

Knowledge Questionnaire on Home Care of Schizophrenics (KQHS): Validity and Reliability.

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Abstract

The number of questionnaires developed by nurses has increased in recent years. While the rigor applied to the questionnaire development process may be improving, there is a need for those who develop questionnaires to be skillful. This paper reports the process of development of a Knowledge Questionnaire on Home care of Schizophrenics (KQHS) which is a part of a larger study. The KQHS is developed with an aim to determine the knowledge of primary caregivers on home care of schizophrenic patients. It is a self-administered 32 item multiple choice questionnaire that quantifies four aspects of home care, i.e, meaning, cause, signs and symptoms of schizophrenia and care of schizophrenics. Review of literature, preparation of blueprint, development of the items, validity, pretesting and reliability were the steps used in the process of its development. After establishing the content validity, the KQHS was pretested. Split half technique (odd-even) was used to determine coefficient correlation using Karl Pearson formula, following which the Spearman's Brown Prophecy formula was used for establishing the reliability $r_{(20)}=0.92$. Item analysis was computed to assess performance of individual question and it revealed overall good results with value for item difficulty ranging from 20 to 80 percentage and item discrimination index of above 0.2. The KQHS is a brief and simple-to-use instrument, which is valid and reliable. It is suitable for assessing the knowledge on home care of schizophrenic patients among primary caregivers.

Keywords: Knowledge Questionnaire, Item analysis, Validity, Reliability, Caregivers, Schizophrenia, Homecare.

1. Background: According to the World Health Report (2001) schizophrenia is a severe disorder that is characterized by distortions in thinking and perception and by inappropriate emotions. It follows a chronic or recurrent course with residual symptoms and incomplete social recovery. An estimated 24 million (1%) people worldwide suffer from schizophrenia (WHO, 2011). Schizophrenia not only influences the lives of those affected, but also those around them especially their caregivers (Srinivasamurthy, 2011). Recently, the trend of involving the families actively in the care of mentally ill persons has shown a decline in the relapse of the condition. (Talwar and Matheiken, 2010). Schizophrenic patients are usually not considered responsible for their own actions. When discharged from hospitals, they are managed at home by their caregivers and are followed up at consultation clinics for maintenance of treatment and assessment. The treatment is more effective when caregivers are equipped with adequate knowledge related to schizophrenia (Nanawar and Kebai, 2004). Meleis, Im, Sawyer, Hilfinger Messias, and Schumacher (2000) pointed out that various factors might influence the client outcome in the community, such as the family caregivers' preparation and knowledge and the availability of community resources. If caregivers do not have adequate knowledge and support, they might not be able to take up the responsibilities of caring for the ill persons, thus leading to relapse or readmission. It is essential to identify the existing knowledge among primary caregivers of schizophrenic patients with valid and reliable tools. The KQHS is one such tool developed by the authors.

2. Method: Development of a valid and reliable questionnaire involves several steps taking considerable time. The sequential steps involved in the development of knowledge questionnaire used in the present study are represented in Figure 1.



Figure. No.1: Sequential Steps used in the Development the KQHS.

2.1 Review of literature: Burns & Grove (2002) stated that review of literature is a review of studies conducted to generate what is known and what is not known about a problem and to determine whether knowledge is ready for use in practice. A literature search was performed using PubMed, CINAHL, books, reports, articles, periodicals, published and unpublished research studies and mass education media. The purpose of the review was twofold: (i) to find an existing instrument to assess the knowledge of primary caregivers on home care of schizophrenic patients. (ii) to provide a comprehensive background for understanding current knowledge and highlighting the significance of new research for the development of tool (Cronin, Ryan, Coughlan, 2008). The existing instruments reviewed were Knowledge About Schizophrenia Questionnaire (KASQ) for patients developed by Ascher-Svanum (1999) and Knowledge About Schizophrenia Interview (KASI) for patients developed by Barrowclough, Tarrier, Watts, Vaughn, Bamrah, Freeman (1987). On reviewing the literature, the authors found that the existing instruments were not appropriate for assessing the knowledge of primary caregivers on home care of schizophrenic patients. Therefore, this instrument KQHS was developed. The review helped the authors to plan the content matter of the tool. Following the review, the blueprint was prepared.

