin, Gibson, Robertson, Pohlmann, & Fralish, 1995; Ledesma & Valero-Mora, 2007).

To evaluate the Discriminant validity, correlations between highlighted factors (subscales) in the questionnaire were evaluated. It is assumed that highlighted factors are distinct constructs. Correlations between factors should not exceed 0.7, lower scales are certified appropriate. Also, the correlation between factors must be less than the internal consistency of each factor (Hallinger & Wang, 2015).

To test the hypothesis as another method in construct validity, the correlation of the scores obtained from the designed instrument (metacognition questionnaire in moral reasoning = MCMR).

The scores of sympathy and moral sensitivity were measured. At this stage, these two hypotheses were tested: (a) There is a direct statistical relationship between metacognition in moral reasoning and sympathy with the patient. (b) There is a direct statistical relation between metacognition in moral reasoning and moral sensitivity.

### 3.6 | Determination of reliability

To test the reliability which aims at getting the same results in repeated tests (Polit & Beck, 2014), both determining internal consistency approaches (Safari & Arezy, 2012) (Cronbach Alpha) and instrument stability were used through test and retest method. To determine internal consistency, Cronbach's alpha for the total score and its subscales was calculated. Some researchers found Cronbach alpha of 0.7 and 0.6 acceptable (Clark & Watson, 1995) and in the stability assessment which means the instrument have to obtain the same results on the same samples at different times (Hajizadeh & Asghari, 2011). Test - retest method was used (Waltz, Strickland, & Lenz, 2010) at interval of 2 weeks. As recommended by Waltz (Numminen & Leino-Kilpi, 2007) et al (2010), the 2-week interval is appropriate (Waltz et al., 2010).

The retest was conducted with a time lag of approximately 2 weeks and filled by 30 Students of medicine, nursing and midwifery. After collecting data, Intra Class Correlation Coefficient (ICC) was calculated for 10 subscales and the whole questionnaire this test is defined as ratio of intergroup variance to total variance. ICC of 0.7 (or more) between two tests indicates a satisfactory stability (Terwee et al., 2007). ICC are classified in: ICC<sub>consistency</sub> and ICC<sub>agreement</sub>. Absolute agreement with two-way random is preferable in this study.

### 3.7 | Ceiling effect and floor effect

If more than 15 percent of respondents get the most and the least score respectively, there will be Ceiling effects and Floor effects (Terwee et al., 2007). For investigating ceiling and floor effects, the sample extracted for testing the construct validity was used, so the most and the least percentage of receivable scores were calculated.

*Moral considerations:* Moral considerations in this research included expressing the aims of the study and manner of doing research, obtaining permission from the participants, obtaining written consent, emphasizing the privacy of audio files in the qualitative phase and the confidentiality of the identity in the qualitative and quantitative phase.

### 3.8 | Ethical statement

The study is performed according to Helsinki principals of ethics. All participants signed a written consent. This study is a part of PhD dissertation by the first author that is approved by Department of medical education research center in Isfahan university of medical sciences and Health services, Iran.(Reg.396424) and Ethic code (1396030424).

**TABLE 2** The demographic features of the participants

Variable	Number (percentage)
University	
Isfahan	299 (54.1)
Bushehr	114 (20.6)
Shiraz	130 (23.5)
Missing	10 (1.8)
Sex	54 (9.8)
Female	291 (52.6)
Male	251 (45.4)
Missing	11 (2)
Field	41 (7.4)
Medical	137 (24.8)
Medical residency	116 (21)
Nursing	146 (26.4)
Midwifery	90 (16.3)
Missing	23 (4.2)
Academic year	
Third	41 (7.4)
Forth	137 (24.8)
Fifth	116 (21)
Sixth	146 (26.4)
Seventh	90 (16.3)
Missing	23 (4.2)
Age (Mean $\pm$ SD)	24.26 $\pm$ 2.54247

**TABLE 3** The amount of KMO and Bartlett's test of sphericity

<b>KMO</b>	<b>0.928</b>
Bartlett's test of sphericity	Chi-square = 1,301.819 df = 2,850 <0.001 p value

**TABLE 4** Comparison of specific value from actual data with the mean and 95 percentile of eigenvalues from random data

Factor	The specific value from actual data	The mean of specific value from random data with 50 repetitions	95 percentile of specific value from random data	Accept or reject
1	18.633	1.805	1.777	Accept
2	3.296	1.770	1.728	Accept
3	2.248	1.736	1.705	Accept
4	1.943	1.721	1.676	Accept
5	1.799	1.701	1.649	Accept
6	1.725	1.649	1.623	Accept
7	1.619	1.617	1.588	Accept
8	1.546	1.531	1.522	Accept
9	1.494	1.453	1.428	Accept
10	1.424	1.423	1.400	Accept
11	1.336	1.392	1.367	Reject
1	1.286	1.367	1.344	Reject
13	1.234	1.347	1.320	Reject
14	1.217	1.318	1.296	Reject

## 4 | RESULTS

This study was designed to investigate the psychometrics of the metacognitive instrument in ethical reasoning. For this purpose, the explanation of metacognition concept and the extraction of tool items were required. The Instrument items were identified by analyzing qualitative interviews and obtained from participants' statements. The demographic features of participants are mentioned in Table 2.

