Research Note

Scoping Review on the Application of DCE in Health Sector Research in Low- and Middle-Income Countries

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Ⅰ Introduction

The use of discrete choice experiment（DCE）in health sector research in low- and middle-income countries（LMICs）remains recent but is rapidly increasing. DCE is a quantitative method to elicit preferences that assumes individual decisions about a good or service are determined by the attributes or characteristics of that good or service [1-3]. Consequently, DCE is considered to be a useful tool for obtaining peoples' views on specific issues and, if the study results are appropriately communicated to policy makers, DCE allows people's views to be considered in policy making [4]. This scoping review aims to identify the extent to which the DCE has been applied in health sector research in LMICs and assess the potential for DCE studies to play a role in health sector research while also considering the limitations of the approach. The paper also attempts to identify features of DCE studies in LMICs that are specific to the context and that should be considered in future DCE research in LMICs.

Ⅱ Methods

A combination of:（1）citation database searches（PubMed and Econlit）;（2）consultation of review papers on the relevant topics; and（3）review of the bibliographies in the papers identified in the previous search strategies identified 75 documents（both peer reviewed journal articles and grey literature）reporting research that applied DCE to health sector research in LMICs. These documents were reviewed in terms of background information, attributes, experimental design, survey administration method, and estimation procedure. In addition, the review looked at study design features, including the use of qualitative approach, that were utilised to address contextual issues when DCEs were undertaken in LMICs.

Ⅲ Summary of findings

Areas of the DCE application

The use of DCE in health sector research in LMICs remains recent, and largely confined to the last decade: all of the papers identified except Chomiz（1998）[5] were published after 2005. Moreover, 66 of the 75 papers were published after 2010.

The application of DCE in health research in LMICs is limited to certain areas, such as the motivation and retention of the health workforce（job choice, 28 of 75 papers）[5-32]. The application of DCE to examine patient preferences in health service delivery has increased over the last five years, including for categories

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such as contraceptives, facility child birth, HIV programmes, quality of health serrices, and health provider choice [33-63]. DCE was also used to examine the relative importance of different criteria for priority setting [64-68], prevention and health promotion programmes [69-73], and assessment of the health worker resistance to new interventions [74]. DCE was used to examine health care financing issues including provider payment mechanism preferences for community based health insurance（CBHI）[75], preferences for CBHI design schemes [76], and benefit entitlements for mandatory health insurance [77]. In addition, two studies used the results of DCE in the economic evaluation of interventions for health worker retention [78, 79].

While the most studied cadres in DCE studies on job preferences in LMIC was medical students and clinicians [5, 10, 12, 13, 15, 18, 28, 29, 31, 32], an increasing number of studies look at the job preferences of nurses, nursing students, midwives [6, 8, 9, 11, 14, 17, 20], and a mix of various health professions [16, 19, 21, 26, 30]. Two studies applied DCE to examine the motivation and retention of community health workers（CHWs）[22, 25].

Of the 75 DCE studies identified, 43 were undertaken in Africa; 21 in Asia; six in Latin America; and one in the Middle East. Two cross-country studies looked at more than two countries in Africa; [44, 58] one study included countries in both Asia and Africa; [9] and another studied countries in Asia, Africa and Latin America [67]. Of the studies in Africa, only four DCE studies were undertaken in Francophone Africa [21, 26, 37, 75]. Recently, there are an increasing number of DCE studies undertaken in the health sector in East Asia [32, 54, 56, 72, 82].

Attributes and attribute levels

The number of attributes included in the studies ranged from four to eight with an average of six. In addition to a review of relevant literature, most of the studies employed a qualitative approach（such as group discussions and/or in-depth interviews）to establish attributes and assign attribute levels. A number of studies did not clearly specify the methods used to analyse the qualitative data for the development of attributes and levels.

Experimental design

All of the studies employed fractional factorial design. Orthogonal design, based on orthogonal arrays, was most commonly used before 2010, but many of the studies published after 2010 employed statistically efficient designs, known as D-efficiency designs, to generate choice sets. Most of the studies used multiple choice design; with majority of these including an opt-out choice. Four studies applied 'labelled choice' design where the options presented had specific labels（such as 'rural job' and 'urban job' instead of 'job A' and 'job B'）[9, 14, 15, 18]. The number of choice sets varied from six to 24.