2.2 Preparation of the blueprint: Blueprint is a guide in the development of a questionnaire (Anderson and Morgan, 2006). It is also considered as the foundation for the questionnaire (Haladyna, 1999). After the literature search, the authors prepared a blueprint to facilitate a guide for item construction. The blueprint is useful for guiding the work of the item writer so that sufficient items are developed at the appropriate level to test important content areas and objectives (Oermann and Gaberson, 2009). The KQHS developed for primary caregivers consisted of five areas that is meaning, causes, signs, symptoms and home care of schizophrenic patients. The home care is again divided into eight sub areas that are personal hygiene, nutrition, medication, social involvement, management of delusion and hallucination, recurrent admission and expressed emotions. (Table. No:1).

2.3 Development of the items: The items were developed on the basis of the blueprint. The authors considered all factors that contribute to the quality of the test items and chose to use the MCQ format for the questionnaire. MCQs is an efficient means of knowledge assessment particularly in well defined subjects that do not change with time (O'Dwyer, 2007). It is often used to measure knowledge as an endpoint in nursing research and education, usually in the content of testing an educational intervention. The multiple choice format was chosen because such items are less time consuming and easier to complete and scoring and processing is simple. This format is chosen instead of true or false to eliminate guessing and indicates that it is the only way to lower measurement error (Polit & Beck, 2008). Further, the stems of the items were constructed in question format, clearly in such a way that the caregiver would be able to answer even without looking at the options. The option includes one key and three plausible incorrect options called distracters.

While preparing the draft of the knowledge questionnaire the wording of each question for clarity, sensitivity to respondent's psychological state, absence of bias and reading level were considered. The draft was critically reviewed by the authors, after which it was content validated by experts.

2.4 Content validity: According to Kerlinger (1986) content validity is representative of the content. Content validity of an instrument depends on the adequacy of a specified domain of content that is sampled. To determine the field of content validity, the KQHS along with its blueprint and criteria checklist were submitted to three experts from the field of Psychiatry and four experts from the field of Psychiatric Nursing. The KQHS was validated twice in terms of percentage of agreement. In the first validation, of the 30 items in the KQHS, 28 items had 100% agreement among experts and two items had only 20% agreement and it was modified as per the suggestion given by the experts. All items were retained and two more items related to the content area "expressed emotions" was added as per the suggestion given by them. The modified tool was subjected to

content validity for second time, by submitting it to five experts. There was 100% agreement among experts, on all items of the tool.

Content Validity Ratio (CVR) was calculated to quantify the extent of experts' agreement. The five point rating scale ranges from "strongly agree" to "disagree". The items that had responses as "strongly agree" and "agree" was considered that the item is "essential" and the items that had responses as "strongly disagree" and "disagree" was considered as "not necessary". Those items which the experts had responded to as "uncertain" was considered as the item which is "useful but not essential".

CVR was calculated using the formula developed by Lawshe (1975):

$$CVR = (n_e - N/2) / N/2$$

CVR= is a direct linear transformation from the panel list saying "essential"

n_e = is the number of the panel list indicating "essential"

$N/2$ = total number of the panel list divided by two.

CVR values range from +1 to -1. Values closer to +1 indicate experts' agreement that the item is essential to content validity. Lawshe concluded that a CVR of atleast 0.99 would be necessary with seven experts or fewer subject matter experts (Shultz, Whitney, 2005). The CVR for KQHS was +1 indicating that the items are essential to content validity.