Then the items were analyzed by medical ethics and instrument designing experts, some of them were eliminated and some were revised. A 131-item instrument was made and reached to 135 by reviewing resources on pool of items which was investigated psychometrically.

**Face validity:** In studying face validity by target group, items were revised and the impact factor of one item was <1.5 which was eliminated and that of other items was >1.5.

**Content validity:** Through qualitative content validity, three items were eliminated and then through quantitative content validity, CVR and CVI were calculated for 131 items which led to eliminating 20 items at this stage. The amount of S-CVI of the instrument aimed at measuring the metacognition in the moral reasoning was 0.935. Finally, this instrument was prepared with 111 items for the construct validity process.

In the item analysis, 35 items were eliminated from the instrument because of their correlation with the whole instrument (<3.0) or lack of correlation (0.3 or more) with at least one item.

The analysis of the main components through an orthogonal rotation method called equamax was carried out on the 76 remaining items of the questionnaire.

The results of KMO statistics indicate that the sample was sufficient for factor analysis. Bartlett's test of sphericity illustrated a significant relationship between items indicating the model fitting





**TABLE 6** The correlation among the subscales of questionnaire and comparing it with internal correlation of subscales

Subscale	2	3	4	5	6	7	8	9	10	Internal correlation
Error Management	0.373	0.358	0.402	0.402	0.346	0.459	0.249	0.364	0.370	0.75
Fulfilling patients' needs	1	0.627	0.651	0.578	0.372	0.545	0.564	0.510	0.620	0.83
Observing Ethics and dignity of the patients		1	0.638	0.592	0.455	0.488	0.637	0.582	0.621	0.83
Bringing Satisfaction and trust in patients			1	0.576	0.394	0.573	0.604	0.556	0.625	0.83
Responsibly decision-making				1	0.475	0.530	0.508	0.488	0.558	0.68
Belief in reasoning					1	0.375	0.310	0.375	0.425	0.70
Decision-making based on reasoning						1	0.484	0.474	0.519	0.75
Factors influencing decision							1	0.539	0.536	0.74
The effects of the decision								1	0.550	0.68
Professional thinking									1	0.67

to designing and psychometric testing of MCMR questionnaire for the medical group. Although this issue is the strong point of this study, it cannot make the comparison of this instrument with other similar instruments. Content validity of the questionnaire was evaluate by experts in the areas of moral reasoning and medical ethic and instrument development based on the experts' comments which is one of the best methods of collecting evidence in support of an instrument (Rubio, Berg-Weger, Tebb, Lee, & Rauch, 2003).

The reliability of the instrument is another criterion indicating the quality of instrument. MCMR has internal consistency and acceptable stability. The reliability increases the potential of a study for discriminating the differences and the significant relationships. The construct validity of this instrument performed through parallel analysis suggests its 10-factor properties and included error management, fulfilling the patients' needs, observing morality and dignity of the patient, making the patient satisfied, responsibly decision making, believing in reasoning, making decisions based on moral reasoning, the effective factors influencing the decision, the consequences of the decision and professional thinking.

One of those factors was error management which the participants emphasized on expressing the faults to patients and their families, taking the best time for expressing errors, explaining the unintentional errors and caring for the patients' benefits to manage errors. People can make the best action and decision based on their reflections, experience and mistakes and get reputation in society (Guraya, Guraya, & Almaramhy, 2016).

**TABLE 7** Correlation coefficient and *p* value between MCMR and two variables of sympathy with patient and moral sensitivity

Variables	Correlation coefficient	<i>p</i> Value
Sympathy with patient	0.356	<0.001
Moral sensitivity	0.427	<0.001

Fulfilling the needs of patients was another factor which is highlighted in moral reasoning from the viewpoint of participants. Considering the individual and cultural differences of patients, treating the patients with respect and regarding the ethical principles, getting information carefully and precisely, paying attention to moral teachings and principles of science are amongst the ethical standards.