Survey administration

Sample sizes ranged from 30 to 3003, depending on the study aim and objectives: studies on priority setting had relatively small sample sizes（30-152）, targeting the survey to health policy makers and mid-level health managers; and studies to elicit people's preferences for health care or quality of care used larger sample sizes（300-3003）. DCE studies with large sample sizes（i.e. more than 1,000）were undertaken as part of larger cohort studies or randomized control trials（RCTs）. Most of the priority setting and job choice studies used self-administered questionnaires. However, the use of face-to-face interviews for job choice studies increased

after 2010 [11, 12, 14, 15, 21-23, 25, 30].

Estimation procedure

The analysis of DCE data typically involves regression models that have a dichotomous or polychotomous categorical dependent variable, such as a probit, logit, or multinominal logit specification [81]. Many recent studies have applied mixed logit specifications that have relaxed the restrictions of multinomial logit models by allowing for heterogeneity of preferences for attributes by study participants [27, 32, 51, 53, 61, 62, 72, 77]. A number of studies used latent class model for analysis, which has the same advantages as the mixed logit model [28, 50, 51, 58].

Incorporation of qualitative approach

Most of the studies incorporate a qualitative approach to identify attributes that consider the study context and population. Individual interviews and focus group discussions（FGDs）are the most common qualitative approaches used when exploring attributes for consideration in DCE studies. Some studies used discussions with policy makers to identify attributes with greater policy relevance and that can realistically be implemented in the study context [44, 45, 77, 82]. Some studies used qualitative approaches to 'validate' and/or discuss the study results with people who are knowledgeable about the study context [23, 63]. There is variation in the extent to which the methodological details of qualitative approaches are described, including on the number of interviews and FGDs undertaken, and in the analysis of qualitative data.

Specific features of DCE design required due to the LMIC setting

An increasing number of studies are using pictures or graphics to visually describe choice sets, facilitate respondent comprehension of choice tasks and to stimulate interest in participation in the study [39, 42, 45, 63, 76]. In LMICs, particularly in Sub-Saharan African settings, face-to-face interviews are more commonly used to administer DCE than self-administered questionnaires, partly due to inadequate development of survey infrastructure. Some studies used more than two（local）languages to administer DCE surveys（using different language versions of the questionnaire）to cope with diversity in the study context and the population [19, 22, 34, 38, 39, 63]. Practical aspects associated with the DCE administration, including the availability of details on the study population, geographical access, security issues, etc., affected sampling strategies in a number of studies [11, 33, 63].

Ⅳ Implications for future DCE studies in LMICs

The diversity in topics studied by applying DCE in higher income countries is greater than that in LMIC settings. Literature reviews on DCE studies, including both high income countries and LMICs, indicate that DCE has been applied to examine:（1）factors relating to the patient experience;（2）health outcome valuations;（3）trade-offs between health outcomes and the patient experience;（4）estimation of utility weights within the Quality Adjusted Life Years（QALY）framework;（5）job choices;（6）priority setting frameworks;（7）health professionals' preferences for treatment options; and（8）preferences for health insurance [83]. In the last few years, an increasing number of DCE studies in LMICs have looked at more diverse health systems issues, including healthcare provider choice, health insurance benefits, HIV/AIDS programmes, treatment choices and prevention and health promotion options.

While job preferences for health professions, particularly relating to the motivation and retention of health professionals in rural areas, is the area most studied by DCE in LMIC settings, specific cadres of health professionals have been less studied, such as CHWs. In spite of the high level of policy relevance in LMIC settings, application of DCEs to examine managerial issues, such as the preferences of health administrators for certain health interventions or health professionals' preferences for certain managerial tools in creating a favourable working environment, has not been undertaken in LMIC settings to date.

Application of the DCE approach in LMIC settings requires use of specific methodological features to adapt the approach to the study context and population [84]. Features include: use of a qualitative measures to identify attributes that reflect the diversity and uniqueness of the study context; use of pictures / graphics to visually present choice sets; use of appropriate language(s) in the questionnaire; use of face-to-face interviews to administer DCE surveys; consideration of practical aspects in administering the study when determining sampling strategies. It is important to further investigate how these issues affect respondents' engagement, the face-validity of the method and subsequent study results. This is indispensable if study results are to be used to inform policy decision-making.

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