After the content validity, the KQHS was translated into Kannada language, the regional language by language experts and retranslated to English for establishing language validity. No modifications were made in the tool after translation and retranslation. The tool was then pretested.

2.5 Pretesting: Pretesting the questionnaire is an essential step before establishing reliability. The purpose of the pretesting is to enhance its clarity and to ensure acceptance of the study by the participants and also to check question wording. It is the trial administration of a newly developed instrument to identify flaws or assess the time requirement (Polit & Beck, 2008). After obtaining formal administrative permission, the Kannada version of the tool was administered to five primary caregivers of schizophrenic patients in a selected hospital. This was done to determine the clarity of the items and the average time required for completing the tool. The KQHS was found to be clear and understandable to the subjects. The average time taken to complete the tool was approximately 30-35 minutes. The reliability of the KQHS was established after the pretesting.

2.6 Reliability of the KQHS: Reliability refers to the degree of consistency or accuracy with which an instrument measures the attribute it has been designed to measure. It refers to the ability of a questionnaire to consistently measure an attribute and how well the items fit together, conceptually (Haladyna 1999; DeVon et al.2007). To establish reliability using split half method the KQHS was administered to 21 primary caregivers of schizophrenic patients. After scoring, the tool was divided into two equal halves with the odd and even number of questions. Correlation of the test was found by using the Karl Pearson correlation coefficient formula and Spearman Brown Prophecy Formula was used to compute the reliability of the whole test.

Karl Pearson correlation coefficient was computed using the formula:

$$r = \frac{N\sum xy - (\sum x - \sum y)}{\sqrt{N \sum x^2 - (\sum x)^2} \sqrt{N \sum y^2 - (\sum y)^2}}$$

Spearman Brown Prophecy was calculated using the formula:

$$r^1 = \frac{2r}{1+r}$$

Reliability coefficients range from zero to one (Catts 1978, Beanland et al 1999). The closer the reliability coefficient is to one, the more reliable the research instrument. A reliability coefficient of 0.7 or greater is generally considered acceptable (Beanland et al 1999). The r^1 value of the KQHS was 0.92 and it indicates that the questionnaire was reliable.

According to Guilbert (1989), item analysis is the process of collecting, summarizing and using information from responses to assess the quality of test items. Item difficulty index and item discrimination index are two parameters which help to evaluate the standard of MCQ questions. The item difficulty index determines the percentage of participants who selected the correct answers for that question. It is calculated using the formula:

$$\text{Difficulty index} = \frac{H + L}{N} \times 100$$

Where, H is the number of correct responses in the high group, L is the number of correct responses in the low group, and N is the total number of responses in both groups (which includes both correct and incorrect responses). An item is considered difficult when the difficulty index value is less than 20 and the item is considered easy when the difficulty index value is greater than 80.

The item discrimination analysis examines how each MCQ is related to overall test performance (Nunnally & Bernstein 1994 and Haladyna, 1999). Guilbert (1989) describes it as the way an item differentiates respondents who know the content from those who do not. The item discrimination index (DI) is calculated using the formula:

$$\text{Discrimination index} = \frac{2 \times (H-L)}{N}$$

Where , H is the number of correct answers in high group, L is the ,number of correct answers in low group,
N is the total number of respondents in both groups. The items with a discrimination index above 0.35
is considered as excellent, between 0.25 to 0.34 is considered as a good question, the items with the DI that
ranges between 0.15 to 0.24 is considered marginal question and the items under 0.15 is considered as poor
question that will most likely be discarded.

Item analysis was performed on the 32- item KQHS. All items had the item difficulty value that ranged
between 20 and 80 percentage indicating appropriate difficulty value. The discrimination index calculated
showed the items were either excellent or good. Twenty six items had a DI of above 0.35, which showed that
they were excellent items. The remaining six items had a DI between 0.25 and 0.34 which indicates that these
items were good. (Table No:2). Therefore, all 32 items of the KQHS were retained without any modifications.