The enthusiasm and interest of physician in treatment of patients, physician's sensitivity to recovery, devoting adequate time to the patients, having sense of unity with patients and having the standard and proper ethical behaviors are effective in developing trust and caring for the patients' needs, in other studies (Miller, 2007) also getting patients' information in a judgement-free environment is a kind of respect (Flickinger et al., 2016a, 2016b).

Considering the benefit of patients and practicing the ethics is effective in creating positive psychological reactions such as being satisfied with work, developing motivation and having sense of competence in the medical team (Hassanpoor, Hosseini, Fallahi Khoshknab, & Abbaszadeh, 2011). Bringing satisfaction and trust in patients is the other factor in moral reasoning which is a strong component in creating a good relationship with patients who trust in their physician are more satisfied with their treatment (Flickinger et al., 2016a, 2016b). The qualitative and quantitative results of studies performed in China indicate that this trust in helpful for doctors (Xie, Qiu, & Zhang, 2009). Also, studies suggest that knowledge, skill and attitude of medical team are not adequate to create relationship and involving the patient in making decision, so conducting the educational programs and preparing the manuals are essential (Visser, Deliens, & Houttekier, 2014). Responsibly decision making is another factor in this study, accordingly, the participants consider their professional duty, ask help from others in case of inability to do their assigned tasks and prioritize the rights of patients for continuing treatment till the last days of their life.



**TABLE 8** MCMR items before doing construct validity: Investigating thinking in moral reasoning

No.	To what extent you agree to the effectiveness of items in reasoning and decision-making manners	Completely agree	Agree	No idea	Disagree	Completely disagree
1	I know listening attentively is important for giving information to the patients and assisting them					
2	I consider the individual differences of patients in communicating with them					
3	I know speaking to the patients can help them choose better treatment method					
4	I know that placing my trust in patients (as a physician) makes them follow the medical orders well					
5	Moral teachings effect on considering the moral standards					
6	I regard costs imposed upon my patients					
7	I consider the involvement of moral principles in my decisions my duty					
8	I am not allowed to label my patients.					
9	I get the subjective questions of my patients while interacting with them					
10	Putting my trust in others causes the stability of my professional position					
11	In my decisions, I care about not blemishing my professional image					
12	In my decisions, I find the cultural differences of patients efficient					
13	I pay more attention to considering moral standards in my job					
14	My income effects on my professional decisions					
15	My expressions effect on the extent of patients' cooperation and accompaniment					
16	Supporting the organizational structure of my workplace effects on risk-taking of my decisions					
17	I know that discontinuing the treatment of incurable patients is not allowed legally					
18	I pay attention to merely strict and inflexible decisions					
19	I know that the legally assignment caring responsibilities must be based on the experiences of individuals					
20	I pay attention to the financial status of my patients while choosing the treatment methods					
21	I know that patients are prioritized legally based on the severity of their illness					
22	I consider that there are not any troublesome consequences in my decisions					
23	I know that individuals who are in specific conditions, have their own principles in making decisions					
24	The more experiences I get, the broader my views will be					
25	Differences among the systems in different hospitals effect on my decision-making process					
26	My ideology effects on my moral decision-making					
27	I know that cultural conditions in society effect on considering the moral principles					
28	I pay attention to the fact that in non-religious viewpoint, considering the principles in medical ethics is important					
29	Providing services to the patients is a kind of intellectual promotion for me					
30	Due to the rights of patients upon the therapist, I pay attention to observing the scientific and moral principles					
31	In my decisions, I pay attention to God, Patients, Myself and the environment					
32	In ambiguous and imperceptible cases, I will review them in details again through stopping the decision-making process					
33	I know the role of patients' companions in different diseases					

(Continues)

TABLE 8 (Continued)

No.	To what extent you agree to the effectiveness of items in reasoning and decision-making manners	Completely agree	Agree	No idea	Disagree	Completely disagree
34	If the patients cannot afford the treatment costs, I think of other financial supporters such as charities and donors					
35	Patients are deserved to know their conditions					
36	In informing the patients about his health state I consider the cultural conditions in society					
37	In informing the patients about his condition, I pay attention to his/her personal roles such as motherhood, fatherhood and so on					
38	I know that patients are deserved enduring treatment until the last days of their life					
39	In case of discontinuing the treatment of incurable patients, I need the satisfaction of patient or his father					
40	I know that sometimes, providing the benefits for the patients may cause tension					
41	I consider the availability of healthcare services in case of providing them					
No.	To what extent you do the bellow items in reasoning and decision-making for patients?	Too much	Very much	No idea	little	Too little
42	I try to place trust in the patient and his family through my knowledge and skill					
43	I always build trust in patient through my honesty					
44	I care about the patient's trust in medical team					
45	With all due respect and understanding the patient's state of health, I make him satisfied					
46	By controlling and assessing my actions, I make the patient satisfied					
47	I try to be tolerant in dealing with my patients					
48	I care about my professional duties and medical oath					
49	I make sure of the correctness of everything before taking any action					
50	Being anxious and worried about the consequences of my professional faults makes me not report them					
51	I try to care about my, colleagues' and also patients' benefits in decision-making					
52	I inform the patient in case of uncertainty about choosing the treatment method					
53	If necessary, I get help from the medical team to prevent damage to my patient					
54	I will fulfil my duties even if they are not pleasant					
55	I do my best to make my patients satisfied					
56	I do not make a judgement in whatever I did not involve into					
57	In order to prevent the legal consequences of work, I inform the patient about the actions and consequences					
58	I defend the rights of patient in any condition					
59	I respect the right of independence and choice in patients					
60	I treat all patients equally with respect due to dignity and human commitment					

(Continues)

**TABLE 8** (Continued)

No.	To what extent you do the bellow items in reasoning and decision-making for patients?	<i>Too much</i>	<i>Very much</i>	<i>No idea</i>	<i>little</i>	<i>Too little</i>
61	I pay attention to the rules of medical centre with regard to taking the principle of confidentiality into consideration					
62	Good interaction with the patient makes me give bad news easily					
63	Through interacting with the patient, I make him more satisfied with the treatment					
64	I get help from my patients' religious beliefs					
65	In order to have more cooperation with the patient, I do my best to boost his/her morale					
66	I get help from the past useful strategies for solving the present problems					
67	Through consulting with my experienced colleagues, I abate the legal consequences of my decisions					
68	I involve the patient in my decisions over time and through getting experiences					
69	I refer the patient to the specialist if the treatment affairs are not related to my specialty					
70	Through acquiring experiences, I learnt to decide based on the scientific principles					
71	I try not to let my past unpleasant experiences in making my best decisions					
72	Before making every decision, I ask myself what important thing I am going to do for my patient					
73	If I cannot visit my all patients, I get help from my colleagues					
74	If I guess the possibility of my personal harm, I will back out of my position					
75	To make the best decision, I strike a balance between the values governing my society and my own values					
76	I pay attention to the humanitarian services to my patients					
77	I accord the request of my patients with my religious basics					
78	I have God in my mind for doing the moral basics					
79	Interviews, observation and non-verbal communications help me with formation of the mental patterns related to my moral reasoning					
80	I always take my faults into consideration when I make decisions for my patients					
81	My decisions for the patient always accompany the adequate reasoning for myself					
82	To analyse the data collected from my patient, I use my own mental structure					
83	Using my mental structure, I apply the controlling points to minimize mistakes					
84	I inform the patients and his family about their stage of illness					

(Continues)

TABLE 8 (Continued)

No.	To what extent you do the bellow items in reasoning and decision-making for patients?	<i>Too much</i>	<i>Very much</i>	<i>No idea</i>	<i>little</i>	<i>Too little</i>
85	If the disease is contagious, I inform the companions of patients according to the national standards					
86	In case of choosing the less expensive treatments, I assure the patient's family					
87	I get help from the patient in case of informing his family about his state of health					
88	In order to raise the patient's morale, I tell the truth about his condition clearly and according to the scientific basics					
89	If necessary, I introduce the ways of diagnostic certainty to the patient and his family					
90	In critical conditions, I do not wait for the patient's decisions with my all great efforts					
91	I do my best to make my patient comfortable					
92	If necessary, I change the standard treatment programs					
93	I rethink about what I did to my patients after taking therapeutic actions					
94	I just think of the patient's benefits while choosing the treatment and caring method without regarding to the therapeutic pressures					
95	I take the quality of done tasks for all my patients into consideration					
96	I respect the expectations of my patient regarding the proper behaviour towards him/her					
97	I do my best to make the patient feel comfortable about being with him/her					
98	I put myself in patient's shoes while making decisions					
99	I compensate patients for the faults upon them					
100	I prevent my bigger faults from happening through expressing my mistakes honestly					
101	At the patient's request, I express my mistakes to him/her					
102	By explaining unintentional medical errors, I help place the patient's trust in humanitarian behaviour of medical team					
103	I inform the patient's family about my mistakes					
104	I inform the high ranking officials about my mistakes					
105	I find a proper time for expressing my mistakes to the patient					
106	I respond to my patient's request for help					
107	By facilitating the conditions of environment, I pave the way for making my patients express their needs					
NO.	To what extent you do agree with below items in reasoning and decision-making for patients?	<i>completely agree</i>	<i>Agree</i>	<i>No idea</i>	<i>Disagree</i>	<i>Completely disagree</i>
108	Mental conditions and fatigue effect on my decisions					
109	I am not worried about the affairs I do for good intentions					
110	Fulfilling my patient's needs is important for me					
111	I am perfectly happy about helping my patient					