2.7 Description of the final KQHS: The final KQHS had 32 MCQs in four areas, that is (i) meaning (ii) causes
(iii) signs and symptoms (iv) care of schizophrenic patients. The fourth area was further divided into eight sub
areas that are personal hygiene, nutrition, medication, social involvement, management of delusion and
hallucination, recurrent admission and expressed emotions (Appendix 1). One mark was scored for a correct
answer, and no marks for an incorrect answer. There was no negative marking. The score for this scale ranged
from 0-32 which was classified as levels of knowledge, that is very good (27-32), good (19-26), average (13-18),
poor (7-12), and very poor (0-6). (Table No:3)

3. Conclusion: In this article, the authors have presented the sequential steps of development of knowledge
questionnaire on home care of schizophrenics. This KQHS is a new instrument which has 32 items useful to
obtain factual information on home care of schizophrenic patients among primary caregivers. The KQHS is a
valid and reliable tool

4. Conflict of interest: None

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statistical inputs.

Table No.1: Blueprint of KQHS Developed for Primary Caregivers.

Content	Knowledge	Comprehension	Application	Total no of questions	Percentage
Meaning	1 (1)	2 (3,4)	--	3	9.37
Cause	1 (2)	--	--	1	3.12
Signs and symptoms	--	2 (5,6)	--	2	6.25
Care of schizophrenic patients :					
A Personal hygiene		3 (7,9,10)	2 (8,11)	5	15.62
B Nutrition		2 (12,14)	1 (13)	3	9.37
C Medication	1 (18)	1 (16)	4 (15,17,19,20)	6	18.75
D Safety measures		1 (23)	2 (21,22)	3	9.37
E Social involvement		1 (25)	1 (24)	2	6.25
F Management of delusion and hallucination		3 (26,27,28)		3	9.37
G Recurrent admission		2 (29,30)		2	6.25
H Expressed emotions		2 (31,32)		2	6.25
Total no of questions	3	19	10	32	99.99
Percentage	9.37	59.37	31.25	99.99	99.99

Table No. 2: Item Difficulty and Discrimination index Analysis of the KQHS

Item Number	Item Difficulty (%)	Discrimination index
1	28	0.57
2	78	0.42
3	50	0.71
4	35	0.42
5	85	0.28
6	42	0.28
7	71	0.57
8	71	0.57
9	35	0.42
10	78	0.42
11	35	0.28
12	21	0.42
13	21	0.42
14	64	0.28
15	64	0.71
16	64	0.71
17	71	0.28
18	42	0.85
19	57	0.85
20	64	0.42
21	21	0.42
22	21	0.42
23	21	0.42
24	28	0.57
25	57	0.57
26	28	0.57
27	35	0.71
28	28	0.57
29	42	0.57
30	78	0.42
31	28	0.28
32	28	0.57

Table No.3: Distribution of Knowledge Scores of Primary Caregivers on Home care of schizophrenic patients.

Level of knowledge	Allotted scores	Percentage
Very good	27-32	82-100
Good	19-26	57-81
Average	13-18	38-56
Poor	7-12	20-37
Very poor	0-6	0-19

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Appendix – 1

If a researcher wants KQHS can contact the correspondence author.

Sample items from the Knowledge Questionnaire on Home care of Schizophrenics (KQHS)

- 1) What is schizophrenia?
 - a) A serious illness that affects the brain and mind
 - b) A disorder that causes disturbances in reasoning and memory
 - c) A condition that causes severe confusion
 - d) A disease that affects intelligence
- 2) Which of the following is a cause for a person to get schizophrenia?
 - a) Imbalance of brain chemicals.
 - b) Bacterial infection.
 - c) Evil spirit.
 - d) Curse of God.
- 3) Which of the following is NOT affected in a patient with schizophrenia?
 - a) Ability to think.
 - b) Awareness of place, person and time.
 - c) Consciousness.
 - d) Lifestyle.

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