Also, belief in reasoning is another factor in this study as respecting the patients' religious beliefs, according to the patients' request with personal belief and attitude and prioritizing the rights of patients are known as prominent points in moral reasoning for patients. Studies suggest that culture, beliefs, religious values, philosophical principles and ethical, economic, environmental, political and individual frameworks are among the effective factors in the process of ethical decision making in medical profession (McAlpine et al., 1997; Safaeian, Alavi, & Abed, 2013).

Participants found that applying the mental structure, analysis and reflection in decision making are important points in moral reasoning because through potential of analysis and using the logic, reasoning will be done (McLeod-Sordjan, 2014) and with self-regulatory and self-assessment skill, the metacognitive insight, application of cognition (critical thinking) and meta-cognition (retrospective thinking) in clinical reasoning will be strengthened (Frisch, 1987; Kuiper & Pesut, 2004; Pesut & Herman, 1992). The eighth factor effecting on the decision is keeping the reputation of the profession and not having the legal consequences of work, maintaining the position, considering confidentiality, availability of treatment and comprehensiveness of decision are the cases effective from the participants' viewpoint. As Goethals states, the individual and environmental factors such as profession values, experience, knowledge, skills, beliefs and environmental factors such as beliefs and experiences of other colleagues, the physician and family of the patient, the rules and regulations and medical guidelines effect on the moral decision making (Goethals et al., 2010). Doane, Pauly, Brown, McPherson, (2004), finds the manner of behaving with people and profession important (Numminen & Leino-Kilpi, 2007). Of course, with getting more experiences in work, the moral aspects are more considered and the problem solving will be done potentially (Borhani, Abbaszadeh, Mohamadi, Ghasemi, & Hoseinabad-Farahani, 2017). According to the factor of decision effects, fulfilling patient's benefits, organizational structure of the workplace, the effect of expressing facts on personal roles were proposed in this study. Based on the ethical theories, involving profitability into decision making make the physician pay attention to the consequences of work based on the duties, rules and his own responsibilities (Tsai & Harasym, 2010). The tenth factor was professional thinking, accordingly, fulfilling patient's needs, truth-telling, respecting independence, helping the patient and trying to make decisions were the themes of moral reasoning from the participants' viewpoints. Studies suggest that transparency and telling truth to the patients cause better decision making (Lyon, McCabe, Patel, & D'angelo, 2004). Also, telling truth is considered as respecting to the patient and maintaining his dignity which brings the sense of dependence and ability in patient (Flickinger et al., 2016a, 2016b).

It seems that developing a curriculum for training ethics and ethical reasoning and a frequent review of educational curriculum, assessing students and choosing appropriate teaching methodology is an important step for strengthening their moral reasoning. Holding clinical conferences with students' rethinking on their clinical experience is one of the effective methods in this regard. Considering the assessment and quality of educating the ethical issues makes students ready

to face clinical problems and gives them the opportunity to strengthen it in the learners by the professors during the period of study (Park, Kjervik, Crandell, & Oermann, 2012; Tuveson & Lützn, 2017).

## 6 | CONCLUSION

MCMR with acceptable validity and reliability is used for the assessment of students' ability to analyze the clinical positions along with ethical codes. These instruments aid teachers in designing Medical ethics education and moral reasoning. One of the strong points of this study is designing the instruments according to the Iranian culture and teachers'/students' experiences, which the face and content validity of this instrument were assessed in this society. Moreover, as this kind of instrument is newly-designed in medical field, further studies such as Confirmatory factor analysis are needed for manner of responding and using its results.

### 6.1 | Limitation

One of the limitations of this study was that some teachers and students refused to participate in the interview. Also, to quantify the validity, two other questionnaires were handed out and filled out in a self-reporting mode at the same time which can lead to fatigue. Moreover, failing to do the Confirmatory Factor Analysis could not make the exact correlation between the factors possible which is predictable during the developing process of tool designing.

### CONFLICTS OF INTEREST

There is no conflict of interest for the present study.

### AUTHOR CONTRIBUTIONS

FK and NK: study design and concept. AU: literature review, performing the study and writing the first draft, NY: statistical analysis, drafting, FK: drafting.

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